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TARNÓW 2011

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MAŁOPOLSKIEJ
WYŻSZEJ SZKOŁY EKONOMICZNEJ W TARNOWIE

PRACE Z ZAKRESU ZARZĄDZANIA

numer 1

TARNÓW 2011

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Foreword

This year's first number of a semi-annual "The Małopolska School of Economics in Tarnów Research Papers Collection" is a joint work prepared by staff and graduate students of the School as well as the employees of Cracow University of Economics, University of Economics in Bratislava, AGH University of Science and Technology, University of Agriculture in Krakow, Jesuit University of Philosophy and Education "Ignatianum" in Krakow, and Wrocław University of Technology, or people working in business.

The articles are the result of scientific work carried out under basic research and research implementation. All of them received positive reviews.

Besides traditional subject matters, such as management development organisation in its multidimensional sense, improvement of the organisation, marketing, hotel industry and recreation, computer science and information management, auditing and management accounting or human resources management, dissertations and articles in the field of sustainable enterprise development, corporate governance, territorial marketing and improvement in the students' education process were published in this issue.

The priority themes covered by this volume are establishment and innovative activities of enterprises and institutions, as well as development of innovative attitudes of young people and students.

Particularly relevant are the papers devoted to the latest regulations concerning creation of cash, self-financing of labour and the process of growth of human capital. In this trend, a description of methodology of evaluating all kinds of things (projects, processes, phenomena), both in diagnostic research and decision making, is also developed.

The volume that we hereby present to our readers is the first number of the magazine published after a reassessment of the journal by a team of experts appointed by the Minister of Science and Higher Education. Therefore, we are pleased to announce that "The Małopolska School of Economics in Tarnów Research Papers Collection" has been included on the list of journals with higher scores as provided in these publications. Articles published in semi-annuals receive 6 points now.

We would also like to report that in 2011, under the Ministry of Science and Higher Education "Index Plus" programme, the editors of "The Małopolska School of Economics in Tarnów Research Papers Collection" implement the project "Research Papers Collection Online". According to the assumptions of the project, all

papers submitted in the volume will be published in two languages: Polish (online) and English (paper and electronic). Both authors and reviewers are welcome to cooperate with us in this endeavour.

Leszek Koziol
Chief Editor

BOŻENA ALEJZIAK*

Fitness as an active form of spending free time by women of Tarnów

Key words: forms of physical recreation, lifestyle, motivation, Tarnów

S u m m a r y: Physical activity of women is an important element of a healthy lifestyle, therefore it was decided to diagnose this problem in the group of women living in Tarnów, which is an average size city in the Lesser Poland Voivodeship (Małopolska Province).

The study was aimed at determining motivation and the social and demographic profile of women participating in one of more interesting forms of physical recreation which fitness is. Popularity of its specific forms has been determined and barriers identified which significantly hindered participation in the classes. The study was conducted in 2010 with the diagnostic poll method in which the questionnaire technique has been used with the questionnaire survey used as the study tool.

The age of the questioned was determined in the research, which turned out to be highly varied, from below 20 to above 50 years of age. The participants in the fitness classes were usually women with higher and secondary education. Students and women working in education were dominant in the groups or were in free professions. Most of the participants in the fitness classes were quite well-to-do. The main reason of participation in the classes in case of over half of the women of Tarnów was improvement of physical body and appearance and improvement in mental and emotional state. The most popular form of the classes was BPU in which the highest number of women participated. Women arrived in the classes in the company of their friends or family members. Numerous barriers appeared in practising physical recreation by the women of Tarnów which hindered participation in the fitness classes. They usually were related to health, economy or lack of free time.

The study proved, on the one hand, high interest of women in participation in physical exercises, and on the other hand it allowed determining the barriers which make the above activity difficult.

* Bożena Alejziak, PhD—assistant professor at the Chair of Tourism and Recreation, Małopolska School of Economics in Tarnów.

1. Introduction

Life in modern world, despite many facilitations, needs special care to remain healthy, and that is why the issue of health is recurring more and more often these days. Many studies conducted in recent years show that the Polish population does not fare best compared with many European countries, for example Scandinavian (1; 2, p. 109 et seqq.). Participation in regular physical activities is an important element of healthy lifestyle which is determined by many factors, such as: lifestyle, education environment, income, social status, education and many more. Additionally, participation in physical activities is always connected with free time, that is the time for personal use after meeting all professional, family, home, and educational duties, the time that may be spent in any classes of choice, autotelic, pursuing one's own hobbies (3, p. 39).

Women start appreciating benefits of physical activities more and more often. The now popularised slim and fit body as the ideal of beauty mobilises many women to start working on it. The variety of recreational physical exercises in which women may take part is high, and fitness is one of the more attractive. It is understood as physical and spiritual well-being of the body achieved with conscious and healthy feeding, satisfaction with one's own appearance, taking pleasures and joy from physical exercises, which translates into satisfaction from professional work, good relations with people and active and positive attitude to the reality (4, p. 34). The term "fitness" may be understood differently, depending on the domain of reference. If the microapproach is the point of origin for defining this term, then it is regarded as a feature and attribute of the human body. If the macroapproach is the plain of reference, then we speak of fitness as strategy or lifestyle (5, p. 11).

Fitness means various organised physical exercises with strictly specified objectives and specific methodological grounds, executed most often in the form of group classes with properly selected music and instruments. It features non-sport nature, comprehensive nature (the possibility of adjusting exercise parameters to individual needs of each participant, irrespective of age, current health, or physical fitness), social nature (conducive for social contacts, relatively low price, common availability (a participant is not obliged to have any individual equipment necessary for exercises), universal application (it may be used practically throughout life and this is its basic difference from other recreational or sport forms (3, p. 92).

According to Dorota M. Opoka, fitness as a method of spending life provides physical, emotional and mental flexibility, and it may give the feeling of independence, help reach high quality of life, it releases freedom and natural behaviour, and is a way to generate energy by the human body, develops and enhances power to undertake daily action, and is a means for delaying ageing processes, ensures optimum functioning of the body's organs and systems. Properly functioning body becomes a source of joy of being and helps doing daily activities without much effort. Participation in fitness classes has many values (6, pp. 23–27):

- learning (discovering physical, mental and emotional possibilities of the human being);
- educational (perceiving the value of the body of another, maintaining and developing human relationships, building platforms connecting generations);
- therapeutic (reducing symptoms and eliminating metabolic disorders, fear conditions, chronic fatigue symptoms, a panacea for many ailments characteristic of the modern civilisation);
- preventive (maintaining balance and reducing the possibility of origination of civilisation diseases);
- hedonistic (a source of joy, the feeling of personal happiness and satisfaction).

Fitness is a good form of physical activity in each stage of human life, specifically because everyone may select exercises for himself/ herself depending on age, health and physical condition. Its leading objective is to ensure harmonious functioning of the human body, which is the source of quality of life. For both young and old people, it is the method to learn one's possibilities without exposing to unfavourable side effects. Properly conducted and systematic training includes all areas of personality of the exercising person. The prospective trainee gains many benefits from participation in fitness exercises. It can compensate lack of exercise, neutralise stresses and psychological overloads, regenerate physical and psychological forces, develop the body, personality, social relationships, that is regulate standard daily activity (7, pp. 11–20).

2. Research methodology

Considering the benefits from undertaking various forms of physical activity, especially by women, the decision was made to diagnose this problem in the city of average size that Tarnów is.¹ It is commonly known that higher care about one's own health is usually displayed by residents of large cities. It is the result of their higher awareness in this respect, and more expanded infrastructure also contributes to it. Tarnów is the second largest city in Małopolska, now with about 115,000 residents. Several fitness clubs are active in the city area. These are: Studio Fitness Dynamica, Ego Fitness dla Kobiet (the oldest one, in operation since 1985), Studio Fitness Tarnów (Tarnowskie TKKF), Fitness Klub FORMA, Q10fitness & Gym, and Relax Fitness Club.

The study was aimed at determining motivation and the social and demographic profile of women participating in one of more interesting forms of physical recreation which fitness is. Moreover, popularity of its specific forms has been determined and

¹ <http://www.tarnow.pl>. [online, accessed: 2011-02-08].

barriers identified which significantly hinder the women of Tarnów from participation in fitness classes.²

To study the above issues, the main problem was formulated as follows: What is the role of fitness classes in the group of the women of Tarnów?

The above problem may be determined with the following detailed questions:

1. What is the social and demographic profile of women participating in fitness classes?
2. What are the reasons the women of Tarnów follow to participate in fitness classes?
3. What are the forms of fitness most often used by the women in Tarnów?
4. What are the main barriers which make participation in fitness classes difficult for the women of Tarnów?

It was decided that in this study the dependent variable will be participation of the women of Tarnów in fitness classes and the forms in which the women participate, the external conditions will be the independent variable, and the internal conditions will be the intervening variables. The indexes resulting from external conditions are: age, education, profession, sector of economy in which the women worked, income, health condition, company of other participants in the classes, whereas the ones that resulted from internal conditions are the reasons (motifs) for participation. In turn the barriers which make participation in the classes difficult result from both external and internal conditions. They refer to individual preferences, values, needs and health condition. In many cases they are independent of human wishes and needs.

The study was conducted with the diagnostic poll method in which the questionnaire technique has been used with the questionnaire survey used as the study tool, the survey being completed in the electronic format or in the traditional way after the end of the classes. Young women preferred electronic questionnaire survey due to its comfortable filling and lack of time, and the older women rather selected the traditional form, which was due to their inability of operating the computer.

3. Study results

The study was conducted in 2010 in Fitness Klub FORMA located in the city centre. It is one of the largest centres of this type and organises various physical exercises which are managed by professional instructors. The proposed exercises are varied in the levels of intensity, loads and forms.

² The study was run and the results were prepared by A. Musiał, the graduate in the Tourism and Recreation, the Małopolska School of Economics in Tarnów, an active participant in these classes.

3.1. Social and demographic conditions of participation of women in fitness

The study covered 100 women participating in fitness classes. The age of the questioned was very varied and covered the age range from below 20 to above 50 years of age. Most of the persons participating in the fitness classes—over a half (51%)—are young women in the age range of 20–30 years. Older women constituted a smaller group. Thus, the age range of 41–50 years accounted for 17% of the women participating in the fitness classes and 16% of them were in the age range of 31–40 years. Women in extreme age ranges constituted the definite minority. Very young women, up to 20, constituted the group of 5% of the questioned, and 11% of them were older persons, over 50. The analysis of the study results in the context of different stages of life shows that the most active were these women whose age was within the range of 21–30. Seeking explanation to this, one could believe that the above age group features quite high physical performance, not too high daily duties load, and has high awareness of their own appearance, needs, life goals and aspirations. At the same time, many of them are independent financially and can quite freely dispose of their own funds, as well as the methods of spending free time. It is also interesting that it is at the same time the stage of looking for a life partner, and the place in the labour market. This leads to the belief, propagated in the media, that attractive external appearance is an important attribute to facilitate personal and professional success. The need of taking care of external appearance is thus increasingly apparent in young women. The lower percentage of older women in fitness classes seems to result from the stereotypes, traditional upbringing, as well as the myth of “a Pole mother” perpetuated over a long period of time in this country, that is a woman cultivating family traditions, first taking care of the good and needs of the family, and putting her own good in the end. Such women used to sacrifice, resigned of their needs and ambitions for which they lacked strength and time, anyway. Low commitment to physical activity in the Polish women is confirmed with the study by Barbara Woynarowska and Anna Wojciechowska (8, p. 23), where it was found out that only 6% of the Polish women preferred active forms of recreation (e.g. swimming, jogging, bicycle riding). Beata Maj reports that “despite transformations in awareness, a large portion of the population still observes the belief that an adult woman, from her childhood prepared to perform the roles of wife and mother, should not practise sport. The phenomenon of different social acceptance as regards participation of women and men in sport forms of exercises should be regarded highly unfavourable from the point of view of development psychology. It is the effect of the mother on developing hobbies and rest habits in children which is usually perceived as more significant.” Thus, the active method of spending free time has not only a personal, individual dimension, but a considerably broader one, social (9, p. 29 et seqq.). The method of upbringing women who at present are 40–50 was far from the modern stream of developing social awareness known at present under the name of “well-

ness” (good feelings and physical condition). It consists in using fully one’s own possibilities, pursuing optimum functioning in modern life, the feeling of satisfaction with life, seeking autonomy in achieving one’s own goals, avoiding hazards which degrade health condition. Additionally, from the historical point of view, the “ideal” feminine body was considerably different from what media emphasise nowadays and it may also be a reason why the group of older women constitutes minority only (10, pp. 20–24). Also, the women in this age are most burdened (apart from professional duties) with family obligations, thus the amount of personal free time is considerably reduced. In lack of earlier formed habits, women usually first resign of the activities important for themselves, in which they participate for their own pleasure and satisfaction, all in favour of the time dedicated to the family.

Education is another factor determining participation in fitness classes. As Barbara Marciszewska has noticed, “the choice of recreation and sport services as a form of spending free time by persons with higher and secondary education probably results from more conscious choice of activities undertaken in free time with a view for prospective benefits for psychological and physical health” (11, p. 150). Thus participation in physical exercises is increasing with the level of education. No doubt, in many cases the actual reasons for women avoiding participation in physical exercises are rooted in stereotypes, deep down in the consciousness of individuals. The source of this condition should be found in prejudices, traditions and habits referring to passive use of free time (11, p. 122). The study in Tarnów confirms this finding. It follows from it that majority of the participants (57%) in the fitness classes have higher education, while the group of women with secondary education is considerably smaller (39%). Persons participating in fitness classes and featuring even lower education background, for example basic (5%), are rather exceptional. Thus it seems that the awareness of the necessity of participation in physical recreation is increasing with the level of education. Educated women undertake physical activity more often, and they are more aware and responsible in taking care of their own health.

Lifestyle often depends on the nature of the profession or the post one is occupying at work. The choice of profession is thus one of the most important decisions in life. Due to young age of many of the questioned women, the women were dominant in the studied group who were students and did not start working (29%), thus they had much more of free time. Every one out of five participants (21%) in the fitness classes worked in education or was in a free profession (15%), so this group could to some extent regulate its time of work and free time. 8% of the women in free professions were physicians, 3% worked as architects, 2% were employed in the pharmaceutical entities, and 2% worked as barristers. It is interesting that women working physically also participated in the fitness classes, but they were not too numerous (7%). They went to the fitness classes because they wanted to associate effort with pleasure, music and relaxation, as opposed to what they were doing in their jobs. Thus the concept that the classes in free time are opposed to classes during the work time is not always true, because some women worked physically and were very will-

ing to benefit from fitness, just because this form of activity gave them pleasant feelings. Women hired as unqualified employee/ office clerk were similarly fewer (7%). It is a curious fact that few women participating in the fitness classes worked in very high positions, for example director (6%) or manager (3%). High level of their education, social and financial status would rather indicate that they should constitute a large group of women participating in the physical recreation classes. In an attempt at explaining the above, one could believe that the cause is lack of time, excess duties, responsibility for entrusted tasks, or possibly lack of strong will or established habits, which all prevent drawing effective benefits from directed, valuable physical activity. The unemployed (5%), old age pensioners (4%) or housewives (3%) were a similarly small group to participate in the fitness classes, even though they had a lot of free time and, on the other hand, considerably lower financial resources, as compared with the employed women. In the effort to determine the profile of the participants in fitness classes, it is clear that these are rather young women, studying or working, most often employed in education or in free professions. It thus follows that these are women who have some free time or who can regulate this time on their own. The women in director or manager posts were a considerably smaller group, because these professional groups do not have too much free time, despite their personal and professional independence.

As regards the sectors of the economy in which most of the participants worked, the highest number of women (41%) were employed in the industry categorised in the questionnaire as “other.” This group includes the students (29%) in such studies as: physical education (12%), tourism (9%), pedagogy (2%), language studies (2%), management (2%), economy (2%). This group included also unemployed women (8%), and old age pensioners (3%). A large group were women in the “education” field, and the study showed that they constituted more than one fifth (22%) of the participants in the fitness classes. These were the women related to some of the schools or college facilities which are operated in Tarnów. Work in education features high level of stress, continuous improvement, additional training and learning and conceptual work, which usually means many hours of sitting at the computer. Thus, fitness classes are for this professional group a perfect opportunity for physical exercises, relaxation, elimination of stress and, often, excess emotions. As the above professional group is involved in education of young people, they are expected to have, and—as the study shows—have high awareness of the role of physical activities in promoting a healthy lifestyle. Participation of the teacher in fitness classes certainly improves his/ her attractiveness in the eyes of the youth and constitutes a model to be followed.

Self-employed women also participated in fitness classes, and there were more than a tenth of the studied group (12%). These women managed their own shop (2%), accounting office (2%), architectural office (2%), barrister office (1%), advertising agency (1%), tourist office (1%). Successful women running their own business usually can financially manage to regularly participate in fitness classes, only limited free time or health problems may be their restrictions. Women employed in service and

trade (11%) and in health care (11%) constituted a very similar group as regards their number. In turn, women working in offices and in state-owned companies constituted a negligible percentage (3%) in the whole analysed group of women. This was also true about the tourist area (1%).

Income is another factor which determines participation in fitness classes. Improving standard of living may be observed in recent years in Poland, which is highly important in following a healthy lifestyle. Increase in income of modern Polish women is also noticeable, which translates into financial independence and higher awareness of one's own needs. It also finds expression in the decisions related to caring about one's own health and participation in physical recreation. More and more women allocate increasing parts of their income on improvement in health, appearance, and physical performance. The study of the women of Tarnów confirms this, with the majority of the participants in the fitness classes (65%) being persons with relatively high income. A major part of them (38%) stated the income in excess of 1,000 PLN per month per person in the family, and every one out of three (27%) declared the income from 800 PLN to 1,000 PLN. However, it has to be noticed that women much less resourceful in finances were also participants in the classes. The study shows that it was not a small group of persons, as this applied to almost one quarter of the participants (26%), and their income per a family member was 500–800 PLN. In less than a tenth of the group (9%), this amount was even lower and amounted to 300–500 PLN per person in the family. Thus low income does not always constitute the barrier for participation in the classes of movement recreation, with bad routines, lack of habits and low awareness in this respect contributing to this problem.

3.2. Health and lifestyle

Physical recreation is, to a high degree, an antidote for unfavourable civilisation factors such as hypokinesia, improper eating habits or stress. Health, or maintaining biological balance, means reducing the possibility of new ailments that lead frequently to development of civilisation diseases. Participation in fitness classes requires some physical ability, therefore the questioned women were asked to assess their own health condition. It follows from their opinions that most of the studied women (52%) assessed their health condition as good and very good (32%). One out of ten (12%) participant in the fitness classes believed that her health condition is on the average level, and only 2% believed that it was bad or very bad. Health condition is known to be in an important relationship with fitness classes, thus women suffering from serious ailments will not usually decide to practise the above form of physical recreation. Most of the women of Tarnów who participated in fitness classes could boast with high level of health and it is possible that participation in the physical recreation classes helped in it.

The lifestyle is in deep relationship with health, and lifestyle is in the literature a term differently named and interpreted. According to B. Woynarowska, it is “a set

of attitudes, behaviours and a general philosophy of life of an individual or a group. It depends on the environment, the social and cultural standards in which man lives, on his/ her community (or of the one with which he/ she feels identified), as well as personal beliefs, value systems, attitudes, general economy, politics and organisation of the community structures” (10, pp. 50–51). Apart from the broadly understood environment, health behaviour patterns are the element co-creating lifestyle. They may be divided into conducive for health (physical activity, proper food) and risky for health (smoking, alcohol, drugs). Lifestyle has invaluable effect on health, and physical activity is one of the most important factors which affect health, good feelings and quality of human life.

The study proved that majority (59%) of the participants in the fitness classes assessed their lifestyle as moderately healthy, whereas more than one third (34%) of the women declared healthy lifestyle. A definite minority (7%) admitted to having an unhealthy lifestyle. The key item in the healthy lifestyle is physical activity, thus one could believe that quite a large group of the questioned women strive to run a healthy style of life by participation in fitness classes. From the research results by many other authors, one has to emphasise that physical activity of women is a process which should run the whole life in order to keep or improve health and break down involution processes. For example, the studies by Józef Drabik show that majority (64%) of his responding women assessed their lifestyle as healthy, and one third (30%) as moderately healthy, and only 7% of the questioned assessed it as bad (12, p. 257). It should say that the group of the Tarnów women leading a healthy lifestyle is almost 30% fewer than in the results of the J. Drabik’s studies, but at the same time the same (29%) number of persons declared leading a moderately healthy life. The women who admitted to having an unhealthy life were in the identical number in both studies.

Excess consumption of alcohol or coffee, smoking and drugs, as well as hypokinesia or indiscriminate medication with sedatives or stimulants are the factors which degrade human health, leading to many ailments called “civilisation illnesses”. It is also interesting to note that the pace of life, as well as performing many social roles and duties result in continuous haste, pressure and stress which have negative effect on health of women. One could believe that educational actions or advertising campaigns in the media (which more and more often promote physical activity as an important item in daily lifestyle) may contribute to making changes in lifestyle.

The Tarnów participants in the fitness classes were also asked about interest in improving their current lifestyle. It follows from the studies that more than one third of women (33%) were satisfied with their life and would not change anything. At the same time, a similar number of respondents (30%) would readily spend more time on general sport, one tenth (10%) on other forms of fitness, and 3% specifically indicated that they would like to practise yoga. One fifth (20%) of the participants in the fitness classes would change the current diet to a more healthy, and 4% would like to limit drinking, 10% would like to quit smoking, 6% would like to reduce both fac-

tors to the minimum or eliminate them completely. Many of the women in the study have responsible work posts where stress is inevitable, therefore some of them (7%) would definitely limit this factor in their life. Spending more time on rest, especially in the family circle, would be an important change in lifestyle for one tenth of the women (10%).

Healthy lifestyle consists of appropriate food, regular physical activity, elimination of addictions. A rational diet is conducive for health and effective education, it prevents such illnesses as obesity, hypertension, tumours, and positively affects development of proper feeding habits. In the analysis of the methods of feeding in the fitness participants, most of the questioned (69%) declared that they feed properly. Unfortunately, quite a large group (14%) of women do not know the principles of proper nutrition or simply do not follow them, and 17% feed improperly. Often feeding errors listed by them were wrong meal time (3%), little time for preparation of a healthy meal, too fast pace of life (6%) and inclination to fast food (5%). In general, however, majority of the questioned took care about their diet and believed it to be healthy and of full value.

3.3. Motifs for undertaking physical activities in fitness classes

The literature describes many classifications on motifs for undertaking physical activities. However, the most often quoted factors related to individual motivation of women are: maintaining good physical condition and health, striving to keep well-shaped body, the feeling of beauty, aesthetics, preventing stress, and sometimes simply fashion. To determine the motifs for participation in fitness by the women of Tarnów, the respondents were given the following categories to select: increasing one's own value, improving the relationships with people, improving results at work/ in the college facility, care about slim body, pressure of the surroundings, the need to relax, relaxation, preventing ageing processes, fighting loneliness, improving mental and emotional state/ need of joy, preventing illnesses, wish to be a modern woman, a form of rest, positive effect on the outlook on the world, the surroundings, wish to meet new friends, a form of fighting obesity, fashion, a way to leave the problems aside, supporting motivation for activity. The questioned women could select more than one category.

The analysis of the distribution of percentage indexes show that over a half of the Tarnów women (57%) take part in fitness classes to improve body and appearance. Most often this applies to getting rid of unnecessary weight and developing a nice, well-shaped body. Another equally important reason for going to the classes, the one with which 41% of the women felt identified, is related to improving the feeling, better mood, increased level of satisfaction, feeling of joy and a higher level of optimism resulting from regular participation in fitness classes. Every third questioned woman participated in fitness classes for relax, relaxation, better feeling (33%) and wanted to prevent involution processes (30%). For a slightly smaller group, an important reason

for undertaking physical activities was fighting obesity (28%) or simply an attractive form of rest in free time (28%).

The women participating regularly in the classes (which applied to almost a fifth of the group, 20%) stated that this form of exercise is an effective drive for further activities, both in personal and professional life. It is known not since this day that regular physical exercises are an efficient factor to release the need of activity and work in different contexts. It follows from many concepts promoting healthy lifestyle that the mind and the body should be regarded holistically, in reference to the ancient saying *mens sana in corpore sano* (healthy spirit in a healthy body).

For very young women, participation in fitness classes is “trendy” and in vogue (19%), and positively affects the relationship to the world and to people (19%). It is also a very good method to stop development of various diseases, including resulting from civilisation factors (19%). Participation in physical recreation is often a method of improving general health, natural resistance, or simply an attempt at running a healthy lifestyle.

Additionally, almost every fifth woman (18%) emphasised that participation in fitness classes has good impact on general social growth of the individual and may improve relationships with people, therefore most of women (70%) were coming to the classes in company, improving relationships and strengthening them. Apart from this, participation in the classes may be a way to meet new friends who follow similar reasons and want to simply meet somebody, not to feel lonely. This problem applies not only to older women, but also to young women in high managerial posts who often suffer from loneliness due to the nature of their work. They are currently named “singles”.

For many women (16%), participation in fitness classes was a good form of getting away from daily problems, with the possibility of increasing self-image and own value. The above reason was used by 13% women. Participation in fitness classes is known to be a good means to achieve a well-shaped body, which highly helps build the feeling of one’s own value.

Every tenth questioned woman (10%) was coming to the classes on recommendation of the physician (7 women were overweight, 3 women had hypertension). Participation in the classes is thus a form of group training aimed at correcting health condition. Other participants in the classes (9%) wanted to be modern women so they were coming to the fitness classes. The opinions of the questioned showed that the classes perform a social role, satisfy the need of prestige, as being a modern woman also means participation in various classes of physical recreation.

A small group of women (5%) noticed that participation in the fitness classes was related to the improvement in the achieved results at work or in the college facility, but this was mostly applicable to students. From among all the categories of motifs proposed for assessment, the least number of persons regarded the classes as a form of fighting loneliness (4%) or was doing it under pressure of the surroundings (4%) or were looking for friends in this way (4%). Fitness classes are used for this purpose

most rarely, as the participants are working people, quite often burdened with family and home obligations, and having not too much of free time. They mostly emphasise getting a slim body and good feelings.

A clear similarity may be found in comparing the motifs for participation of the women of Tarnów in fitness classes with the reasons diagnosed by Zofia Kubińska. In both of these studies, the following were important reasons for participation of the women in the physical exercises classes: improvement of physical body (28%), enjoying participation in the classes (22%), caring about health (17%), improvement of relationships with people (15%), an attractive form of spending time with friends (17%) (13, p. 225).

Fitness classes, if properly selected in terms of type, intensity and frequency, bring about the intended results. They satisfy many needs and are a strong motivational stimulus to keep the developed form, give satisfaction and the feeling of good work done, and help stabilise proper habits and active lifestyle. Thus they are a significant item in the healthy self-study and self-education.

3.4. Preferred forms of fitness classes

Fitness allows keeping physical ability and health at a high level for long years in an attractive way. However, to achieve this, the forms of these classes should fit age, physical condition, predispositions, and even likings of the participants. Additionally, presence of positive stimuli (music, team work) makes fitness classes release joy and satisfaction with the participants, allow relaxation, motivate for action and work on oneself. The analysis of the offer of the classes in physical recreation in the Tarnów centres shows a large variety of forms so that anyone interested could find an appropriate form, in various levels of advancement and intensity. The Fitness Klub FORMA, where the study was held, proposes the following classes: BPU (belly, buttock, thighs), Joga Fit with stretching, Senior Forma, Stretching, Pilates (Body Art), Step, TBC (total body condition), Dance aerobic, Dance step, Hi-Lo, Tae-Bo (a fighting form), Multi Forma, Hatha Yoga. The women who participated in the above classes were asked about their attractiveness and frequency of coming to fitness classes was determined.

The analysis of the obtained results showed that BPU (work with weights and small dumb-bells) was the most popular form in fitness classes, and the largest group of women (41%) participated in it, 6 times a month on the average. Physical keep-fit and ability requirements are small here and anyone can meet them. The classes help quickly lose unwanted kilograms. All this makes this form the most popular among the women of Tarnów.

Pilates (28%) and Step (28%) were other attractive forms for the women of Tarnów, although in a slightly smaller scope, and every fourth woman participated in the classes in both these forms. Pilates is a form of fitness which the women of Tarnów used 5 times a month on the average. Its objective is mostly to help strengthen mus-

cles without their excessive building up, releasing the spine, improvement in position, make the body flexible, lower the level of stress and improve the general health of the participants. The ladies over 40 years of age very readily took this form, because it does not require high rate of work. Step, despite being the complete opposition to Pilates, was also practised by the Tarnów women 5 times a month on the average. It is an intensive form of effort which allows burning high amount of calories. Thus it is helpful for the persons who take care about their lines and fight unwanted kilograms.

26% of women declared participation in Dance aerobic. It was practised by the questioned women 7 times a month on the average, which proves its high popularity. Dance aerobic is the form for those who love dancing and good music. Therefore, it is so popular a form among young women. Dance aerobic is in the group of CARDIO trainings whose main objective is strengthening the circulation system. It is a very relaxing form of aerobic which, apart from bringing up physical fitness and burning fat, allows also release of emotions due to combining dance and exercises.

Dance step is a form very similar to Dance aerobic, but it differs in that it is done with a platform (the so-called step). Almost one fifth (18%) of the women of Tarnów favour this form of fitness and participate in it 5 times a month on the average. This form of classes uses elements of dance, e.g. salsa, rumba, latino, funky, afro, with the step. These exercises greatly improve coordination and flexibility.

Hatha Yoga enjoyed similar popularity among the studied women. Participation in this form of classes was declared by 18% of the questioned, participating in it 5 times a month on the average. These exercises stretch and relax tense muscles, tendons and joints, physically improving the whole body, strengthening the immunological system, and providing harmony for the body and the mind.

Slightly fewer women enjoyed the “Multi forma” classes which are sort of general fitness exercises, develop strength, flexibility, coordination and endurance. 13% of the women declared participation in this form and they participate in these classes about 5 times a month.

Few women preferred the TBC classes. It is one of the forms of fitness which consists in work of the muscles of the whole body which allows shaping the body, accelerating metabolism and burning fat in a relatively short time. It requires quite high physical performance, therefore this form may be regarded as less popular. Almost every tenth woman (11%) participated in it, 5 times a month on the average.

9% of women declared participation in the Joga Fit classes. It is a form of classes with physical and breathing exercises which improve health conditions. They work not only on muscles, joints and breathing, but also have positive effect on heart work, circulation, lymphatic and nervous systems and psychological functions. This form is popular among older women (over 45 years of age) due to low intensity and relaxing form, and the women of Tarnów participate in it 5 times a month on the average.

Stretching includes relaxing and anti-stress exercises aimed at stretching all groups of muscles and ensuring good basic muscle tension responsible for flexibility

of the body and coordination. 8% of the women regularly participated in this type of classes. Popularity of this form was low, which could be the result of poor knowledge of the role of stretching in the training. The questioned women participated in the above form of exercise 5 times a month on the average.

Senior Forma is the adaptation training which prepares the heart and vascular system, and the bone and muscles system to effort. It is recommended in osteoporosis, spine pain, rheumatic illnesses, illnesses of the circulatory system, overweight, diabetes, stress. This programme is addressed to women over 45 years of age. 8% of the questioned women participated in this form. Two forms enjoyed the least interest: Hi-Lo and Tae-Bo (a fighting form). Hi-Lo is a form which was practised by only 1 person, once a week. It is a training of high intensity, based on choreography with elements of jumps, jogging and fast marching. It requires from the participants high performance and strength. That is why it is a form of exercises low in popularity among the women of Tarnów. Tae-Bo is an intensive form of fitness for persons in good physical condition—an aerobic with elements of boxing, kickboxing and martial arts (combinations of punches and kicks). Only 2 women from among the respondents declared participation in this type of the classes. It is often selected by men, because it is complimentary to strength training. Thus one could think that this form should not be popular with the women due to its aggressive nature.

3.5. Company during fitness classes

Physical recreation as a form of rest has its source in the need of motoric activity and the need of belonging and social contacts, creating good interpersonal relationships. The study results show that the definite majority of the questioned women were coming to fitness classes along with another person. More than a half (55%) of the women participated in the classes with a friend, and 16% with a family member, usually a sister (10%), a mother (4%), a daughter (1%) and a sister-in-law (1%). The rest of the group, that is one third of the women (29%), were coming alone. Thus one could believe that company of a close person is an important factor for the women of Tarnów in motivation to regular participation in the classes. Not all the researchers confirm, however, the necessity of support from another person in gaining systematic presence in the classes. The study by Urszula Parnicka in Biała Podlaska, Chełm, Lublin and Zamość shows that almost a half of the questioned women (49%) were coming to the classes alone, without the need of any company. 27% women needed support of another, a friend, a colleague, and one fifth of them (24%) preferred company of a family member (14, pp. 39–40). However, the residential address of the studied women or the scope of the study could be an important determinant which made the U. Parnicka's study different.

3.6. Barriers to and shortcomings of participation

Various barriers were there preventing practising physical recreation in the women of Tarnów and hindered their participation in fitness classes: related to health, economic situation and lack of free time. Other important factors which made it difficult or simply prevented participation in fitness classes included also availability of services, closeness and comfort of reaching of the recreation infrastructure. Various types of difficult situations in life have effect on participation of women in fitness classes. As many as 63% of the questioned women confirmed existence of barriers of varied importance. The other women (37%) did not report any limitations.

The analysis of the obtained study results shows that the highest barrier which limited physical activity of the studied women was lack of time resulting from executed professional work (23%) and lack of financial funds (23%). The lack of time due to family obligations (child care) (6%) and studies (6%), and health problems (3%: spine degeneration 2% and high pressure 1%) was an important cause limiting physical activity of some of the questioned women. For a relatively small group of women (2%), access to the fitness club was a factor limiting participation in the classes due to long distance from the place of residence. All in all, the degree of participation in fitness classes significantly depended on economic factors, conditions of life, health and place of residence.

4. Final remarks

Awareness of women increases in recent years in reference to caring about one's own health, external appearance and physical condition. It manifests mostly in modification of lifestyle. The above trends are apparent not only in large cities, but also in medium-size places like Tarnów. Women, despite many barriers and obstacles, try to find more time for physical activity, as they have been noticing that participation in physical recreation may better their comfort of life with cultivation of health, development of strength and resistance to stress and daily efforts. The studies show that the share of the women of Tarnów in physical recreation is determined by many factors, such as age, education, profession, industry and income. This study confirms the common trend that awareness of the necessity of participation in physical activities increases with education. More women with higher education than with secondary or basic ones come to the fitness classes in Tarnów. A definite majority of the questioned are young women 20 to 30 years old. Older women are in minority, which is probably due to the stereotypes functioning in the Polish population and the perpetuated belief that older women are not expected to take part in this type of activity.

Profession, the sector of economy in which women work and income in the family are the factors which determine participation in fitness classes to a very high degree. The studies show that majority of the participants in fitness classes are students, one

out of five women works in education, and almost a seventh part of their group is in a free profession. Some extremes may be found in the analysis of social status of the women who participate in fitness classes: on the one hand there are women at very high managerial and director posts, with high income, independent, on the other hand there are unemployed women and old age pensioners. Both groups are in minority in fitness classes, though, the former due to lack of free time and excessive duties, the latter due to financial barriers. Even though the women presenting high professional and social status are in minority in the classes, most of the questioned are quite well-to-do women, as income per person in their families is above 1,000 PLN.

The exercises require some physical performance, therefore women who participate in fitness classes enjoy good health despite the fact that a major part of them have problems with proper feeding. Mistakes in feeding include wrong meal times, little or no time for preparation of a healthy meal, weakness for fast food. The women reported, however, that participation in fitness classes is a good way to change lifestyle and the current diet.

The main reasons for participation in fitness classes is caring about slim body, well-being, and increasing the feeling of one's own value. It is commonly known that improvement of appearance by participation in the classes increases the feeling of one's own value, and this gives satisfaction and fulfilment. The most attractive types of classes for the women of Tarnów are BPU, Pilates and Step. These are one of the most often selected physical exercises. The study shows that women are very interested in the classes organised outdoors (aerobic, yoga), especially in the spring, summer and autumn seasons. The women of Tarnów who participated in the fitness classes did their best to make it effective, as one out of three questioned women participated in two different forms of fitness, which proves that these are women quite active physically. One could also believe that the group of active persons will be increasing as the questioned women are very sociable and usually come to the classes with a friend, a colleague or somebody from the close family, which is mobilising and encouraging even for the surroundings. Mutual support is a very important factor stimulating participation in fitness classes. However, there are many barriers which make it difficult for the Tarnów women to undertake various forms of physical activities. These are reasons related to economy, health, lack of free time, excess professional and family duties. The lack of the possibility of participant in the classes is sometimes related to the place of residence and the resulting problems with travel. The study shows, however, that the women residing in average-size locations, such as, for example, Tarnów, have increasing awareness of the care about their health, condition, and external appearance. The women treat it as the necessary part of the day and modern life managed at a high pace and in stress, which all requires the proper psychological and physical condition.

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Fitness jako aktywna forma spędzania czasu wolnego tarnowskich kobiet

Streszczenie: Aktywność ruchowa kobiet jest ważnym elementem zdrowego stylu życia, toteż postanowiono zdiagnozować ten problem w grupie kobiet mieszkających w Tarnowie – średniej wielkości mieście w województwie małopolskim.

Celem przeprowadzonych badań było ustalenie motywacji oraz profilu społeczno-demograficznego kobiet uczestniczących w jednej z ciekawszych form rekreacji ruchowej, do której należy fitness. Ustalono popularność poszczególnych jego form oraz zidentyfikowano bariery, które w znacznym stopniu utrudniały uczestniczenie w zajęciach. Badania przeprowadzono w 2010 roku metodą sondażu diagnostycznego, w którym wykorzystano technikę ankietowania, gdzie narzędziem badawczym był kwestionariusz ankiety.

W badaniach ustalono wiek respondentek, który – jak się okazało – był bardzo zróżnicowany: poniżej 20. do powyżej 50. roku życia. Uczestniczkami zajęć fitness były zwykle kobiety posiadające wykształcenie wyższe oraz średnie. Dominowały studentki oraz kobiety, które pracowały

w oświacie bądź wykonywały wolny zawód. Większość uczestniczek zajęć fitness to osoby dość zamożne. Głównym motywem uczestnictwa w zajęciach dla ponad połowy tarnowskich kobiet była poprawa sylwetki i wyglądu zewnętrznego oraz poprawa samopoczucia. Najpopularniejszą formą zajęć okazało się BPU, w której uczestniczyło najwięcej respondentek. Na zajęcia kobiety przychodziły zwykle w towarzystwie koleżanek albo kogoś z rodziny. W uprawianiu rekreacji ruchowej tarnowskich kobiet pojawiały się liczne bariery utrudniające uczestnictwo w zajęciach fitness, zwykle miały one charakter zdrowotny, ekonomiczny lub związany z brakiem wolnego czasu.

Badania wykazały z jednej strony duże zainteresowanie kobiet uczestnictwem w aktywności ruchowej, z drugiej zaś – pozwoliły ustalić bariery, które powyższą aktywność utrudniają.

S ł o w a k l u c z o w e: formy rekreacji ruchowej, styl życia, motywacja, Tarnów

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Efficiency of the owner's supervision in public sector enterprises in view of the new institutional economy

Key words: institution, owner's supervision, public sector, principles of supervision

S u m m a r y: The paper presents selected aspects of efficiency of the owner's supervision institution and its specific nature in public sector enterprises against the background of the new institutional economy. In-depth presentation includes the meaning of the "institution" term, its structure and types, with a special attention paid to supervision institutions. The problem has also been discussed of the functionality of application of the institutional approach (especially of the new institutional economy) for assessment of effectiveness of the owner's supervision. This issue has been discussed against the background of the specific nature of the public sector in Poland. These issues have been presented in the context of defining the role of the state in the economy and directions of changes aimed at reduction of its unreliability. The issues have also been analysed concerning the public domain resulting from modern social expectations and principles of the market economy, with a special attention paid to the theory of ownership rights. In the context of indication of the role of the state in the Polish economy, the principles have been presented for exercising the owner's supervision over the companies with the share of the State Treasury, introduced by the Ministry of the State Treasury in March 2010. The principles prepared are not contradictory to the theory of the owner's supervision, yet the assumed concept for strengthening the position of the supervisory board requires application of effective mechanisms of the owner's supervision to ensure strengthening this institution.

Presentation of excerpts from results of empirical research of the author in reference to the effectiveness institution of the supervisory board in municipal companies, along with the conclusions from these tests is an important part of the paper. Application of the research methodology based on the categorisation procedure was the essence of the conducted research. The final part of the paper discusses the directions for improving corporate governance in these companies in the view of the new institutional economy.

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1. Preliminary notes

The issues of corporate governance are more and more often analysed in the already numerous and broad literature, both domestic and international. Not a small number of researchers seek corporate order concepts, yet so far the satisfactory solution has not been found. Recently, weaknesses of corporate governance are even emphasised as one of significant causes of the financial crisis, stirred up by financial institutions in the capital market, among others. The institution of the capital market has not coped with ineffectively managed corporations, and its mechanisms in the form of bankruptcies, mergers and takeovers proved to be ineffective in the clash with the principle “too large to go down.” Thus, the discussion should be started on revisioning of the role of the current corporate governance institution, and new roles of the state in this field should be proposed or the old ones redefined. The weight of this issue is best proven with the fact that the Nobel Prize in Economy in 2009 was awarded to the researchers of this field: Elinor Ostrom (University of Indiana, Bloomington) and Oliver E. Williamson (University of California, Berkeley).

The issues of corporate governance in general, and the owner’s supervision in particular, are not disappearing, but increasing, especially in the sector of public companies. Conflicts of interest and power abuse within this type of organisations are a major threat to the corporate order. There is still little written and said in this country about these issues. Hopefully, this paper will make a contribution to eliminate this gap in the knowledge of significant problems of corporate governance for public sector enterprises. The paper also addresses the issues of effectiveness of the owner’s supervision in public sector enterprises analysed in the light of the modern economic theories, especially the new economy theory (NEI) (1).

Thus the basic objective of the paper has been defined: recognising the issues of efficiency of the owner’s supervision institution as an important factor affecting the proper functioning of companies, and (through quality of these institutions) the rate of economic growth of the country. The empirical part of the paper includes a section of own research of the author conducted in the companies of municipal sector and the research managed jointly within the research project executed in the Małopolska School of Economics in Tarnów.

2. Importance of institutions in executing corporate governance

Institutions¹ are the economic category ignored by the neoclassical theory, yet immensely significant for understanding the economic processes. They are important for the economy with specification of rules for business transactions understood as

¹ Institution is a set of limitations in behaviours in the form of principles and regulations, procedures which are used to detect deviations from principles and regulations, moral and ethical behaviour standards (the definition formulated by Douglass C. North within the new institutional economy).

interchange of ownership rights done depending on the amount of transaction costs in the market or within the hierarchical structure. The institutions which make up the institutional environment are often classified as formal and informal. Formal institutions are created consciously and purposefully, e.g. standards of the law. Informal institutions come up spontaneously as a result of an evolutionary process, and these include, e.g., standards of social behaviour. Both formal and informal institutions play a significant role in developing social behaviour so as to ensure the necessary order (2, p. 119).

Managing business activities is increasingly determined with institutional factors. These factors decide about behaviour of the society as the entirety and its individual constituent parts. Institutions usually are in the form of organisations and rules and regulations for social and economic activities which determine behaviour of entities.²

Many venues of the theory of economics deal with problems of institutions, while this paper tackles mostly the achievements of the new institutional economy.

The New Institutional Economy is critical about the narrow attitude to economic problems represented by the neoclassical direction, with attention paid to the meaning which institutional conditions, the nature of ownership rights, or the contract and the related transaction costs play in the economy.

This approach emphasises the need of joint analysing of economic and social issues, as economic management processes do not happen out of the historical and social context, but within specific institutions which create various institutional systems. Institutional systems are the identifier of the methods of management.

High dynamics of changes in the economy may be noticed in the last several years as a result of the processes of globalisation, which are the cause of both unification and variation in institutional solutions. Institutions may be thus created as a result of social interactions, but institutional structures at the same time affect the units and their preferences, becoming a sort of social structure. This understanding of institutions makes them at the same time conditions and limitations of business activities of companies, thus being an element of external conditions of management, and shape preferences and systems of values for individuals. Even though importance of institutions was appreciated in other fields of economy, it was emphasised only on the basis of the new institutional economy. It was due to the fact that this theory perceives institutional limitations, thus can better adjust to the explanation of the economic and social reality.

In accordance with the premises of the new institutional economy, *corporate governance* is a system of connections of the given entity with units of the external surroundings (in the market and off the market) and social organisation of the company. The system of corporate governance thus depends on: legal and regulatory solutions, structures of ownership rights, the type and principles of the owner's supervision and

² The terms "institution" and "organisation" should not be recognised as identical. D. C. North defines institutions as rules of game and organisations as players (cf. 3, pp. 32–34).

social pressure (2, p. 116). The following Table 1 presents the classification of institutions of corporate governance along with their generated mechanisms of supervision.

Table 1

Classification of supervision institutions and mechanisms

| Type of supervision institution | Type of supervision mechanism | Criterion of classification |
|---------------------------------|---|---------------------------------|
| Capital market | Hostile takeover | External supervision mechanisms |
| | Exit | |
| | Critique-vote | |
| Debt market | Debt | |
| Market of manager talents | Disciplinary behaviour of managers | |
| Market of products | Demand for product | |
| Assembly of partners | Degree of concentration of ownership | Internal supervision mechanisms |
| Supervisory board | Contract of management | |
| | Motivational remuneration | |
| | Degree of independence | |
| | Method of work of the supervisory board | |
| Employees | Participation of employees | |

Source: author's own study.

Analysing significance of institutions in improvement of effectiveness of corporate governance, one has to remember the fact that effectiveness at the microeconomic level translates into effectiveness at the level of national economy, thus quality of supervision institutions and their generated mechanisms affects the rate of economic growth of the country.³

The advocates of the new institutional economy, enhancing importance of institutions in the economy, have undertaken research in determination of institutional structure. This issue was broadly addressed in the works of Douglass C. North, who stated the key factor of economic growth as the so-called "adaptive effectiveness". The author understands in the flexibility of institutional structures which are favourable for creativity, entrepreneurship and innovativeness (4, p. 12).

³ Effectiveness means the ratio of benefits to expenditures, and efficiency is the capacity to achieve the goals.

According to the D. C. North principle, effective markets result from activities of the institutions which ensure low costs of measuring and enforcement of agreements. Achieving this purpose is possible with the rules which support adaptive effectiveness (in particular supplementary for informal institutions) and effective enforcement.⁴ Adaptive effectiveness assumes a slightly different dimension at the micro-economic level. This term applies to the institutional structure which will guarantee execution of objectives of all the entities related to the activities of the given company with the corporate governance system. Thus it should ensure coherence of intermediating institutions in the markets of products, in the production factors and in financial intermediation, as well as their complementarity.

Adaptive effectiveness of corporate governance institutions means their capacity to adjust to changing surroundings and settling problems (5). It consists in fast reacting to all disturbances and changes, and its determinant is such functioning of supervision institutions which will cause:

- reduction in transaction costs;
- adapting new phenomena such as technical progress, knowledge management, social potential management, etc.;
- willingness of companies to apply various types of innovations.

Moreover, adaptive effectiveness of supervision institutions shall be used for implementation of selection procedures in ineffective supervision institutions and motivational systems.

The structure of corporate governance (supervision mechanisms and institutions), constituting a system of limitations and obligations related to specific actions of the board of directors and other bodies of the corporations, is not an obstacle in managing business activities. The system of corporate governance (the supervision structure along with the legal and cultural surroundings) may affect effectiveness of corporations. The currently conducted empirical research does not allow clear determination of which of the national systems of corporate governance is more effective, because, e.g., change in the prices of stock reflects many factors which are not the result of the model of the corporate governance system. Therefore, the quality of supervision institutions understood as the capacity to generate behaviours which meet the criteria of dynamism of organisation and responsibility of the board of directors may be assumed as the indicator of effectiveness of the corporate supervision system (6, pp. 582–583).

Considering the above criteria, the method of functioning of corporate governance institutions should be re-examined, so that managing of corporate business activities facilitated the shareholders to multiply their capital, and so that the corporation surroundings could be protected against negative consequences of the process of creating wealth.

⁴ Even though formal principles may be changed by the state administration very quickly, informal limitations change at a very slow rate. Both formal principles and informal limitations are finally shaped by subjective perception of the world around.

3. Selected issues in effectiveness of supervision institutions in public sector enterprises

The issues of quality of supervision institutions is also enhanced in the system of exercising the owner's supervision in public sector enterprises. It is included in a broadly understood public management whose significance will be increasing, along with the complexity of mechanisms and organisational structures necessary to tackle and settle current problems in the public domain.⁵ We observe in recent years a radical change in the method of public management resulting, among others, from such processes as development of economies based on knowledge, development of IT and telecommunications technology or globalisation. Moreover, change in social structure, especially as a result of fast increase in the level of education, caused increase in activity for the state on the part of citizens aware of their interests, capable of effective care over their execution. The above trends and a number of other processes, according to the researchers dealing with broadly understood public sphere, contribute to the changes which had place in the second half of the 20th century in organisation and functioning of the state, economy and society, that is in the social order general model. It may be said that the changes occurring provoke further trends of this type, including individual areas of the public domain.

Analysing this issue on the plane of the new institutional economy allows making use not only of the institutional approach but also of many other theories which contribute to it, namely transaction costs, ownership rights, agency, or specific assets. On the basis of the new institutional economy the role of the state may be defined and effectiveness of its institutions may be assessed. The analysis of extensive literature on public management shows that the role of the state in economy consists in (7, pp. 67–68).

- ensuring macro- and microeconomic environment which generates the proper stimuli for effective business activities;
- ensuring institutional infrastructure (title of ownership, peace, law and order, rules) which is conducive for effectiveness of long-term investments;
- guaranteeing the basic education, health care and material infrastructure, which is required by business activities, and in protection of the natural environment.

The state executes these tasks by executing functions focused on:

- correcting and strengthening the market;
- ensuring just allocation of goods.

⁵ Public domain is a forum (along with the necessary infrastructure) for public discussion over the issues significant for the community. Functioning of this domain requires active participation of citizens but also such designing of state institutions that will make them transparent for the public opinion.

The main problem in implementation of this type of management is low effectiveness of the state in effective execution of these functions. According to many researchers of this problem, it results from the state taking on too many tasks, which leads to its ineffectiveness due to low quality of institutional infrastructure. Therefore, the following stages of improvement of the role of the state in the economy are proposed:

- adjusting the tasks executed by the state to the objectives adopted—improvement in efficiency;
- better results in the activities of the state—improvement in effectiveness.

Under Polish conditions, we often find situations of efficient, but ineffective state. Institutions facilitate cooperation and coordination of activities of business entities parallel with “fair” competition conditions. Many of them are formal and are inspired by the state. Therefore, improving the system of the institutional state in general becomes a superior issue, in particular as regards the institutions related to the economy.

The phenomenon of “unreliability of the state” is often related to the operation of the state. This phenomenon is conducive for development of other institutions in the sector of social organisations, local government sector, hierarchical organisations, such as corporations and other large companies, development of units with mixed ownership forms, etc. Then, networks of dependencies and cooperation are developed between various institutions, which feature a specific type of relative solidity, called institutional balance. The essence of institutional balance is maintaining the appropriate proportions between constructive system changes and bottom-up spontaneous changes. The balance between, e.g., the governance in formal and informal institutions, between the public and private domains in the economy, and definition of the state–market relationship, between the public sector and the private sector, between the areas of politics and economy, between public interest and partial interests as well as between the requirements of effective and efficient management and a system of social consultations. Financial stability is also a sign of institutional balance. These relationships occur in both macro- and microeconomic scale, e.g. at the level of the company operating in institutional environment.

Considering the above views on the basis of exercising of the owner’s supervision in the enterprises of the public sector in Poland, a thesis may be set that the new institutional economy constitutes good theoretical substructure for improving the principles of the owner’s supervision for this sector. The selection of this approach comes from the fact that application of the principle of assessment of effectiveness, based on economic account of one of the basic NEI terms—transaction costs—is possible. Competitiveness of companies in current times should be assessed not only in terms of production costs but also (or mostly) in terms of transaction costs. They constitute the basic determinant of effectiveness in the area of organisation, management and supervision.

4. Directions for improving the principles of the owner's supervision in Poland

The Ministry of the State Treasury introduced the principles for exercising the owner's supervision over companies with the share of the State Treasury in March 2010. The main objectives of the owner's supervision, according to the said principles, are (8):

- increase in effectiveness of operation, efficiency of management and value of companies with the share of the State Treasury;
- preparation of entities to the process of transformations and privatisation in pursuit of achieving the target model of the state sector in economy;
- ensuring transparent operation of companies with the share of the State Treasury.

The following aspects shall be considered in execution of the listed objectives (8):

- applying the forms and procedures of the owner's supervision of the Minister of the State Treasury extended against the provisions of the law in force;
- the selection of properly prepared members of the supervision boards to ensure the proper functioning of the owner's supervision;
- improving criteria for selection of the managing personnel in the companies with the share of the State Treasury;
- development and implementation of new standards and mechanisms for monitoring and assessment of economic and financial activity of companies with the share of the State Treasury, allowing fast reaction to negative phenomena.

In the section related to the objectives of the owner's supervision, the above rules specify the details of the role of supervision institutions: "for execution of the indicated objectives of the owner's supervision, the proper functioning of code-based bodies of commercial law companies is of key significance ... Direct supervision over the activities of companies with the share of the State Treasury is executed by supervision boards ... This place of supervision boards ... in the system of the owner's supervision is the instrument of the Minister of the State Treasury (MST) creating the possibility of monitoring and controlling the processes in companies. This is why special attention is paid in the policy of the owner's supervision over the companies with the share of the State Treasury to the issues of competencies, procedures and selection criteria, organisation and assessment of work, as well as remuneration to members of supervision boards ..."

Pursuant to the MST guidelines: "this document should not be regarded as a standard act of the government administration (the regulations of the law do not authorise the Minister of the State Treasury to issue such an act), but as a template document. On its basis, the organs of the government administration or public entities may develop their own solutions within their competencies, taking into account the specific nature of the supervised entities."

With the above taken into account, theoretically there are no limitations against improvement in adaptive effectiveness of the owner's supervision institution in companies with the share of the State Treasury. Thus the problem remains open: why capital companies in the state sector do not generate financial results as expected by the owner? A partial answer to this question may be found in the analysis of the issues of the owner's supervision in the light of the theory of ownership rights. The share of the State Treasury or of the Commune in the ownership structure makes the companies perceived more as joint enterprises than as instruments to achieve profits. The dominant role of the state (as a result of commercialisation) and slow process of privatisation create the possibility of policy affecting economic processes. As allocation of economic power has its source in the rights of ownership, the allocation of the rights of ownership is important, including residual control rights, as a result of the processes of transformations of ownership (1, pp. 279–280).

The numerous and broad literature in the field of corporate governance in Poland pays special attention to the importance of institutions of the supervisory board and its generated mechanisms for exercising effective supervision.

In general, the role of the supervisory board comes down to supervising company operations and control over the work of its board of directors. The researchers of this issues are unanimous that the position of the supervisory board in the dualistic model is stronger than that of the board of the company in the monistic model. It is due to its independence of the board of directors, but mostly due to close relations to stockholders, because it is external to the board of directors. Moreover, the strong position of supervision boards results from its competencies guaranteed by the Code of Commercial Companies, the principles of exercising supervision prepared by MST and in the by-laws of companies as regards the issues concerning selection, suspension or dismissing the members of the board of directors. In the monistic system, weaker position of the board of the company results mostly from its relationship with the board of directors. Moreover, the type of the ownership and control system (*outsiders, insiders*) has major effect on the position of the boards. Poland is one of the countries in which external supervision mechanisms are still relatively poorly developed.

The above issue is confirmed in the research conducted by the author on effectiveness of supervision mechanisms in municipal capital companies sector.⁶ As the subject matter of research, assessment of effectiveness of the mechanisms has been assumed. Data were collected with the properly developed questionnaire which was sent to 27 municipal companies. The questions in the questionnaire were addressed to the board of directors and to the supervision boards of the analysed companies (9, pp. 210–250). They were related to: the features of members of the supervision boards, the activities, the method of exercising effect on the activities of the board of directors by the supervisory board, the effect of the supervisory board on effectiveness of the company, as well as cooperation of the board of directors with the supervision board.

⁶ The municipal sector is supplementary to the public sector which includes the state public sector beside the local government sector.

The procedure of categorisation was the basis for the research procedure (10). In general, categorisation is a research procedure aimed at determining the quality class (category) of the given company. Thus it meets the role qualifying the examined company into the specific quality group due to its functioning and results achieved.

On the basis of analyses of literature and statements of experts, the following assessment criteria were used as regards assessment of the degree of effectiveness of the owner's supervision in municipal companies in the examined companies:

1. The method of defining the objectives of municipal companies;
2. The effect of stakeholders groups on the decisions made by the board of directors;
3. The role of the supervisory board and the method of its work;
4. Competency features of the members of the supervisory board;
5. The methods of remuneration of the members of the board of directors;
6. The degree of interaction of external supervision institutions;
7. The barriers hindering participation of the company in capital markets;
8. Quality of the conducted audit and audits of annual balance sheets;
9. The information policy by the board of directors.

Categorisation of the examined companies allowed conducting the comparative analysis for the principles and control tools used in the system of corporate governance in the municipal sector companies for the purpose of determining effectiveness of mechanisms of the owner's supervision in capital companies in this sector.⁷

In the context of the supervisory board institution, the research results are as follows:

1. Comparing the assessment of features of members of the supervision boards by presidents of companies and chairmen of these boards, the dominance of features concerning the skills of objective assessment of company operation and the appropriate substantial preparation of its members has to be noticed. However, the fact is significant that priority of the stated features is different in both groups of respondents, which is proof of demand for objective assessment on part of presidents caused by lack of independent members in supervision boards of the examined companies.⁸ Demand for the appropriate substantial preparation for the purpose of coming up with knowledge to the presidents of the supervised companies among chairmen of the supervision boards.
2. In the category of the method of work of the supervisory board, its chairmen rather prefer the control function of the boards than enforcing active supervision resulting from participation in preparation of the programme for company

⁷ A Category—good companies, B Category—average companies, C Category—weak companies.

⁸ Independence of a member of the supervisory board in the public sector should be considered in the formal and legal relationship with the person or institution who decide about its choice. This applies mostly to the relationships other than causing subordination in the scope of the execution of supervisory functions, e.g. the officials of the establishing body being part of supervisory bodies of companies should be inadmissible.

activities. The above hierarchy refers to the answer to the question on the features of supervision boards members, where—according to this group of respondents—the most significant feature was the appropriate of the substantial preparation, that is the skills related to the control function, and not, e.g., creation or objectivism.

3. To the question regarding the degree of cooperation of the board of directors with the supervision board and the degree of effect of the supervision boards on effectiveness of companies, in each of the categories of companies, the effect of the supervisory board on effectiveness of companies was not significant in the opinion of the presidents of the boards of directors. Paying much attention to this aspect by chairmen of supervision boards is understandable.

Due to the limitations discussed in this paper, the complete description of research results according to the presented criteria is impossible. The above is only a part of the researches directly concerning the institution of the supervisory board and its generated mechanisms.

With the comprehensive analysis of the answers obtained in the context of the adopted assessment criteria, presidents of boards of directors are definitely on better substantial terms than chairmen of their supervision boards. This situation results from lack of independent and competent representatives in supervision boards. It makes cooperation of both bodies of companies highly difficult.

The regulations of the Code of Commercial Companies in force do not call for the possibility of common application of other solutions. According to the experts in practice, the most functional solution would be to reconstruct the existing mechanisms and owner's supervision institutions by introduction of the monistic (one) system supported by the internal audit, and with modern methods of management such as management contracts, controlling or the strategic card of results. It is confirmed by the research at the Małopolska School of Economics in Tarnów within the "10th Contest for development applications" organised by the Ministry of Science and Higher Education on "Checking effectiveness of the ownership supervision system in companies" (Leszek Koziół, Witold Zych, Kazimierz Barwacz) (11, 12).

Reconstruction of the existing supervision mechanisms and institutions in municipal companies should lead to selecting competent members of the supervision boards, ordering an internal audit and facultative use of modern management methods such as management contracts, controlling or the strategic card of results.

5. Conclusion

The above general analysis of effectiveness of the state in executing the owner's supervision in companies of the public sector with the example of the new institutional economy does not exhaust the list of problems. Their complete discussion in this paper would be difficult if not impossible. Thus the objective of the paper is

much more modest and applies to the explanations of some of the stated issues. In emphasising the importance of supervision institutions, attention is also paid to the consequences of their low quality, not meeting expectations of the owners (the community) of public sector companies.

Complimenting the attempts at solving the above problem is improvement of supervision institutions in accordance with the rules of the new institutional economy in order to strengthen their adaptive effectiveness facing social expectations as regards the rate of economic growth of the country.

The analysis of importance of the institutions and the related adaptive effectiveness in execution of the owner's supervision presented in this paper constitutes framework for further analysis.

The notion of transaction costs is of major significance in this process, which is understood at the contact point between politics and economy as obstacles preventing determination, monitoring and enforcing economic transactions. The policy of transaction costs should be used for analysis of the political processes which determine effectiveness of the policy of economy, on the principle of analogy with the economics of transaction costs which examines the effect of transaction costs on the structure and results of activity of the organisation.

An important issue related to corporate governance is the fact that it makes up a set of limitations of negative nature, as they include a long list of dounts, dos, recommendations, and even penal sanctions, without positive stimuli which would encourage the agent to employ functional actions in reference to the expectations and objectives of the principal (13).

Referring these considerations to the problem of functioning of corporate governance institutions in the context of behaviour of the supervisory board checking managers who manage the company, two contradictory models of cooperation of the supervisory board with the board of directors may be presented (14, p. 37):

1. In the first, the supervisory board, after concluding the contract of management, monitors the financial result of the company and verifies on the ongoing basis the board of directors in view of their execution of the contract conditions.
2. In the second, the supervisory board actively cooperates with the team of managers who manage the company in the management process within the whole hierarchical structure of the company. It requires more extensive activities on part of the board and using various factors, both internal and external, in the process of having impact on behaviour of the executive managers.

According to the researchers of this problem, the second case features lower transaction costs and better meets the requirements of modern economy. However, the areas of responsibility of the supervisory board and of the board of directors for decisions made by these institutions under conditions of increasing environmental turbulence have to be clearly separated. Under the Polish economic reality, the first case is appropriate for the public sector, whereas the second one is more suitable for the requirements of the private sector.

All in all, the premises of the new institutional economy for the owner's supervision institutions should constitute the base for further work on their improvement. The above presented examples of dependencies between theory and pragmatic approaches used in Poland indicate that the rules related to functioning of corporate governance in this country are still insufficiently developed and are subject to continuous changes. This applies to both formal and informal institutions, that is both strong (legal mechanisms) and weak (good practices) regulatory approaches. It has to be emphasised as well that the legal system concerning corporate governance in Poland does not fully take into account theoretical grounds included in the science of economics and management.

Numerous empirical research studies conducted in the world indicate much higher effect of institution quality on the economic growth than that of economic policy (15, 16).

The correct interpretation of the ownership law and its enforcing, effective corporate governance, internalisation of external effects as well as reducing signs of unreliability of the state should constitute the base for increasing adaptive effectiveness of the institutional system. Reduction in transaction costs generated by particular institutions should be the determinant of effectiveness in this process.

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Skuteczność nadzoru właścicielskiego przedsiębiorstw sektora publicznego w świetle nowej ekonomii instytucjonalnej

Streszczenie: W artykule zaprezentowano wybrane aspekty skuteczności instytucji nadzoru właścicielskiego oraz przedstawiono jego specyfikę dla przedsiębiorstw sektora publicznego, na tle dorobku nowej ekonomii instytucjonalnej. W obszerny sposób omówiono znaczenie pojęcia *instytucja*, jej strukturę i rodzaje, ze szczególnym uwzględnieniem instytucji nadzorczych. Poruszono również problem celowości zastosowania podejścia instytucjonalnego (szczególnie nowej ekonomii instytucjonalnej) do oceny skuteczności nadzoru właścicielskiego na tle specyfiki sektora publicznego w Polsce. Kwestie te zostały zaprezentowane w kontekście zdefiniowania roli państwa w gospodarce oraz kierunków zmian zmierzających do zmniejszenia jego zawodności. Podjęto też problematykę całokształtu spraw dotyczących sfery publicznej wynikającą ze współczesnych oczekiwań społecznych i zasad gospodarki rynkowej, ze szczególnym uwzględnieniem teorii praw własności. W kontekście wskazania roli państwa w gospodarce polskiej przedstawiono zasady sprawowania nadzoru właścicielskiego nad spółkami z udziałem Skarbu Państwa, wprowadzone przez Ministerstwo Skarbu Państwa w marcu 2010 roku. Opracowane zasady nie stoją w opozycji do teorii nadzoru właścicielskiego, niemniej jednak przyjęta koncepcja wzmocnienia pozycji rady nadzorczej wymaga zastosowania efektywnych mechanizmów nadzoru właścicielskiego, które wzmocnią tę instytucję.

Ważną częścią artykułu jest prezentacja fragmentów wyników badań empirycznych autora dotyczących efektywności instytucji rady nadzorczej przedsiębiorstw komunalnych, wraz z omówieniem wniosków z tych dociekań. Istotą prowadzonych poszukiwań było zastosowanie metodyki badawczej opartej na procedurze kategoryzacji. W końcowej części artykułu omówiono kierunki doskonalenia nadzoru korporacyjnego tych przedsiębiorstw w świetle nowej ekonomii instytucjonalnej.

Słowa kluczowe: instytucja, nadzór właścicielski, sektor publiczny, zasady nadzoru

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Multi-criterion optimisation of transport orders with the innovative evolutionary approach

Key words: genetic algorithms, PDPTW, SPEA, logistic support system

S u m m a r y: One of the common problems encountered frequently in logistic issues is PDPTW (pickup and delivery problem with time windows) where a limited transport base is to be used to expedite goods in an efficient way from point A to point B. Every organisation, both business and non-profit is, for obvious reasons, unable to grasp the whole logistic process without the aid of automation, so it has to be equipped with a logistics support system.

A viable alternative to other analytical solutions can therefore come in the form of a system based on genetic algorithms, which takes into account the limitations of the infrastructure, the time frame and the resulting penalty for any delay. This platform should also allow for the transition from a mathematically defined solution to a problem (however little practical use it has) to the real logistical problems based on the actual needs of the industry. Such a system was implemented, and with the basic genetic operators (cloning, mutation and crossover) is able to plan a solution for any arbitrarily defined, solvable problem of transportation, with the help of any algorithm using those operators. After starting the program and entering the dataset, the pre-set number of simulated generations of the genetic algorithm is started with the default chosen SPEA algorithm (strength Pareto evolutionary algorithm). The results of the simulation in the form of the final set of solutions are being saved to a file. For the algorithm applied to the test problem, the optimal solution for each variable, or middle-ground solutions were found.

1. Introduction

The processes of physical flow of material goods in the company, as well as between companies, and the flow of information used in enforcing control over these processes is the basis of logistics. Under the conditions of the modern economy, the physical flow of

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material goods becomes more and more complex. Beier and Rutkowski (1, p. 16) state that logistics faces three tasks:

- coordination of the flow of raw minerals, materials and finished products for consumers;
- minimising the costs of this flow;
- subordinating the logistic activities to the requirements of customer service.

Control of this process requires proper information and tools and the methods of their processing to achieve optimum solutions for each of the three reasons.

Execution of these tasks according to the above concept of logistics requires technical infrastructure, that is means of transport, warehouse capacity and human support. Any organisation, both business and non-profit, for obvious reasons of the incapacity of grasping the entire logistic processes without automation, must be provided with the logistic support system (Polish abbr. swl). The logistic processes executed by the system which support the organisation consist of several components, including: planning of logistic support, support of the economy with human resources, services supporting functioning and maintenance of the organisation, the databases, the information systems, the technical documentation and maintenance of reliability, performance (2). The issue of logistic infrastructure is of special significance, and at the same time it is very difficult for the economy of a country. The logistic infrastructure includes: transport infrastructure, telecommunications, warehouse facilities, other facilities, human resources infrastructure (personnel potential).

The transport infrastructure is made up of the following branches of transport: railway, road, air, pipeline, inland and sea shipping transport. Due to the protection of nature and continuous growth of transport networks, the road transport is most significant, and it has the largest share in load transport since 1998. The issue of optimal use of available transport capacity is a complex problem not only in logistics, but also in mathematics.

The objective of this paper is thus to develop a methodologically correct simulation platform allowing solution of the PDPTW problem (pickup and delivery problem with time windows)—the transport issue which consists in finding the optimum route between many points, taking into account time windows and load capacity of the available vehicles with the simulation system and evolution algorithms. This platform should also enable transition from settling the problem defined mathematically (yet with little practical application) to logistic problems based on the actual industrial needs.

2. Definition of the problem

The matrix $M_{[2q+1] \times [2q+1]}$ represents time and optionally costs of connection between any two points. One of these points is the transport base, the others refer to the order. There are p trucks in the base, each with the capacity c_i , $i = 1 \dots p$. There are q transport orders to be executed.

Every order is defined as a set of five elements $(A, B, m, t1, t2)$, where A and B are identification numbers (indexes in the matrix) of points of loading and unloading, m is mass of goods to be transported (we must direct the trucks with the total capacity larger than the mass of the goods $\sum c_i \geq m$ to execute the order), and $t1$ and $t2$ form the time window in which the order must be executed (date/ time from $(t1)$ to $(t2)$ the order should be executed).

The problem is static, that is all the orders are known at the time when planning starts. No new call may appear during execution of the plan.

The solution of the problem consists in completing all transport orders within the available means and all the above limitations.

To guarantee existence of the solution, soft time windows may be introduced, i.e. the pre-set times $t1$ and $t2$ may be exceeded, but their exceeding makes the solution worse (by a function of penalty defined in the problem). For such statement of the problem, there is a solution if we have at least one truck with $c > 0$.

3. Optimisation and selection of the acceptable solution

The problem stated in this way may have a lot of solutions, some of which are better than others. Therefore, it is important to phrase the criteria for which the optimisation of the found solution is provided.

There are many possibilities, e.g. minimisation of the total execution time of all the orders, the number of the used trucks, etc. The client satisfaction index may also be entered, e.g. at the maximum value when the goods are delivered right away, and decreasing when delivery is delayed in time for longer than the acceptable value. When a soft time window is accepted, the function of penalty may be added to estimation of the satisfaction of the client.

With this number of variables, it is necessary to define some assumptions as regards the conditions of the task. In this case, the issue is solved with soft time windows which guarantee existence of a solution and better reflect the reality. With transport orders, the time of loading and unloading has to be included as the function of the quantity of the goods, and the cost and time of connection between each pair of points is stored in the matrix. The cost and time do not need to be proportional. Three functions were selected for optimisation (minimising):

- The maximum number of the used vehicles defined as $\max_{t \in [0, T]} (v(t))$, where t stands for time, T stands for the time of execution of the last call, and $v(t)$ specifies how many vehicles are off the base at the given moment.
- The average cost (not time) of execution of all the orders defined as $\left(\sum_{j=1}^v \sum_{i=1}^{s_j-1} M_{[X_{s_j}, X_{s_j+1}]} \cdot cost \right) / n$, where v means the maximum number of vehi-

cles participating in execution of the order (defined as in the above function), s_j means the number of points visited by the j vehicle (along with the base at the beginning and the base at the end), and X means another point on the route of the given vehicle.

- The average index of dissatisfaction of the client with our services defined as $\left(\sum_{i=1}^n e^{\alpha \cdot \Delta t_i} \right) / n$, where Δt means the total delay in execution of the i call, α means dissatisfaction of our clients (their mood gets worse exponentially in time), and n is the number of calls. Delay is defined as a sum of exceeding the time window and the time added in execution of other orders, i.e. $\Delta t = \max((t_{\text{arr}} - t_1), 0) + (t_{\text{real}} - M_{[A, B]} \cdot \text{time})$, where t_{arr} means the time of arrival, t_1 means the end of the time window, t_{real} means the time between the end of loading the goods and the arrival to the point B, and $M_{[A, B]}$ means the minimum time of transfer between the points A and B (read from the matrix).

Such a defined mathematical problem can also be extended to the dynamic task by introduction of time into the simulation. In the initial moment, we would only know some of the calls for which the plan would be executed according to the earlier assumptions. However, later during the execution of the plan, which takes some time, additional call may come up. The times of their appearance and the parameters may be entered by the user or may come from the random parameter generator with the distribution parameters selected so as to enable possibly the most faithful simulation of the actual situations of transport companies. The program, apart from generating the plan, should have the possibility of its modification with elements unknown before. However, adding new calls to the algorithm is not supported in the current version.

4. Introduction to genetic algorithms

Every problem may be defined as the environment in which there is some population of individuals: the possible solutions. Each one of the individuals has specific data assigned which constitute his/ her genotype, and which are the basis for developing the phenotype with the adjusting function. The phenotype is a set of features significant for the adjusting function modelling the environment and assessed by it. All in all, the genotype describes the proposed solution of a problem, and the adjusting function assesses how good this solution is.

Genotype is made up of chromosome—units of information collected by the adjusting function—in which phenotype is encoded and, possibly, some information auxiliary for the genetic algorithm. Chromosome consists of genes, the smallest indivisible units of information (single arguments of the assessing function).

The following are common features for evolution algorithms which differentiate them from other, traditional methods of optimisation:

1. Using genetic operators which are adjusted to the form of solutions (the actions specific for the evolution process, fitted to the form of the input data).
2. Processing the population of solutions leading to parallel searching in the space of solutions from various points, which prevents “getting stuck” in the local extreme of the space of solutions.
3. Quality of the current solutions is the sufficient information for directing the search process.
4. Intentional introduction of random elements, similarly to the Monte Carlo calculation methods.

The genetic algorithm most often runs as follows (3, p. 33; 4, p. 38):

1. An initial population is drawn which creates the initial space of solutions of the problem according to statistical distribution.
2. The population is subjected to selection. The best adapted individuals in the population (the solutions closest to the optimal one) take part in the reproduction process, other are rejected as useless.
3. The genotypes of the selected individuals are subjected to evolutionary operators:
 - they are mutually matched way combination of the genotypes of their parents (crossing)—some arguments of the adjusting function are exchanged between the pair of solutions on the principle of complementarity, thus creating two new solutions maintaining some characteristics of the input solutions;
 - mutation is conducted, that is introduction of minor random changes in the solution to prevent stagnation of the algorithm in the local extreme of the adjusting function.
4. The second (successive) generation is born (the next population of solutions) and the algorithm returns to the second step if a satisfactory good solution was not found. Otherwise, the result is obtained.

5. Implementation details and substantial correctness of the platform

The software has been developed in which a clear user interface allows reading from a file, or directly from a user, the data necessary for the algorithm (the matrix of time and costs, the list of tasks and the list of trucks) processing these data (the evolutionary operators are mutation and crossover; the methodology of working with the data will be discussed in the following chapter), and returning the results. SPEA (Strength Pareto Evolutionary Algorithm) is the basic algorithm used by the software, although the program is ready for easy use of other algorithms implemented in a modular way by dll modular libraries. The descriptions of specific algorithms may be found in the literature (5, p. 126; 6, p. 47), and their tests and implementation form the subject of our next publication. Dissatisfaction of the client, the number of the trucks used and the cost of the operation are the optimised variables. Within the platform, individual solutions (proposals of solutions) are represented as single ob-

jects including several queues of the tasks executed by particular trucks (treated as the chromosomes of the crossing algorithm).

5.1. Format of data

The data, if they are not entered manually by the user, may be read from a text file including:

Matrix of time and costs

The first line of the file includes the number specifying the number of analysed places, the other lines include the square matrix where a pair of numbers in parentheses and separated with a coma is on the crossing of line n and column m . The first number is the time of travel between the points n and m , the second number is the cost of travel, and mathematical correctness of the entered data is guaranteed because the condition of the triangle in the metric space is tested for the entered data.

Table of tasks

The first line includes the number of tasks, further describe specific tasks as a series of numbers separated with commas, which mean (in the following order) the first point of the task (the point of loading) read from the matrix of time and costs, the beginning of the time window, the end of the time window, the second point (the point of unloading), the beginning of the time window, the end of the time window, the mass of transported goods.

Table of trucks

The first line specifies the number of the trucks, the further on specify load capacity of the trucks.

5.2. User interface for manual entering of data

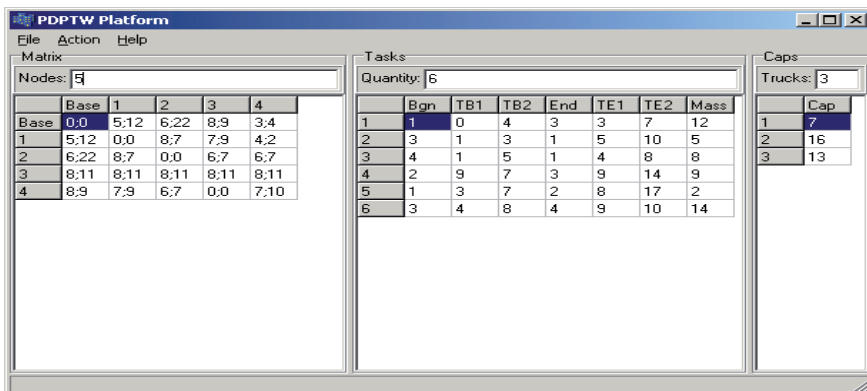


Figure 1. Interface design

5.3. Operations on solutions

The operators of mutation, crossover and cloning are defined on the solutions (individual agents). With these operations, more complex algorithms may be implemented.

Cloning

The result is the exact copy of the cloned solution, with breaking apart of all the memory dependencies: copying of all the data, bit by bit. Cloning is necessary to maintain the older solutions, as mutation and crossover modify the data of the solution.

Mutation

Mutation irreversibly modifies the proposed solution in a random way. If an incorrect solution results from mutation, the empty value is returned from the function. Our program in its original version executes three types of mutation (randomly selected for execution in a specific call):

- the permutation of the order of execution of the tasks by one truck within one solution;
- the exchange of the tasks between two trucks within one solution;
- handing over of the tasks by one truck to another within one solution.

The later tests proved that the second type of mutation runs worse than the third and is not necessary to ensure that the series of mutations could have a chance to generate any solution. In the final version, the first or third mutation is run with the probability of 50% each.

Crossover

Crossing between the solutions consists in selecting a random number of trucks from one solution and supplementing them with complementary trucks from the second solution, and then arranging the solutions so that every task is served exactly once. Our algorithm of the crossover:

1. Draw n trucks.
2. Create the list of tasks executed by these trucks in the second solution.
3. Remove all these tasks from the first solution.
4. For each drawn truck, at the end of its list of tasks in the first solution copy a list of the tasks executed by the corresponding truck in the second agent.

Crossover is defined in such a way that if the ancestors were correct it would give a correct descendant (each task should be served exactly once and the capacity of the truck will not be exceeded), which guarantees creation of only correct (not necessarily optimum) proposals of solutions.

After starting the program and entering the data, simulation is started for the pre-set number of generations of the genetic algorithm, by default executed according to the SPEA algorithm. The results of the simulation in the form of the final set of solutions are saved to a file.

6. Sample tests and results

Right at the very beginning it turned out that the exponential function counting dissatisfaction is not matched in terms of scale of the returned results with the rest of the optimised functions. Its values are several (even up to several dozen) orders of magnitude larger than for the other functions. This causes problems with the reliable implementation of the algorithm clustering method. Therefore, we replaced this function as follows:

$\sqrt{\sum_{i=1}^n (\Delta t_i)^2}$, where Δt remained unchanged. After modification, the algorithm is correct and does not favour any of its optimised parameters.

Test problem

The following sample test problem was used, reproducible in the real world:

The freight operator has three vehicles in his transport fleet, capable of transporting 19, 27 and 36 units of goods, respectively. For the needs of the problem, it is not important whether it is road, sea or air transport, as we assume that all transport units are capable of identical performance in terms of speed and the possibility of reaching the points set forth in the task.

There are six clients in the address base of the forwarder, located in different places. The time and cost of transfer between any two of them is known (it is not calculated on the basis of geographical coordinates, although there is such a possibility with, e.g., paid motorways or detours instead of regular straight line distances).

The data used in the test are:

| | X | A | B | C | D | E | F |
|----|----------|----------|----------|----------|----------|----------|----------|
| X: | (0, 0) | (9,12) | (10, 14) | (8, 9) | (5, 9) | (7, 11) | (11, 13) |
| A: | (9, 12) | (0, 0) | (8, 7) | (7, 9) | (10, 13) | (8, 9) | (15, 16) |
| B: | (10, 14) | (8, 7) | (0, 0) | (15, 16) | (8, 11) | (16, 15) | (11, 12) |
| C: | (8, 9) | (7, 9) | (15, 16) | (0, 0) | (7, 10) | (6, 8) | (17, 18) |
| D: | (5, 9) | (10, 13) | (8, 11) | (7, 10) | (0, 0) | (8, 7) | (10, 11) |
| E: | (7, 11) | (8, 9) | (16, 15) | (6, 8) | (8, 7) | (0, 0) | (12,12) |
| F: | (11, 13) | (15, 16) | (11, 12) | (17, 18) | (10, 11) | (12, 12) | (0, 0), |

where X is the transport base, and A–F mean consecutive clients. Thus it may be read from the above table, for example, that the time of transfer from the base to the point D takes five units of time (minutes, hours, days, depending on the scale of the enterprise) and is expressed in the cost of 9 (the costs of fuel, fees, etc.). In this case, the cost calculation is symmetric (the cost and time of transfer from X to D is identical in both directions), but it does not have to be the condition.

With the known geographical situation of the region of operations, nine transport orders were entered into the system, each one with the target point, the end point, the load of the goods to be transported and the time window in which loading and unloading should be done.

One of the sample orders is as follows:

(A, 6, 10, C, 13, 17, 12)—which means that the vehicle must load 12 units of goods in the point A between the 6th and the 10th unit of time (e.g. within 8 days, counting from the start day) and unload them in the point C, where collection of the goods may only be done between the 13th and the 17th unit of time. If these conditions are not met, penalty is charged.

Results

For the test algorithm (SPEA) applied for the test problem, optimum solutions have been found for each of the variables or intermediate solutions. The following charts refer to the following configurable data of the algorithm (these are internal parameters of the program):

- population size 240—or the number of solutions analysed in one moment;
- elite size 24—or the number of the best solutions selected from the population for further tests (10%);
- number of iterations 512—the time of operation of the algorithm calculated in its repeated runs. The exact clock time is variable and dependent on performance of the computer hardware.

The number of binary tournaments per iteration 48—or the number of solutions rejected within one iteration.

The population chart after the end of the algorithm:



Figure 2. Initial test results

Source: authors' own study.

And the chart of elite populations in the Pareto fronts:

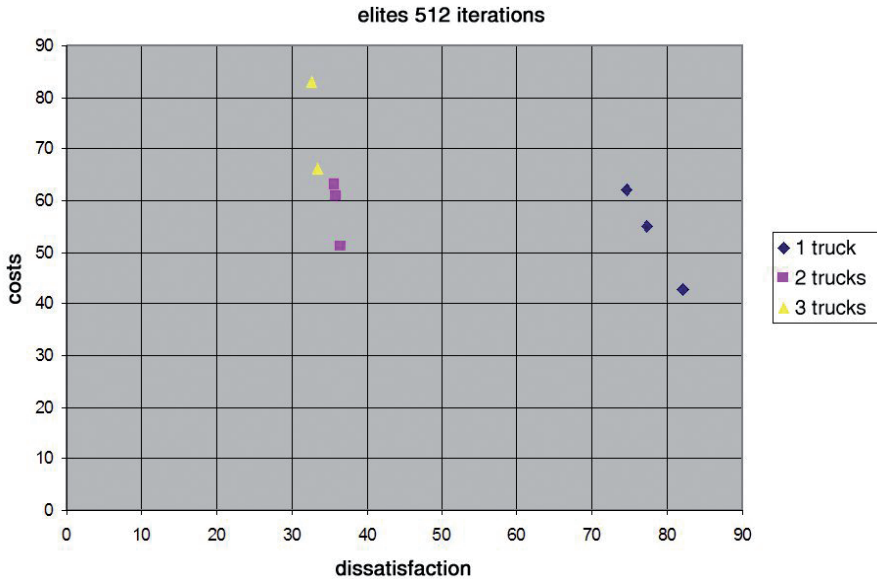


Figure 3. Optimum solutions found

Source: author's own study.

– elite solutions—or closest to the ideal—are:

| | | |
|---------|----|---|
| 32.4962 | 83 | 3 |
| 35.9166 | 61 | 2 |
| 82.0305 | 43 | 1 |
| 74.5185 | 62 | 1 |
| 35.6651 | 63 | 2 |
| 77.3499 | 55 | 1 |
| 36.4555 | 51 | 2 |
| 33.3617 | 66 | 3 |

For each of these solutions, it is possible to see the order of the places, where and when the vehicle should be sent to obtain the indicated result.

It is clear that after these corrections, the algorithm does what it is expected to do and finds the optimum solution for the pre-set three variables, which suggests its substantial correctness for the tested algorithm.

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Wielokryterialna optymalizacja zleceń transportowych przy użyciu innowacyjnego podejścia ewolucyjnego

Streszczenie: Jednym ze standardowych problemów spotykanych często w zagadnieniach logistycznych jest PDPTW (Pickup and Delivery Problem with Time Windows), gdzie dysponując ograniczoną bazą transportową, należy w sposób efektywny transportować towary z punktu A do B. Każda organizacja, zarówno biznesowa, jak i o charakterze niekomercyjnym, z oczywistych powodów niemożności ogarnięcia całościowo procesów logistycznych bez pomocy automatyzacji musi być wyposażona w system wsparcia logistycznego.

Alternatywą dla innych rozwiązań analitycznych może być zatem system oparty na algorytmach genetycznych, biorący pod uwagę możliwości infrastruktury oraz ramy czasowe i wynikające z nich kary za opóźnienia. Platforma ta powinna też umożliwić przejście od rozwiązywania problemu zdefiniowanego matematycznie (jednak mającego nikłe zastosowanie praktyczne) do problemów logistycznych opartych na faktycznych potrzebach przemysłowych. System taki został zaimplementowany i przy użyciu podstawowych operatorów genetycznych – klonowania, mutacji i krzyżówki jest w stanie planować rozwiązania dla dowolnie zdefiniowanego rozwiązywalnego problemu transportowego oraz dowolnie zdefiniowanego algorytmu używającego tych operatorów. Po uruchomieniu programu i wprowadzeniu danych rozpoczynana jest symulacja zadanej ilości pokoleń algorytmu genetycznego, domyślnie wykonywanych według algorytmu SPEA (Strength Pareto Evolutionary Algorithm). Wyniki symulacji w postaci końcowego zbioru rozwiązań wypisywane są do pliku. Dla zastosowanego algorytmu dla problemu testowego znalezione zostały rozwiązania optymalne dla każdej ze zmiennych bądź rozwiązania pośrednie.

Słowa kluczowe: algorytmy genetyczne, PDPTW, SPEA, system wsparcia logistycznego

KAROLINA CHRABĄSZCZ*

Using e-learning in the process of students' education

Key words: e-learning, distance learning, t-learning, e-learning platform, research

Summary: The paper presents the activities undertaken by the Małopolska School of Economics in Tarnów (MSET) in order to develop distance learning in students' education. Diversity of distance teaching forms has been outlined. The author has analysed advantages and shortcomings of distance teaching which may have major bearing on the future of e-learning in higher-level teaching. The possibility of adjusting time dedicated for learning and the rate of assimilating knowledge to individual needs of a student is an important advantage. E-learning allows minimising fear or shyness in some students during traditional lessons. The worst shortcoming of this system is lack of direct contact of a student with a teacher and other class participants. Another problem is lack of motivation and self-discipline in the learning person, so important in case of distant teaching.

The Małopolska School of Economics in Tarnów has its own e-learning platform based on the Moodle program. Similar types of platforms are already in use by academic facilities all over the world. The MSET e-learning platform was first used in teaching in the academic year 2009/2010. The classes with this tool were attended by 458 full- and part-time students. The paper presents initial research after the pilot classes in the blended learning system. The research results indicate that students support development of the college facility towards distant teaching, but without resignation of direct contact with the teacher. The experience of MSET may be helpful for other entities which have not undertaken actions related to distance teaching.

1. Preliminary notes

The form of teaching with the use of network and computer is increasingly spreading in university-level education in Poland. More and more university-level education facilities decide to implement distant teaching, thus more and more students may

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have their own opinion whether this form of teaching is suitable for them. At the time of the Internet and lack of time, the distant teaching form is becoming increasingly important. Many forms of this type of teaching are in existence for years. The higher school facilities should decide which form to select and which one will be best for their students, because the decision “whether” to opt for it should not be a question any more. This tool introduces a new way of thinking in university-level education. If the Polish college facilities should like to compare with the best ones in Europe or in the USA, they must invest in development of distance learning. E-learning is proven as a method supplementary or replacing the traditional didactic process (t-learning). Interest in e-learning is also increasing as a disciplinary field of science, which numerous publications prove.

The objective of this paper is presentation of possibilities offered by distant teaching in university-level education, with the example of the Małopolska School of Economics in Tarnów. Valuable information is provided from the questionnaire research in a group of students who have taken advantage of classes in the MSET e-learning platform.¹

2. Diversity of distance teaching forms. E-learning

Distance teaching (d-learning) is a method of teaching with indirect (opposite to direct as in t-learning) contact of a student and a teacher. Three groups of participants of this process may be named: teachers, pupils/ students and administrators. D-learning occurs in different forms such as: mail education, teleconference education, Internet (online) education or mixed education combining the above forms.

Mail education means periodical meetings of a student with a teacher to verify knowledge acquired independently on the basis of the material made available. Printed materials, course books, manuals or lessons broadcast on TV or radio are used here. The e-mail model is also called the “first generation model”. Teleconference education makes use of satellite television. With this method, students have the opportunity of getting feedback from the teacher with telephone, e-mail, television or radio. This model, called the “second generation model,” consists in using printed materials, lessons on audio and video tapes, computer floppies, interactive video tapes and disks. The “third generation model” is the so-called teleeducational synchronous model. It consists in the use of audio and video conferences, and radio and TV lessons. Online education is the “fourth generation model”. It consists in uploading courses to a website with materials for students. Feedback in this form of education is based on e-mail or chat communication. Mixed education may have the form combining all the above forms, that is simultaneous sending of printed materials, tele-discourses, online classes, etc. (1, pp. 12–13; 2). All in all, d-learning is a training technique which

¹ The research has been conducted in cooperation with Łukasz Kowalski, MA, assistant at the Computer Laboratory of the Małopolska School of Economics in Tarnów.

makes use of all the possible media electronic, such as the Internet, Intranet, Extranet, audio/ video tapes, satellite messages, interactive television or CD-ROMs. The whole sense of distance teaching is in shifting centre of gravity in teaching from the teacher to the student.

E-learning is one of distance teaching forms. Due to the existence of several criteria of classification, e-learning is broken down into many forms. Table 1 presents selected forms of e-learning.

Table 1

E-learning classification

| Criterion of classification | Form of e-learning |
|----------------------------------|--|
| Accessibility in time | <ul style="list-style-type: none"> * Synchronous mode—simultaneous presence of the learners and the teacher * Asynchronous mode—does not require the presence of the teacher at the time of the course participants taking advantage of the training |
| Student–teacher relation | <ul style="list-style-type: none"> * Courses with the teacher—executed in any mode of the described above * Courses without the teacher—with the use of prepared, dedicated multimedia materials * Independent self-learning—with the use of various materials and forms of teaching |
| Relation to traditional teaching | <ul style="list-style-type: none"> * Supplementary to traditional teaching—electronic teaching supports traditional didactic processes * Replacement of traditional teaching—the whole programme is executed with e-learning methods |

Source: (3).

E-learning is a broad and non-uniform field. The term of “e-learning” includes all the processes related to teaching and learning in the environment and with modern information technology, mostly with the Internet. E-learning is an “interactive educational process” which allows execution of specific relationships between teacher and student as well as between individual students in the group with the available technical measures (4, p. 7). E-learning is not only course materials sent over a computer network. E-learning systems are not limited to LMS or LCMS class solutions. Starting up the LMS (Learning Management System) is associated as a synonym to implementation of e-learning. This system is the most popular e-learning solution in the world (5, p. 68). LCMS is a system for management over educational materials (Learning Content Management System). More and more often, these terms are replaced with more general, like virtual learning environment (VLE). The above terms are helpful in defining the e-learning platform. It is an expanded application, a set of tools which facilitates creating, managing, and administration of educational courses (6, p. 9). Very often, the e-learning term is associated with education over the Inter-

net, yet e-learning means all activities in support of the training process which use various tele-IT technologies (7, p. 28).

3. Advantages and shortcomings of distance teaching

Distance teaching at a higher level is not a new concept. Oxford University is believed to be its forerunner, where the first forms of distance teaching were introduced as early as in 1780. This form of teaching developed in the 19th century (1, p. 39). At present, the best developed higher education facilities in Poland in terms of e-learning are the AGH University of Science and Technology in Krakow and the Nicolaus Copernicus University in Toruń. However, with every new year more and more university-level education facilities reach for the possibilities offered by e-learning, thus the analysis of advantages and shortcomings of this form of education. The possibility of adjusting time dedicated for learning and the rate of assimilating knowledge to individual needs of the student is clearly a major advantage. The student alone decides when and where he/ she will learn (*anytime, anywhere*). It is especially important for persons employed, living in families or having other obligations. E-learning allows minimising fear or shyness in some students during traditional lessons. It gives the possibility of asking questions by e-mail, chat, discussion forum or blogs, thus giving students distance to teachers and letting them not be shy. Using various forms of message (video or text materials) is another advantage. The video technique allows the student to pause, rewind and view again the video material at any time. Remote teaching is a method of gaining education by people for whom the traditional form of teaching is impossible due to different limitations, e.g. high costs of commuting, living costs in the place of the classes or due to the fact that quality of teaching in the local centres is too low. It is also an alternative form of learning for the disabled. Relatively low cost of functioning of the system is another advantage of e-learning. Education with e-learning may reduce costs of teaching, especially in non-stationary and postgraduate studies. The highest costs go to development and implementation of the system. After that, the course may be used for many years without major financial expenditures. With implementation of the distant teaching system, academic facilities may minimise costs by reducing occupation of buildings or didactic rooms. It is of special importance in case of these entities which have insufficient number of didactic rooms against the number of their students. Moreover, the content of e-learning materials may be checked many times, thus making errors occur much less frequently than in case of traditional lecture notes. E-learning may be an important advantage of the educational offer of any educational facility going in this direction. Apart from many advantages of applying for e-learning, continuous increase in attractiveness of the teaching system and materials made available to training participants is an important aspect (8, p. 2).

The worst shortcoming of this system is lack of direct contact of the student with the teacher and other class participants. Another problem is lack of motivation and self-discipline in the learning person, so important in case of distant teaching. The research shows that a high percentage of those starting e-learning courses do not complete them. Nowadays there are also persons sceptical about using computer hardware or who have problems with operation of this hardware, which constitutes another barrier to the development of the system (9, p. 83; 5, pp. 25–27; 10).

Additional problem is the issue of protection of copyright for the materials included in the learning courses and the issue whether the e-learning course is a multimedia work subject to protection by a number of acts. These issues, in the view of the Polish intellectual property rights, are regulated not only with the provisions of the copyright law, but also with the legal acts such as the Act of 27 July 2001 on database protection (Dz. U. 2001, no. 128, Item 1402), the Act of 18 July 2002 on providing services with electronic means (Dz. U. 2002, no. 144, Item 1204), the Act of 16 April 1993 on suppression of unfair competition (Dz. U. 2003, no. 153, Item 1503) (11, p. 1). Every higher education facility offering e-learning methods must face the issue of copyright. The issue of copyright and e-learning is not legally settled in the Polish legislation. The considerations related to e-education and use of technology in university-level education from the view point of protection of the author's rights are possible with the Act of 4 February 1994 on copyright and related rights (Dz. U. 2000, no. 80, Item 904 as amended) (12, p. 21).

4. MSET e-learning platform in Tarnów

For didactic purposes, the e-learning platform was developed at the Małopolska School of Economics in Tarnów, following thus the current trend in university-level education.² It is based on the Moodle program (version 1.9.5+build of 17 June 2009). Moodle (Modular Object-Oriented Dynamic Learning Environment) is one of the most popular e-learning platforms used by many Polish university-level education facilities. It is *open-source* software made available for free under the GNU GPL public license. The Moodle platform is used by such facilities as Open University of the United Kingdom, Ohio State University, the University of York, Athabasca University—Canada's Open University, Open Polytechnic of New Zealand, the University of Iceland, etc., and the leading Polish academic facilities such as the Jagiellonian University, Cracow University of Economics, Maria Curie-Skłodowska University, Adam Mickiewicz University in Poznań and many other (6, p. 12).

²The MSET platform is supervised by Paweł Belzowski, MA, Head of the Computer Laboratory and employee of the Independent Department of Computer Science and Quantitative Methods of the MSET.

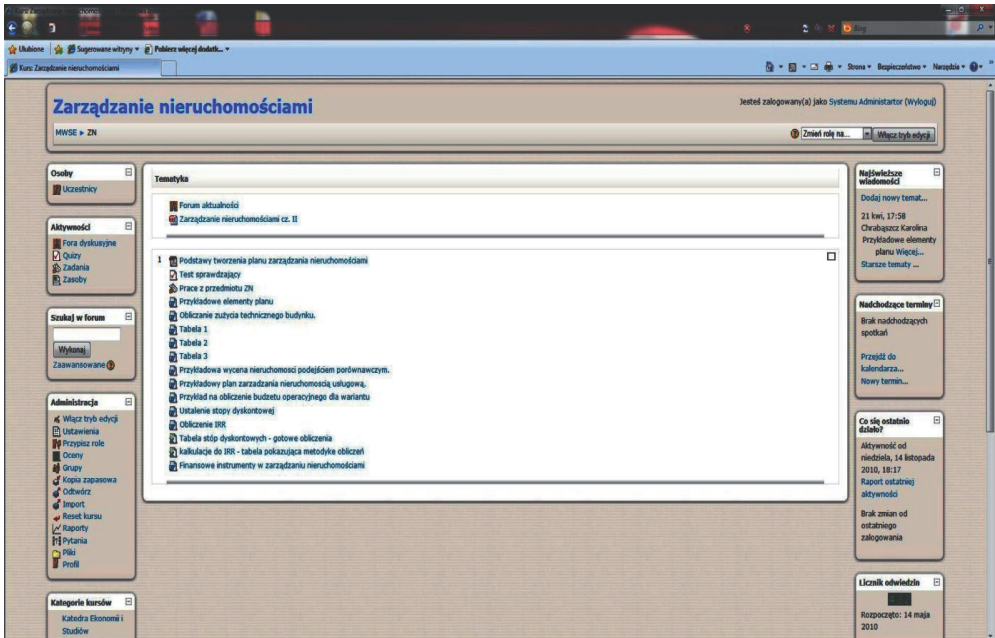


Figure 1. The MSET platform, the “Estate property management” course in the 6th term of stationary and non-stationary studies of the 1st degree in Management, with Estate property management specialisation

Source: Internal materials of MSET.

The MSET e-learning platform was first used in teaching in the academic year 2009/2010. The classes with this tool were attended by 458 full- and part-time students. During the classes with the MWSE e-learning platform, the students had personal contact with the teacher, thus the mixed form was adopted, between e-learning and t-learning, the so-called blended learning. The necessary materials were uploaded to the platform which the students were to prepare, read and assimilate. These materials were in the form of videos, quizzes and documents in the Word or PDF formats. In case of the “Estate property management” course, full-time students who have access to computers were filling in multimedia tests in presence of teachers during the classes. Extension students were to fill in the test uploaded to the platform off their duties, at the defined date and time.

After completion of their classes, the students were to fill in the questionnaire on their opinions on teaching in the distance learning system in the e-learning platform. The answers to the questions in the questionnaire were given by 158 students in the Management and Tourism and Recreation faculties. The questionnaire consists of 20 questions, 2 on the imprint, 3 on using the Internet in teaching, 11 on opinions on the e-learning system education in general and 4 on opinions on the MSET plat-

form. 97% of the responders (152 persons) have permanent Internet access at home. 69 respondents (44%) who gave answers to the questions asked in the questionnaire can use the Internet several times a day, 65 persons (41%) at least once a day, 11% of the respondents (18 persons) 2–3 times a week, and 5 persons (3%) several times a month. The research shows that over a half of the respondents (64%) occasionally print text material which they have to learn if it is more than three pages. This proves that more and more students are getting used to reading text directly from the screen. Only 20% of the respondents always print text material and 15% always read it directly from the screen.

The research shows that the students mostly accept forms of distance teaching, but at the same time do not want to resign from direct contact with the teacher and with other participants in the course. A definite majority of persons participating in the research (89%) support this form of teaching. Only 11% persons are definitely against it. Among the answers there are comments that this form of teaching is appropriate only for selected subjects.

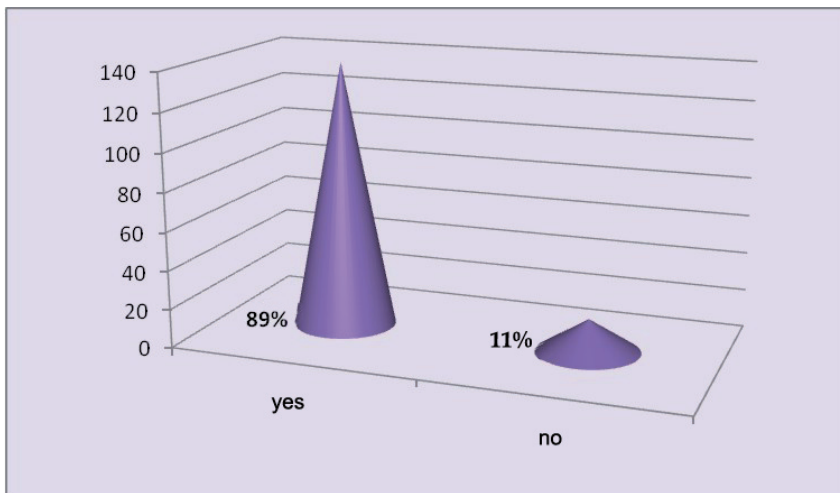


Figure 2. Answers to the question whether the e-learning platform is suitable for the person

Source: authors' own study

At the same time, 75% of the respondents are willing to continue education in the mixed mode, that is following the blended learning way (in the traditional way with the use of the e-learning platform). 15% of the respondents would like to educate solely with e-learning, and 10% solely in the traditional way. 86% of the respondents (135 persons) are willing to use the e-learning system for a larger number of subjects in further terms. The attitude to e-learning could be expected to be differentiated depending on the mode of study. The needs of stationary and non-stationary students

depend on family situation, work, etc. Extramural studies students work in regular hours, are more bound to their work places than full-time students. Family obligations are further limitations, therefore extramural students would be expected to support d-learning more than full-time students. The research shows that there are no differences in the views on this issue between full-time and part-time students. 89% (90 out of 101) extramural students and 88% (50 out of 57) full-time students like this form of managing classes.

The most important benefits from using e-learning were found to be freedom of learning (place and time)—85%, individualisation (custom rate, automatic adjusting of material to gaps in knowledge)—50%, savings (no commuting costs and loss of time)—41%, the possibility of joining the process of teaching those who had no opportunity to take part (the disabled, living farther away)—37%, easy, although distant contact with the teacher—26%.

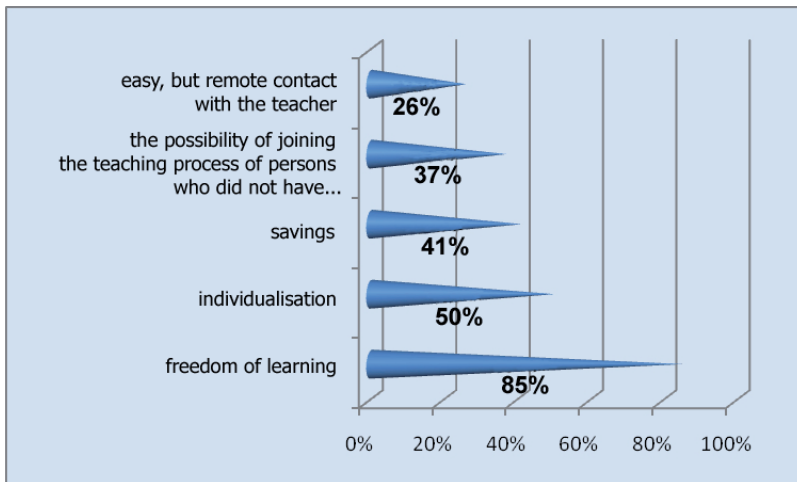


Figure 3. Answers to the question about the most important benefits from using e-learning

Source: authors' own study

The respondents named the worst shortcomings of this system: lack of possibility of direct contact with the teacher (64%), small possibility of cooperation with other participants (42%), the necessity of having high motivation (36%), the necessity of having optimum equipment and Internet connection (33%).

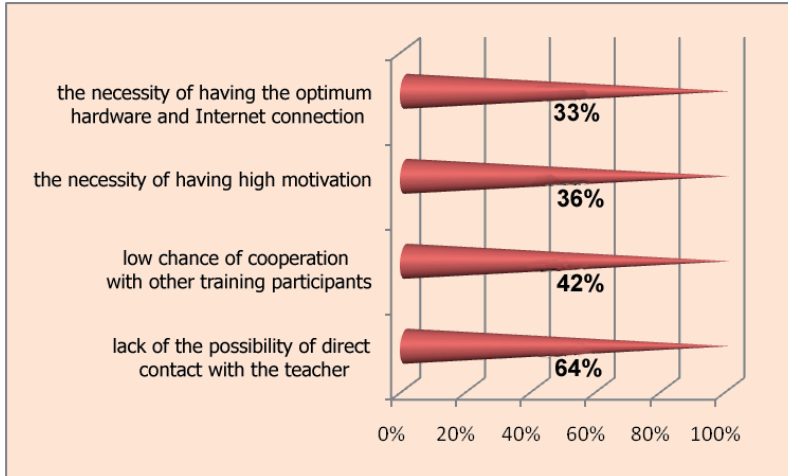


Figure 4. Answers to the question about the most important shortcomings in using e-learning

Source: authors' own study

The respondents have considered as the most effective forms of communication during the e-learning course: text messengers (64% of the respondents), discussion forums (63%), electronic mail (40%), video talks (37%), chat (27%), telephone talks (18%) and blog (14%). The respondents considered multimedia files (66%), prepared text documents (29%), forum statements (4%) the best forms of handing over knowledge during the course. To the question about the best methods of verification of knowledge in the e-learning course, the respondents stated online tests (76%), exercises, interactive lessons and quizzes (66%) and written statements (13%).

The respondents (81%) are of the opinion that e-learning will be the main source of gaining knowledge in the future. According to the respondents (90%), the MSET platform has been prepared professionally.

5. Final remarks and conclusions

Distance teaching is nothing new. Various forms of this teaching have developed for years, all with progress in technology, changing attitudes in people, and changing civilisation. The disputes about effectiveness and need of such form of learning have continued for a long time and will continue. The rich variety of methods and forms of d-learning allows selection of the most suitable form for the given individual, for the organisation or for the educational facility. Blended learning gains many positive opinions. The role of teaching in the mixed system, in the traditional way with the e-learning platform, that is the so-called blended learning, is strengthening

with the research which shows that this form of teaching brings about much better results than online teaching alone or the traditional mode alone, in the building of the college facility, with the teacher. The research shows that combination of these two forms of teaching makes the students learn in the most effective way (13, pp. 41–43). They have direct contact with the teacher, additional contact over the platform, chat, discussion forum, e-mail, and the possibility of discussion with other students and unlimited access to materials. The research conducted with participation of students from the Małopolska School of Economics in Tarnów confirms this thesis. Students support development of the educational facility with distance learning, but do not want to give up direct contact with the teacher which they highly value. Every important educational facility in Poland which pursues modern technology must invest in distance teaching systems, at the same time not depriving their students of direct contact with the teacher and with other students in traditional classes. The Małopolska School of Economics in Tarnów intends to continue growing with distance learning and expand the scope of its subjects supported with the e-learning platform.

The educational facilities which have not undertaken attempts at implementation of e-learning systems should initiate their activities with creation of their own e-learning platform. The platform may be developed on the basis of the free Moodle program, which is successfully used all over the world. In the first period of work on the implementation of distant teaching, motivation is very important, and it may be aroused in many ways. All types of training events are useful which eliminates barriers that teachers have to face when preparing to the first tests of work with the e-learning platform. Each educational facility should prepare its own student training system for operation of the platform. Obligatory training of 1st year students in e-learning platform operation is a good idea. The “self-learning manual” allows becoming independently acquainted with operation of the platform at any place and time. The research shows that using the e-learning platform as a tool for giving variety in the traditional system of teaching, that is blended learning, is the most effective way of its use.

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Wykorzystanie e-learningu w procesie kształcenia studentów

Streszczenie: W artykule opisane zostały działania, jakie podjęła Małopolska Wyższa Szkoła Ekonomiczna w Tarnowie (MWSE) w celu rozwinięcia distance learningu w kształceniu studentów. Przedstawiono różnorodność form nauczania na odległość. Autorka artykułu przeanalizowała wady i zalety nauczania na odległość, które mogą mieć znaczącą wagę dla przyszłości e-learningu w nauczaniu na poziomie wyższym. Ważnym atutem jest możliwość dostosowania czasu poświęconego na naukę, jak i tempa przyswajania wiedzy do indywidualnych potrzeb ucznia. E-learning pozwala zminimalizować strach czy nieśmiałość uczniów, jaką przejawiają oni względem nauczyciela podczas tradycyjnej lekcji. Największą wadą tego systemu jest brak bezpośredniego kontaktu studenta z wykładowcą i innymi uczestnikami zajęć. Inny problem to zdarzający się brak motywacji i samodyscypliny uczącego się, tak ważny w przypadku zdalnego nauczania.

MWSE w Tarnowie posiada własną platformę e-learningową, bazującą na programie „Moodle”. Podobnego typu platformy wykorzystują uczelnie wyższe na całym świecie. Po raz pierwszy platforma e-learningowa MWSE została zastosowana w nauczaniu w roku akademickim 2009/2010. Zajęcia za pomocą tego narzędzia odbyło w sumie 458 studentów studiów dziennych, jak i zaocznych. W artykule zaprezentowano wstępne badania po przeprowadzeniu pilotażowych zajęć w systemie blended learning. Wyniki badań wskazują, iż studenci popierają rozwój uczelni w kierunku zdalnego nauczania, ale bez rezygnacji z bezpo-

średniego kontaktu z wykładowcą. Doświadczenia Małopolskiej Wyższej Szkoły Ekonomicznej w Tarnowie mogą być pomocne dla innych podmiotów, które jeszcze nie podjęły działań w kierunku nauczania na odległość.

Słowa kluczowe: e-learning, distance learning, nauczanie tradycyjne, platforma e-learningowa, badanie

MARIA DĄBROWA*

Study in standard of living—methodology of structure of selected indicators

Key words: standard of living, Geneva method, HDI indicator, threshold meter, distance

S u m m a r y: Social statistics has been interested for many years in such categories as: *standard of living* and *quality of life*. These two categories should be regarded separately, even though in common language they are often synonymous. For this reason, the initial part of this paper provides clarification for these terms along with comments related to terminology and methods used in the research. The paper is dedicated to only one of these categories, standard of living, yet discussion of both terms was necessary.

Research on standard of living has been concentrated since 1950s on building a synthetic, objective indicator which would enable not only description of a phenomenon, but also comparison of the degree of meeting material and cultural needs in the international scale.

The paper presents two research procedures: the Geneva method (distance) and the method of building the Human Development Index, HDI.

In case of the Geneva method, the main methodological premises have been presented along with mathematical formulae which allow building the aggregated, synthetic indicator of the degree of meeting material and cultural needs. Both advantages and shortcomings of this method have been discussed.

The traces of the distance method may also be noticed in the building method of the said HDI indicator. The premises and mathematical formulae adopted in this method to enable building this indicator have been presented. The HDI index has also been calculated on the basis of the 2010 data. As this index is used in international comparisons, the research results from 2010 and the rank of Poland among 169 countries of the world have also been given.

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1. Introduction

In the analysis of such categories as, e.g., standard of living, quality of life, living conditions, social development of well-being, the researchers have been facing a number of difficulties. These are the difficulties of both substantial (what is there to be studied?) and methodological (how to study?) nature. This fact was already noticed by Andrzej Luszniwicz (1, p. 11). At the same time, in 1950s interest was increasing related to standard of living and construction of a synthetic index which would allow quantification of standard of living and comparison of the degree of meeting material and cultural needs on the international scale. This type of research in Poland dated back to mid-1960s (1, p. 12). The statistical procedure proposed by the United Nations Research Institute for Social Development (UNRISD), called *the Geneva* or *distance method*, published between 1960s and 1970s, contributed to development of this research. This method was also used at this time in research in Poland. The original version of this method had to be modified and adapted due to the system in force in Poland and the centralised economy.

The last twenty years in Poland is a period of deep changes in the system and in the economy. 2004 brought about another breakthrough change: Poland joined the European Union. These changes revived interest in the issues of standard of living and quality of life under the changed reality. Both during the system transformation period and at present, after joining the European Union, numerous studies were conducted (e.g. by the Centre for Public Opinion Research, CBOS, or GUS) and research projects were under way (e.g. financed by the Committee for Scientific Research). The reports from these studies show social and territories differentiation in living conditions in Poland and comparisons with other countries are made.

Under the auspices of EUROSTAT, studies are systematically conducted in the field of social statistics, with attention paid to standard of living and social development of member countries, in particular these which joined the European Union in recent years. The objective of this research is to create databases, design social indexes and such their interpretation which would allow obtaining results comparable for all member countries.

The European Union Statistics on Income and Living Conditions, EU-SILC, should be mentioned here. EU-SILC (2) is an instrument used for collecting current, cross-section and comparable data related to income, level of poverty, social exclusion and living conditions in Europe countries, in particular in the EU member countries. These studies were initiated in 2003 in several EU countries, covered 15 countries from 2004, and more 10 countries from 2005 which joined the EU along with Poland on 1 May 2004.

The ranking of countries for their level of development became highly significant in recent years. Preparation and publication of the results of the research dedicated to practically all countries of the world which agreed to make data available, is the work

of the UN branch for Development (UNDP). Every year starting from 1990 it has been publishing the *Human Development Report* which employs HDI, the Human Development Index.

This paper discusses the main methodological premises related to the Geneva method and determination of the HDI index.

2. Standard of living and quality of life—comments on terminology

Barbara Pawelek (3, pp. 12–23) has comprehensively reviewed literature¹ for the definitions proposed by the authors of the categories listed in the introduction and analysed the terminology used by them. The review of selected definitions presented by the author proves both their variety and different approach of individual researchers to measurements and descriptions of the given phenomenon.

It is significant that attention is paid in the discussions concerning living standard not only to material (economic) aspects but also to emotional, spiritual and moral condition and the feeling of safety (one's own, of the family, of property, of work), respect, esteem and problems related to health care or educational possibilities.

For this reason, research related to standard of living (so, in a sense, social welfare) should cover these two aspects in parallel: economic expenditures and social aspects (1, p. 16).

The opinion of the Finnish sociologist, Erik Allardt, are also interesting. He made a similar classification, assuming that social welfare consist of three areas of human needs: *to have*, *to love* and *to be*. At the same time, E. Allardt made difference between the terms: *standard of living* and *quality of life*.

He assumed that *standard of living* is related to material needs and is determined by the first factor of human needs (*to have*), whereas *quality of life* means needs other than material which as such are characterised by the two other areas of human needs (*to love* and *to be*).

Analysing views of various authors, the most problematic was unanimous defining of the terms of *quality of life* and *standard of life*, and most authors make a clear distinction between these categories.

The definitions by Teresa Słaby (4, p. 8) are used in many studies on social statistics concerning the categories discussed here:

- *Standard of life*—is the degree of meeting material needs, the basic in the hierarchy of human needs.
- *Quality of life*—“includes all these elements of human life which are related to the fact of human existence, being somebody recognised and feeling various emotional conditions resulting from, e.g., the fact of having a family, colleagues, friends.”

¹ These are numerous titles in economy, social statistics, sociology and psychology.

Two types of statistical features may be found in statistical research: quantity (measurable) and quality (non-measurable) features. The first category includes these features (or properties of the elements of the studied community) which may be specified with numbers. The features used in the study of *standard of living* are in the quantity measure.

The other group includes the features whose specific variants are in quality categories, and they may be specified verbally. Statistical features related to studying *quality of life* are quality features.

Therefore, numerical methods may be used for studying standard of living (or economic wealth), objective indicators, models, and forecasts may be developed.

In case of research on quality of life, that is quality features, using these mathematical operations and statistical methods is limited and determined by the type of measure scale (5, pp. 23–34). Only polls, interviews or questionnaires may be used in acquiring statistical data, and these are all cost- and time-consuming methods. Moreover, it has to be remembered that results of this type of research are marked with a large dose of subjective, emotional feelings of the studied persons.

Attention has to be paid to the aspect of the research related to social results of economic changes (6, p. 107): determining two types of the studied statistical communities. These are:

- the household community;²
- the community of residents (the population).

These communities are most often studied with partial studies on the basis of random studies. The choice studied subject is closely related to the subject matter of the research.

Households are usually the studied community in the research on standard of living or social conditions. In this case, the economic aspect is important: acquiring and spending cash to meet material and cultural needs.

The population is taken as the studied community in case of research in quality of life. Then, individual persons are covered with statistical observation and the degree of meeting the given need or satisfaction with various aspects of life are determined with subjective assessment.

Due to the further discussion, the following is assumed:

1. The definition will be used in determination of *standard of living* as stated by A. Luszniwicz (1, p. 13)³: “standard of life of the population (Y) in the given unit of time (t) and in the given unit of space ($d = 1, 2, 3 \dots$) shall mean the degree of meeting material and cultural needs of households ($X_{1td}, X_{2td} \dots X_{ktd}$) executed (in the mean-

² *Household* may be understood (following A. Luszniwicz, 1, p. 18) as “a team of people residing together and being in material relations (co-dependency), i.e. with a common household budget.”

³ It is a proposal of defining the standard of life formulated by the UN experts and adapted to the Polish conditions (in 1970s).

ing of securing it) by streams of fee-paid goods and services and gratuitous funds of social consumption and natural use.”

2. *Quality of life* shall mean the definition quoted above, as formulated by T. Słaby.

3. The Geneva (distance) method as statistical method of quantification of standard of living—the basic methodological assumptions

The above quoted definition of standard of living is the one of the studies on the degree of meeting material and cultural needs in households⁴ with the Geneva method, which assumes the form in the stochastic approach (1, p. 13):

$$Y_{id} = F\{[X_{id}], \xi_{id}\} \quad t = \text{const}, \quad d = \text{const}, \quad i = 1, 2 \dots k \quad (1)$$

Where:

Y_{id} —the aggregated variable characterising standard of life for the defined period of time (t) and the specified unit of space (d),

ξ_{id} —the random item of the model,

$[X_{id}]$ —the vector of the specified variables of household standard of living (the measures); the expected values of the degree of meeting needs is their function.

Some attention should be paid to the terms adopted conventionally by A. Luszczewicz (1, pp. 11–12): *measures* and *factors*.

Measures of standard of living or, broader, *social indexes* shall mean in his approach (1, pp. 77–78) the variables used for studying the degree of meeting material and cultural needs of households, regarded as numerical assessments of social results of economic growth. Exogenic variables are named *factors*.

Teresa Słaby elaborates slightly more on *indexes* and *measures* (6, p. 108). She states that many researchers regard these terms as identical, while others emphasise certain differences: *measure* may be understood as a specific empirical numerical assessment, and when this assessment is used also to interpret changes in social phenomena, the term *index* is used.

He named 7 groups of material and cultural needs in his research:

$$X = [X_i] \quad i = 1, 2, 3 \dots 7, \text{ where:}$$

X_1 —food

X_2 —shelter (housing, clothes, shoes)

X_3 —health care

⁴A. Luszczewicz (1982, p. 18) defines household as a team of persons residing together and sharing the household budget.

X_4 —education

X_5 —recreation (free time and its use)

X_6 —social protection

X_7 —material security.

All the other variables which are not included within the selected groups of needs are regarded as factors, that is exogenous variables which explain variations in standard of living. A set of representative measures whose number is theoretically unlimited, but in practice is limited with the base of the available information, is specified in each group of material and cultural needs. These measures may be agreed by non-random selection.

The selected groups of needs may be specified in a slightly different way. Andrzej Luszniwicz (1, p. 20) quotes the classification used by Jan Drewnowski, who listed three aggregates of groups of needs:

- (A) consumer needs, including: food, clothes, housing, health and education;
- (B) protection needs—including: recreation and protection;
- (C) environmental needs—to which he included: social environment and physical environment.

9 groups of needs were used in the study under direction of Aleksander Zeliaś (5, pp. 103–105):

1. Health care and welfare;
2. Employment market, work conditions and safety;
3. Salary and income;
4. Housing conditions;
5. Education;
6. Recreation, culture and free time;
7. Communication;
8. Public safety;
9. Degradation and protection of the natural environment.

Several variables were defined in each of the groups of needs, which was determined with the accessibility of data from statistical annuals.

Introducing *threshold measures*, called critical, is a significant feature of the distance (Geneva) method:

- a) *The minimum threshold measure* ($x_{0,ij}$)—which theoretically corresponds with the worst of the known conditions of meeting needs in which survival is possible;
- b) *The optimum threshold measure* ($x_{100,ij}$)—which corresponds with highly satisfactory meeting of material and cultural needs.

After determining threshold measures, the sequence of inequalities is true: $x_{0,ij} \leq x_{ij} \leq x_{100,ij}$ for each pair of ij , where i means the number of the group of needs, and j is the number of the representative measure in the given group of needs.

Threshold measures limit the range of variability of partial representative measures. Determination of the value of threshold measures is not easy, especially the value of the *optimum threshold measure* of meeting material and cultural needs. Luszniwicz (1, pp. 27–28) quotes several methods which enable determination of threshold measures:

- **Statistical methods**—the minimum and optimum threshold values are identified with the lower and upper limits of confidence intervals and, e.g., with the values of extreme decyls (the fifth and the ninety-fifth) for representative measures in the form of continuous random variables.
- **Planning methods**—the forecasts of development in the scope of selected material or cultural needs (selected statistical, econometric, optimisation or balance techniques may be used here) may be the basis for determination of the threshold measures, especially the optimum ones.
- **Comparative methods**—determination of some threshold measures may be based on theoretical standards (e.g. in the scope of food) or on the basis of practice of other countries or regions (at the relatively highest or lowest level of economic, social development).

After determination of the values of threshold measures, the distance formula of the index of meeting the j need in the i group of needs may be given:

$$x_{ij} = \left[\left(\frac{x_{e.ij}}{x_{0.ij}} - 1 \right) : \left(\frac{x_{100.ij}}{x_{0.ij}} - 1 \right) \right] \cdot (1 - k_{ij}) \cdot 100\% \quad (2)$$

$x_{e.ij}$ —means the empirical numerical value which a specific representative measure in the given group of material and cultural needs assumes,

k_{ij} —is the Lorenz concentration index and assumes the values from the range $\langle 0, 1 \rangle$.

The above formula of the partial index used for numerical representation of the degree of meeting the j needs in the i group consists of two multiplicatively connected elements: (Δ_{ij}, e_{ij}) :

- The first of them measures the average percentage distance from the achieved level of meeting of the given need to the level determined by the optimum threshold measure:

$$\Delta_{ij} = \left[\left(\frac{x_{e.ij}}{x_{0.ij}} - 1 \right) : \left(\frac{x_{100.ij}}{x_{0.ij}} - 1 \right) \right] \cdot 100\% \quad (3)$$

- The second element, $e_{ij} = 1 - k_{ij}$, expresses the result of empirical distribution of the given representative measure.

The basic formula of the index of meeting a specific need x_{ij} may be saved with the matrix:

$$[x_{ij}] = [\Delta_{ij} e_{ij}] = \begin{bmatrix} \Delta_{11} e_{11} & \Delta_{12} e_{12} & \dots & \Delta_{1m_1} e_{1m_1} \\ \Delta_{21} e_{21} & \Delta_{22} e_{22} & \dots & \Delta_{2m_2} e_{2m_2} \\ \dots & \dots & \dots & \dots \\ \Delta_{k1} e_{k1} & \Delta_{k2} e_{k2} & \dots & \Delta_{km_k} e_{km_k} \end{bmatrix} \quad (4)$$

Where: $i = 1, 2 \dots k$ (the groups of needs), $j = 1, 2 \dots m_i$ (the representative measures).

Entering empirical statistical information into the formula (2), thus into the formula (4), a set of the matrix $[x_{ij}]_d$ for the selected territory units ($d = 1, 2 \dots$) is received.

Here the immense problem arises related to the concept of the distance method (1, pp. 36–37): aggregation of partial indexes of meeting the i needs in the j groups of needs into the form of the group indexes X_i and into the form of a collective, synthetic index standard of living (Y). To do this, in the procedure of aggregation of partial and group indexes of meeting needs ($x_{ij} \rightarrow X_i$ and $X_i \rightarrow Y$), weights should be used which should reflect the share of the representative measures and the selected groups of needs in developing the standard of living (households). It is an extremely difficult process, but for the lack of knowledge of unanimous social preferences.

Distance weights (w_{ij}), and distance weights w_i at a further level of aggregation may be designed for the aggregation process. The function of the distance between the empirical and the optimum levels of meeting the j need in the i group of needs is used in their development.

These weights may be determined with the formulae:

$$- \quad w_{ij} = \frac{100}{x_{e.ij}} \quad (j = 1, 2 \dots m_i) \quad (5)$$

$$- \quad w_i = \frac{100}{x_{e.i}} \quad (i = 1, 2 \dots k) \quad (6)$$

The inequalities are met: $\sum_{j=1}^{m_i} w_{ij} \geq m_i$ and $\sum_{i=1}^k w_i \geq k$,

where m_i stands for the number of representative measures in the i group of needs.

The formula (6) is used for determination of the weights at a further level of aggregation.

Please note that the lower the degree of meeting the given need or group of needs, the higher the level of the distance weight. The lower the sum of distance weights at a given level of aggregation, the shorter the distances of empirical measures against the optimum threshold measures.

Based on the system of distance weights obtained from the formulae (5) and (6), two types of aggregated indexes of meeting needs may be obtained:

$$1. \quad \text{The indexes of meeting groups of needs: } X_i = \frac{\sum_{j=1}^{m_i} x_{ij} w_{ij}}{\sum_{j=1}^{m_i} w_{ij}} = \frac{m_i}{\sum_{j=1}^{m_i} \frac{1}{x_{ij}}} \quad (7)$$

where $i = 1, 2 \dots k$ means the number of selected groups of material and cultural needs;

2. The average indexes for:

- The basic groups of material needs ($i = 1, 2, 3$):

$$\bar{X}_{i=1,2,3} = \frac{\sum_{i=1}^3 X_i w_i}{\sum_{i=1}^3 w_i} = \frac{3}{\sum_{i=1}^3 \frac{1}{X_i}} \quad (8)$$

- The basic groups of non-material needs ($i = 4, 5, 6$):

$$\bar{X}_{i=4,5,6} = \frac{\sum_{i=4}^6 X_i w_i}{\sum_{i=4}^6 w_i} = \frac{3}{\sum_{i=4}^6 \frac{1}{X_i}} \quad (9)$$

Please note that the above indexes may be determined with the formulae (7)–(9), interchangeably applying the arithmetic weighted means or the non-weighted harmonic means.

The determined distance weights (1, pp. 40–41) may be used to build the vector of group indexes of the degree of meeting material and cultural needs, except for material management (X_7); this is the vector: $X_i = [X_1, X_2 \dots X_6]$.

The second level of the distance weights and the formulae (8) and (9) are used to determine the indexes of a further level of aggregation: $\bar{X}_{i=1,2,3}$ and $\bar{X}_{i=3,4,5}$.

To build a general synthetic index of the standard of living, aggregation for the above indexes with the index $\bar{X}_{i=7}$ should be done.

Further on, the system of distance weights may be used to build the vector:

$$w_h = \begin{bmatrix} w_1 = \frac{100}{\bar{X}_{i=1,2,3}} \\ w_2 = \frac{100}{\bar{X}_{i=4,5,6}} \\ w_3 = \frac{100}{\bar{X}_{i=7}} \end{bmatrix} \quad (10)$$

Then, the synthetic index of standard of living has the form of:

$$Y^{(d)} = \frac{\sum_{h=1}^3 X_h \cdot w_h}{\sum_{h=1}^3 w_h} = \frac{3}{\sum_{h=1}^3 \frac{1}{X_h}}, \quad (11)$$

where:

$Y^{(d)}$ —the estimator of the expected value of the synthetic index of standard of living $E(Y)$ in the given unit of time and space obtained with the method of distance weights (d) used on three levels of aggregation,

$h = 1$ —material needs: food, covers and health protection ($i = 1, 2, 3$),

$h = 2$ —cultural needs: education, recreation and social protection ($i = 4, 5, 6$),

$h = 3$ —the needs in the scope of material management ($i = 7$),

where: $\sum_{h=1}^3 w_h \geq 3$.

Please note that using the distance method set forth in this paper despite its obvious advantages was related to many problems.

The most important of them are:

- limited possibilities of international comparisons, especially at the time when this method was in development (communist and capitalist countries); this method proves best in the studies on the countries of similar social and economic conditions or in the scale of one country;
- the difficulties in determining universal indexes;
- the questionable selection of a set of variables to be observed (measures, factors, representatives);
- the high costs of creating the database and problems with unification of the data in case of international studies;
- aggregation of partial results and development of the synthetic index may lead to simplification of the image of the studied phenomenon.

Despite these problems, this method was the first attempt at a systematic approach of measuring the standard of living (households).

Even today, the concept of distance measuring constitutes an important method of building statistical measures of social results of economic growth, and its elements are (after some modification) used in international studies.

4. Human Development Index, HDI

Human Development Index, HDI, was developed by the Pakistani economist, Mahbub ul Haq. Along with Amartya Sen⁵ (7), an Indian economist, he published the first *Human Development Report* in 1990.

Since then, on the initiative of the UN agency for Development (UNDP⁶), the said report is released every year, which now makes 20 editions. It is a detailed, very broad document (8, pp. 217–220) including, among others, the ranking of countries by social development level. The HDI index is used in this ranking: a synthetic measure describing the level of social and economic development in individual countries, built on the three basic dimensions of social development: health (longevity), access to knowledge and standard of life (the material aspect). HDI is the geometric average of standardised average indexes achieved in all these fields:

$$HDI = \sqrt[3]{I_I \cdot I_I \cdot I_{III}} \quad (12)$$

where:

I_I —the index related to longevity

I_{II} —the index related to education

I_{III} —the index related to national income *per capita*.

The 2010 report describes 169 countries which were broken down, depending on the HDI value, into four categories (8, pp. 151–152). Poland, for the first time, was among the countries with the highest development level, ranked 41.

The report includes detailed information related to four groups of data, necessary to determine HDI, and the basic sources of their obtaining (or obtaining their estimated values). These are:

- expected longevity (in years): UNDESA;⁷
- the average period of school education (in years): Robert J. Barro and Jong-Wha Lee (9);
- expected duration of education (in years): UNESCO Institute of Statistics;
- gross national income *per capita* (in USD): the World Bank.

4.1. Creating indexes for individual dimensions of social development level

The first step in defining the indexes for all the listed areas is—just like in the distance method—to determine the maximum and the minimum threshold values. The maximum values are determined on the basis of the current observation for the studied countries in the years 1980–2010.

⁵ Amartya Sen comes from India and is an economist, 1998 Nobel Prize winner in economy. He was awarded the Prize for his contribution in the economy of well-being.

⁶ United Nations Development Programme.

⁷ UNDESA – United Nations Department of Economic and Social Affairs

The minimum values necessary for survival or simply zero may be adopted as the minimum values. For example, the minimum value for the expected life has been assumed as 20 years, 0 years for both variables related to the duration of education, and \$163 for the gross national income (per person).

The minimum expected longevity was assumed on the basis of long-term historical studies conducted by Maddison (2010) and Riley (2005) (10).

\$163 was assumed as the minimum income value necessary for survival. This is the lowest documented value reported in Zimbabwe in 2008. The gross national income per resident was then recorded at below 45 cents (\$0.45) per day.

Table 1 gives the threshold values for the listed areas.

Table 1

Threshold (maximum and minimum) values used in HDI determination
in the *Human Development Report* in 2010

| Dimension of social development | Recorded maximum | Minimum |
|---|---|-------------------------|
| Expected longevity (in years) | 83.2 (Japan, 2010) | 20 |
| The average period of school education (in years) | 13.2 (USA, 2000) | 0 |
| Expected duration of education (in years) | 20.6 (Australia, 2002) | 0 |
| Total index for education | 0.951 (New Zealand, 2010) | 0 |
| Gross national income <i>per capita</i> (in USD) | 108,211 (United Arab Emirates, 1980) | 163 (Zimbabwe, 2008) |

Source: Own research on the basis of (8, p. 225).

The general formula for creating indexes for individual areas has the form of:

$$I = \frac{x_{akt} - x_{\min}}{x_{\max} - x_{\min}}, \quad (13)$$

where:

x_{akt} —the current value

x_{\max} —the maximum threshold value

x_{\min} —the minimum threshold value.

It is interesting to note that the formula (13) expressed in percents is identical with the formula (3) which measures in the distance method the average percentage distance from the obtained level of meeting the given need to the level determined by the optimum threshold measure.

In case of determination of the index related to education (I_{II}), the formula is used (13) to determine both partial indexes (average duration of education and expected duration of education), and then the total index related to education with the use of geometric mean. The total index related to education is assumed as the maximum threshold value.

Natural logarithms from the current, maximum and minimum values are used in determination of the index for the national income *per capita*.

4.2. Calculation of HDI for Poland

Table 2 presents the current values of analogous measures for Poland which, along with the information in Table 1, will allow to determine the Human Development Index (8, pp. 216–217).

Table 2
Current numbers related to Poland, necessary to determine HDI for the year 2010

| Dimension of social development | Recorded current value |
|---|------------------------|
| Expected longevity (in years) | 76 |
| The average period of school education (in years) | 10 |
| Expected duration of education (in years) | 15.2 |
| Gross national income <i>per capita</i> (in USD) | 17,803 |
| HDI index | 0.795 |

Source: author's own study on the basis of (8).

The calculation of the index uses the formulae (12) and (13) along with the respective notes.

$$I_I = \frac{76 - 20}{83,2 - 20} = 0,886 \text{—the index related to longevity}$$

$$I_{IIa} = \frac{10 - 0}{13,2 - 0} = 0,758 \text{—the index related to the average duration of education}$$

$$I_{IIb} = \frac{15,2 - 0}{20,6 - 0} = 0,738 \text{—the index related to the expected duration of education}$$

$$I_{II} = \frac{\sqrt{0,758 \cdot 0,738} - 0}{0,951 - 0} = 0,786 \text{—the index related to education}$$

$I_{III} = \frac{\ln 17803 - \ln 163}{\ln 108211 - \ln 163} = 0,722$ —the index related to the gross national income *per capita*,

finally: $HDI = \sqrt[3]{0,886 \cdot 0,786 \cdot 0,722} = 0,795$.

Human Development Index is developed on the basis of only three criteria. The list of factors which affect standard of life is considerably longer, yet it is built on the basis of reliable, comparable data collected over many years. Thus it may be assumed that its cognitive values are at a high substantial level and give a clear image of the situation.

5. Final remarks

Modern studies in social statistics provide immensely interesting information and conclusions concerning many areas of social life, and allow comparing various aspects of social life on the international scale.

Building general, objective indexes allows development of the ranking of countries according to various criteria and (which is most important) allows observations of changes, and tracking social and economic development of countries.

The objective of this paper was to present the methodology of studies on building indexes which describe standard of life. It is a very broad area which has only been outlined here. Two methods have been presented:

- *the Geneva method* (distance) which was a huge breakthrough in social studies at the time of its creation (1950s and 1960s). Now it is slightly forgotten and neglected, even though its main methodological premises (with some modifications) are still being used these days;
- the method of building the Human Development Index is a method used contemporarily in international comparisons. It is interesting to note that it forms a certain generalisation of the distance method.

In common language (including statements of politicians, some economists or press materials), such social statistics research categories as *standard of life* and *quality of life* are often regarded as identical and are used interchangeably. Therefore, attention has been paid to the differences in terminology of these categories and to the rules which differentiate them.

Analogous discussion of the methodology of creating subjective indexes used in research on quality of life would be an interesting continuation of the issue outlined here.

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Badanie poziomu życia – metodologia konstrukcji wybranych wskaźników

Streszczenie: Już od wielu lat w obrębie zainteresowań statystyki społecznej znajdują się między innymi takie kategorie jak poziom życia i jakość życia. Należy je traktować oddzielnie, chociaż w języku potocznym często są one utożsamiane. Z tego też względu we wstępnej części niniejszego opracowania dokonano systematyzacji tych pojęć, zaprezentowano uwagi dotyczące terminologii oraz stosowanych w ich badaniu metod. Pomimo iż tematem artykułu jest tylko jedna z tych kategorii: poziom życia, omówienie obu pojęć wydaje się niezbędne.

Badania dotyczące poziomu życia koncentrowały się, od lat pięćdziesiątych XX wieku, wokół budowy syntetycznego, obiektywnego wskaźnika, który umożliwiłby nie tylko opis zjawiska, ale pozwoliłby na porównywanie stopnia zaspokojenia potrzeb materialnych i kulturalnych na skalę międzynarodową.

W pracy przedstawione zostały dwie procedury badawcze: metoda genewska (dystansowa) oraz metoda budowania Wskaźnika Rozwoju Społecznego – HDI.

W wypadku metody genewskiej przedstawiono główne założenia metodologiczne wraz z formułami matematycznymi, pozwalającymi na zbudowanie zagregowanego, syntetycznego wskaźnika stopnia zaspokojenia potrzeb materialnych i kulturalnych. Zwrócono uwagę zarówno na walory tej metody, jak i na jej wady.

Ślady metody dystansowej można również dostrzec w metodzie konstrukcji wspomnianego wskaźnika HDI. Zaprezentowane zostały przyjęte w tej metodzie założenia oraz matematyczne formuły umożliwiające zbudowanie wskaźnika. Przeprowadzona została również kalkulacja wskaźnika HDI dla Polski na podstawie danych z 2010 roku. Ponieważ wskaźnik ten jest wykorzystywany w porównaniach międzynarodowych, przedstawione zostały wyniki badań z 2010 roku oraz miejsce Polski w rankingu dotyczącym 169 państw świata.

S ł o w a k l u c z o w e: poziom życia, metoda genewska, wskaźnik HDI, miernik progowy, dystans

MIECZYŚLAW DOBIJA*

How to convert economics to science

Key words: economic theory, labor, capital, money

S u m m a r y: Sciences characterise some special quality. Each science saves expensed action, that is to say time and energy. Moreover, professionals are responsible for their action and they can be suing if their work fails. Bridge or plain constructors are responsible for their work, as well medical doctors, and other similar professions. It is also met among some economic disciplines. Who is able to measure periodical income of company faster, cheaper, and better than double entry accounting system? This is not a case of macroeconomics, particularly the most important domain, namely the theory of money. This is economic domain where fundamental law of energy conservation is not respected, despite the fact that in sciences this principle is known since 150 years. Each professional takes into regard the fact that ability of doing work cannot be created. The present theory of money admits action against this never broken rule. Therefore it is not a science. This fact is damaging for societies and for that reason possible economic progress is blocked by budget deficits and taxes.

1. Why economics mostly fail?

Economics and especially macroeconomics are too often unsuccessful in their practical actions. Crises come suddenly and it seems that subsequent crisis like events are still ahead. Therefore a question appears. Is economics a scientific activity? Is it the activity, where professionals are responsible for their theories as it is the case of electricity, constructions, and quantum mechanics and so on? In case of science and techniques professionals use their theories in order to attain to aim. Theory is a guide leading to success. A failure can happen provided the professionals did not hold to standards designed by their theory.

How our reality manifests itself to us? There is no clear and simple answer to such a question. We can assume some points of view: self made or borrowed from other

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thinkers. In my personal opinion economists ought to use the most general concepts elaborated in sciences, particularly in physics, where scientists have discovered many fundamental principles and fundamental constants. Values of the identified constants are the manifestation of firm reality; for instance the gravitational constant enables computation of the Earth acceleration. Having computed the acceleration, engineers can calculate gravitational forces and are able to plan contemporary buildings. The truth of the theory is a guarantee of the construction stability. In case of a failure the consistence with the theory is examined. There are many such constants that link elaborated knowledge with unrecognisable reality. They are anchors holding relation between scientific theories and reality.

Other anchors are established by the fundamental principles. Nobody proved a theorem that energy cannot be created from nothing. Our human reality does not allow for such godlike capabilities. We can use existing energy from limited resources by applying work and effort. Humans have to strive to extract and convert the energy, and they can succeed on some fields, thanks to the efforts of many scientists, as Nicolai Tesla among others. There are more fundamental principles. The famous Second Principle explains that time flows, and nothing can stop it, although decline of the concentrated potential of ability for doing work included in the objects can be restrained to some extent.

A question arises. How should a researcher take into consideration the existence of the constants and significant position of the fundamental principles? Marcelo Gleiser¹ (1, p. 124) proposes remarkably modest attitude. The sciences create a description of the world that manifests itself to humans by constants and fundamental principles. To illustrate, we can see our theories as descriptions where the constants are the letters of alphabet, and the fundamental principles are the grammatical rules determining the legitimate, correct sentences. Of course, we originate our descriptions applying scientific methods. Thus, the scientific approach, the constants, and the fundamental principles are indispensable factors of the theory origination.

The above consideration leads to a conclusion that there are serious differences between proper sciences and economics. The latter has not recognised constants and fundamental principles determining the very nature of reality. This is a principal difference. It is significant that economics, economists, and policy makers are not held responsible for the economic crises. It is considered normal that the economists talk and make policy decisions without serious consequences when they get it wrong. This is not the case in proper sciences. If a construction fails then builders are sued carrying full responsibility because they had proper theory and they failed to apply it correctly. By contrast, when the workers lost a significant chunk of their pension funds in a stock market crash nobody was responsible, despite the fact that workers had worked as usual day after day transferring their human energy into products.

¹ What if we look at science as a narrative, a description of the world that has limitations based on its structure? The constants of Nature are the letters of the alphabet, the laws are the grammar rules and we build these descriptions through the guiding hand of the so-called scientific method.

Eventually they are told that it is the market that is responsible and that it should be charged. In economic talk the personified Mr Market is the main convenient actor since this “person” is not tangible.

2. Do we see any signals of progress?

Fortunately the long lasting quest for the correct concept of capital, the key economic notion, is close to the end. Research has explained (2) that *capital is the abstract ability of doing work*. Consequently *labour is a transfer of human capital to object*. This transfer involves also capital embodied in technical means used in the labour. For that reason *money is receivable for labour done* and it arises as a record of wage receivables. Money as such is information, which arises correctly as quantitative confirmation of work done.

The above definition is pillars of correct economic thought and fundamental limitations stem from them. Capital cannot be created. Labour can be accomplished provided capital is concentrated in working persons. Money comes to existence only by labour. Money is immaterial and value of the compensation should be equal to capital transferred by the labour. Money unit is the labour unit.

The error of economics that poisons economy becomes apparent. *Money cannot be created by fiat*. Despite it is everyday practise of central banks and sick theory of money lets for it. It is a sin against the fundamental principle that ability of doing work cannot be created from nothing. Inflation and crises resulting from this incorrect actions are not the merely one evil. The worse is lack of understanding that labour is always self financing. Therefore the existence of the budget deficits and significant part of taxes manifests as result of economic theory malfunction (3).

This understanding of the capital has been manifested in the research of many economists, especially those who accepted the capital capabilities of the machines, not just the machines. They did not pursue the model of capital to the end since it required taking into regard the fundamental principles that govern our reality and it needed recognition and introduction of the associated constant. Ultimately, the capital seen as ability of doing work (doing work requires in case of an individual to be alive) is the fundamental category of the economics as energy is in physics, and it was recognised by Lord Kelvin as the absolutely most important category. Capital understood as abstract capacity to perform labour is the most important category of the economy. Capital is located in different resources such as natural, material, immaterial, or institutional resources. The capital category has its roots in labour being a transfer of capital to products. Labour is therefore the capital in use. Workers transfer human capital resulting in a product. Therefore labour is only a transfer of capital and as such these notions are tightly connected.

Considering economy as capital flows one can ask about the mandatory fundamental principles governing economics. It is clear that scientific framework for eco-

nomics is the same as for the other intellectual considerations. Economics is not beyond time and space since economy is a part of our reality. It is noticeable that at least three fundamental laws of reality established in physics materialise the scientific framework for the economic considerations. The first is a statement that capital does not arise from nothing. It is equivalent to the first law of thermodynamics. The second is that all concentration of the capital spontaneously disperses, that is to say it behaves due to thermodynamic arrow of time. It is the economic equivalent of the famous second law of thermodynamics. The last is the principle of the least action.

The present interpretations of the second law are deep indeed. According to Scott Sampson (4, p. 48), "... the second law of thermodynamics represents the unwavering propensity of energy to disperse and, in doing so, transition from high quality to low quality forms..." More generally speaking, nature does not maintain gradient, where a gradient is simply a difference over a distance—for example, in temperature, or pressure, or value. In economics the second law is for the most part interpreted as the arrow of time, which causes a diffusion of capital and depreciation of assets. In economics however, the most basic formulating of the second law made by Sir Kelvin is the most useful. It is well explained by Peter Atkins (5, Chapter 6) who has pointed out the abstract heat engines working in human body. It implies that some part of human capital diffuses to environment. Therefore the human capital research shows that the fair pay is an equivalent of the diffused capital.

Contemporary economics is different than sciences since some macroeconomic theories admit violation of the fundamental law of the capital conservation (the first principle). In fact when the Central Bank creates paper money known as cash for commercial banks lending, the fundamental law of capital preservation is violated. Money should arise only as a result of performed labour, represented by abstract pay receivables and of course payables. Therefore issuing cash money by the Central Bank, without proper regard for labour done, leads to financial instability. The wage receivables arise as a result of the transfer employees' energy while cash money arises in the current system by *fiat*. The injection of the cash money into economy by the commercial bank credits disturbs the natural equilibrium between mass of products and money matched against these products. It enables, among other things, that stock indexes grow too high for long periods, when natural potential rate of growth is determined by the constant $p = 8\%$. Eventual adjustment to the long term rate of return is unavoidable.

There is not merely one drawback. Principal reforms of the Central Bank are crucial for the economic stability and friendly economy. Incorrect theories of money and central banking are artificial limitations of the economic life and natural economic development. The most apparent manifestation of these theories inadequacy is the budget deficit. It arises from the lack of understanding that it is the labour process which creates our money. Someone's money is a certification of labour done, therefore labour is always self-financing. Governments do not need to collect taxes in order to finance work performed by the public sector. Understanding of the phenom-

enon of the self-financing of labour liberates economies from the budget deficits and correspondingly it allows for tax reduction (6). Moreover, it liberates the unused resources of labour that is to say it decreases unemployment.

The economy is subject to one essential limitation. It is labour productivity that has to be maintained at least at the achieved level. The labour productivity ratio Q determined roughly as the quotient of the real GDP to total wages should grow constantly. Therefore, political efforts should aim for a small regular growth of the Q . Declining Q would lead to inflation. Thus, the level of the ratio Q determines the size of the total compensation for the public sector. This is the essential change. The public sector is not limited by the ability to collect taxes but by the necessity of maintaining and improving its labour's productivity. Assets used by the public sector are financed by taxes.

The paper presents the theory of deficit-less economy. It proves that the budget deficit is a result of misunderstanding of money and in particular of the fact that labour process creates money. Therefore it is easy to make a well governed economy free of the budget deficit. But the deficit arises also when an employee earns less than a fair minimum pay. Then employee's human capital suffers deterioration and it adds to the deficit in a given economy.

3. Where and when did some inaccuracy appear in economics?

Where did the problem originate? It seems that economic theory malfunction is caused by a weak recognition of the triad: capital—labour—money, where the understanding of the role of labour is the weakest link. The problems with categories of capital and money follow naturally from there. Adam Smith wrote that "...What is bought with money or with goods is purchased by labour as much as what we acquire by the toil of our own body. That money or those goods indeed save us this toil. They contain the value of a certain quantity of labour which we exchange for what is supposed at the time to contain the value of an equal quantity. Labour was the first price, the original purchase-money that was paid for all things. It was not by gold or by silver, but by labour, that all the wealth of the world was originally purchased; and its value, to those who possess it, and who want to exchange it for some new production, is precisely equal to the quantity of labour which it can enable them to purchase or command..." (7, Book I, Chapter V).

The most considerations included in this chapter have the same thread of the labour embodied in the commodities and the labour determining exchange value. Then comes a passage (1.5.6) when this great economist wrote: "... But when barter ceases, and money has become the common instrument of commerce, every particular commodity is more frequently exchanged for money than for any other commodity..." Then after some butcher-baker consideration author concludes that "... Hence it comes to pass, that the exchangeable value of every commodity is more frequently

estimated by the quantity of money than by the quantity either of labour or of any other commodity which can be had in exchange for it...”

This is the moment when Adam Smith abandons the former strong view about labour-based nature of money and instead accepts silver coins as money—the most common good. At that moment the author gives silver coins the status of money and the idea of the labour and work receivable as the only correct concept of money is lost. He does not consider what is labour and what is correct labour unit and its eventual relationships to the money unit. He also does not develop an agenda for measuring labour, and its relation to human capital, although it is A. Smith who correctly said that human capital is all human ability of doing work.

Measuring abstract capital by a number of coins is like measuring capital by a number of bricks. It shows the principal contradiction by equating abstract capital with material bricks. It is like trying to measure electric energy by bricks or weighing soul in kilograms. Electricity is measured correctly in unit of labour since labour is energy in transfer. Of course A. Smith lived in times when the correct way of thinking was not yet developed. He published the great book at the time when steam engine was first built and the theory of energy and labour was not known.

Abandoning of the correct way of developing the economic thought made the societies unable to reach much more benefits. Namely a self financing of labour had not been discovered. Economists did not understand that labour is always self financing and that is the only correct process of money creation. Therefore taxes were necessary for the public sector financing, and budget deficits have appeared as strong limitation of economic development. The last factors caused unemployment and leaving a part of working force (human capital) not used for society wellbeing.

4. What is beyond the economics and economists responsibility?

Considering economy as capital flows one can ask about mandatory fundamental principles for economics. It is noticeable that at least three laws established in physics create scientific framework for economic considerations. The first is a statement that capital does not arise from nothing. The second is that all concentration of the capital spontaneously diffuses, provided the diffusion is not congested by aimed action. The last relates to law of the least action, which points out requirement of optimisation.

There are many countries in the world that have all premises of sustainability in the long run. First of all a country and economy need a right structure of capital located in the four main resources. It is cognitively fruitful to perceive economy as a continuously reshaped system with changing proportion between capital embodied in natural, human, physical and intellectual resources as it is expressed in Figure 1. The last resources involve social norms, standards, constitution, legal acts, scientific achievements and all elaborated by years of experience structures enriching a state. The institutional and intellectual capital is indispensable component that as-

sure growth of a state socio-economic performance. Insufficient institutional capital can be a reason of socio-economic catastrophes.

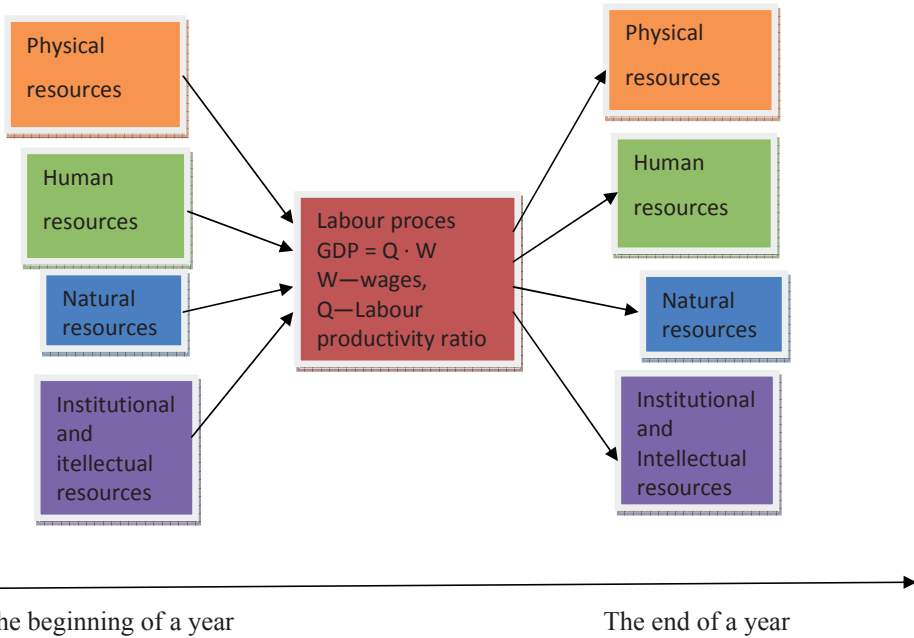


Figure 1. Economy as continuously restructuring capital

Source: author’s own study.

In a year, structure of these four resources is changing under influence of different factors where natural forces and productive labour are the most important among others. The arena of these processes is Nature, which is one more factor of welfare. It is not located in Figure 1, since Nature is not under human control although it is significant wealth creating factor as well. It is labour process that reshapes the initial structure to the end of year structure. An aim is ever-increasing of the social sustainability in the state. A future of a country is uncertain when introduced structure is not adequate in respect to aimed level of sustainability. Capital located mainly in human resources without parallel growth of other resources can be a reason of a bloody revolt as was the case at Rwanda conflict. Instead, a growing number of citizens are a positive factor in Japan where structure of resources is maintained close to equilibrium. In conclusion, much is beyond control of economic theory and policy.

Labour placed in the centre of Figure 1 involves all the labour accomplished in the private sector, in the public sector, and in the households. Assuming real GDP as a measure of a year performance, we see that it depends on two factors. The first one is cost of labour or wages (W), and the second is labour productivity ratio Q . The

ratio Q currently does not exceed 3.5 in case of the USA. This means that \$1 of wages produces \$3.5 of real GDP. It is not the highest issue, since Luxemburg or Norway has the higher ratio. There is however a group of countries with low Q not much over 1. Poland operates with the ratio less than two.

5. A wisdom hidden in the compound interest

What factors are able to change the initial capital? Capital does not arise from nothing, but it has an ability to multiply in compounding processes. It can grow steadily, because the Earth is an energetically open system, where there is a continuous inflow of energy from the Sun. The average rate of growth is almost constant, since the Earth moves on a constant orbit at a constant tilt. Marvellous process of photosynthesis absorbs the Sun energy and makes it accessible to humans use. These facts explain why the economic constant exists, whose size is 8% of initial capital. It determines average capital growth in environment of wisely managed economic activities. It manifests itself by the so-called *Ibbotson standard* (8) concerning the risk premium size manifested on the capital market, theory of human capital measurement and fair compensations, as well as parallel problem of return on capital invested in assets. Research shows real economy being the none zeros game; it is in fact the $p\%$ game. Here $p = 0.08$ [1/year], and it denotes the fundamental economic constant.

Thus, thanks to the constant flow of the Sun energy, the Earth's economy is a non-zero game. Without this inflow, in line with the First Law establishing that energy and capital do not arise from nothing, the economy as a game would have the sum equal to zero. One agent would gain more only if the second agent loses an equivalent value. In non-zero games, each participant can benefit, humanity can succeed and capital incorporated in all resources can grow, too. As Robert Wright (9, p. 13) wrote, these are not easy processes since greed, hate and other low feelings make many troubles and these forces are powerful.

Despite that, companies can benefit from the law of exponential growth of the invested capital. This opinion results from the fact that companies have mostly positive ROA so that in long run the capital grows in line with the compound interest formula. The mentioned formula is the basic natural model of a capital growth where time denoted by letter t plays role of the growth factor. Let us note that it is a formula: $C_t = C_0 e^{at}$, where the initial capital has to appear, thus the formula is consistent with the law of energy (capital) conservation. Albert Einstein² is credited with statement often repeated in Business Schools. Referring to compound interest formula this great scientist told that it is "... the greatest mathematical discovery of all time." Nobody can deny that the formula works well. Possibly A. Einstein had discerned deeper sense of the compound interest as the main economic model.

² <http://www.ruleof72.net/rule-of-72-einstein.asp>. [online, accessed: 2011-06-18].

There is some rationale for the wide acceptance of the compound interest formula. Many great people expressed a high esteem for the concept of the compound interest. Jesus introduced a parable (Mt 25:14) about a king and his three servants whose task was to multiply the initial capital. The highest price was given to the man who achieved the highest rate of return. Warren Buffett is well known for his admiration of the compound interest, and what is more important he was able to use this power in practice. Millions of people use this model for controlling growth of their deposits and for capital projects evaluation. If not the greatest, the formula is the most commonly used and extremely practicable.

But the true scientific challenge is a theory of the rate of growth. Discerning compound interest formula as an economic growth model, we see that it is essential law indeed, provided understanding the complexity of the rate of growth. According to the present knowledge (7; 10), the rate of growth has three factors structure. Namely $a = p - s + m$. It denotes that an initial capital C_0 is influenced by the three factors. These factors are: the economic constant that expresses a potential of growth given by natural forces, the factor s expressing natural and spontaneous diffusion of initial capital, which is a consequence of the Second Law, and third factor denoting inflow of capital through work. In line with the model a corn sowed on the field grows thanks to natural forces but farmer has to work in order to collect healthy grains of corn, otherwise the time arrow would disperse concentrated wealth.

6. Nature and model of capital

In English language the term “science” does not encompass “economics”. Economics is beyond science so a question arises why? One of the reasons is the never completed research in respect to the category of capital. In 1963 year Robert Solow (11, p. 10) wrote about capital: “... when a theoretical question remains debatable after 80 years there is a presumption that the question is badly posed—or very deep indeed ...” Although the term is widely used in economics, accounting and finance, and has been researched by recognised economists, their efforts basically failed, and in 1975 Christopher Bliss (12, p. 7) wrote: “... When economists reach agreement on the theory of capital they will shortly reach agreement on everything. Happily, for those who enjoy a diversity of views and beliefs, there is very little danger of this outcome. Indeed, there is at present not even agreement as to what the subject is about...” The mentioned author presents an important opinion, since understanding of the capital category allows understanding of labour and money as well.

The category of capital and the whole triad *capital—labour—money* is no longer debatable, since its constitutive features were described in papers (13; 14; 15; 2, Chapter 4), and numerous papers written in the Polish language. Capital is an abstract ability of doing work, whereas value of an object is a concentration of capital in this object. Labour is a transfer of capital to products, and money is a work receivable

for labour done. Essence of capital is captured by the model showing forces, which change initial capital in a given time t . Besides labour that causes inflow of capital to object there are, among others, natural forces causing its spontaneous, and random diffusion. Explanation of these forces is tightly related to the nature of the flow of time. There is also an economic constant of potential growth.

Let us remind the main steps leading to the formulation of the theory of capital. The concept of capital is, as it is commonly known, the most important idea in economics. In accounting, capital is a totally indispensable category. Double entry accounting can be seen as the theory of measurement of changes of the initial capital invested in economic unit and its changes by business activities. Outstanding premises of the understanding of capital have been formulated by Yuji Ijiri (16), who focuses our attention on the abstract nature of capital:

... “Capital” and “resources” are the two financial sides of the same entity ... Since current liabilities ... are for the most part generated in the process of managing resources, they are often netted against assets. Following this practice, we state equality of capital and resources as:

Resources = Capital

... Capital is abstract, aggregated, and homogenous, while resources are concrete, desegregated and heterogeneous. The double entry bookkeeping system that has been the backbone of accounting in more than five countries has since its inception recorded resources and capital in tandem.

Luca Pacioli (17) used in 1494 the concept of economic power as the crucial category, when introducing a conceptual system for measuring capital and its periodical changes in an economic unit. The earliest concept of bookkeeping used the abstract category of capital and the duality principle as fundamental for double entry recording of business transactions. This system is presently called “accounting” and it turned out to be indispensable for conducting business.

In fact it is the duality principle that is the most important rule of accounting theory, which allows explain the profound meaning of capital. The fundamentals of the double-entry accounting is the equation $A = E + D$, where A denotes assets, E denotes owner’s capital, and D denotes debt capital. Let us get rid of the ownership so that the equation has the simplest form $A = C$, where C denotes capital in general. To discover the very nature of capital we ask: what the variable C means if the A is the only one machine? Then the answer is clear that the variable C represents *an ability of this machine for doing work!* This interpretation is consistent with the understanding of capital as introduced by John Bates Clark, who perceived capital as abstract category, not the machine being an asset but its capacity of serving as the machine.

Therefore the fundamental clarification of the capital introduced, among others, in the paper (2: 89) explains this category as *abstract ability of doing labour*. Importance of capital is underlined by the fact that in case of a living creature who has abil-

ity for work, he/ she has after all ability for maintaining his/ her life. In addition, the *ability of doing work* is crucial category in physics (it is called energy) as explained by Peter Atkins (5, p. 118), who writes that: "... energy deserves for special attention because it is significant for the Universe, for all structures inside the Universe, and for all events, which happen. The two fundamental pillars supporting the sciences are cause–effect relationships, and energy. Causality decides about consistency of the chain of events, which determines an evolution of the Universe; instead energy works always as a guard who controls whether causality leads to correct activities. Therefore energy is the adequate money in cosmic bookkeeping because energy cannot be created but only transferred by labour ..." Therefore capital in economics and energy in physics are the fundamental scientific categories indispensable in depictions of reality.

Capital in economics is an abstract category and energy in physics is an abstract notion, too. Many researchers, as discussed by Philip Mirowski (18) and others, have investigated similarity of these two notions in the past. This author carried out an outstanding research on the appearance of energy-related metaphors and concepts in economic thought. Although the outcome from P. Mirowski's analysis discloses that many economists conceived value and utility in physical terms of energy, and mechanics was recognised as a benchmark and framework for economic science, the idea of capital still remained tangled, unsolved and unclear. The key problem was inherent in correct interpretation of the thermodynamic laws in respect to economic matters.

The concept of energy in physics and concept of capital in economics belong principally to the same abstract category. We should agree that understanding energy and capital as the ability of doing work can be far from satisfactory explanation not fulfilling all expectations. Why? Human cognition is limited. Our experience should help to agree with constraints. Words cannot express the deepest secrets of the world. Ability of doing work is all that can be said about energy in physics (5, p. 116) and about capital in economics. It does not mean that we cannot strive for better cognition. Nevertheless we should agree that designates of the concept expressed as *ability of doing work* belong to the world of physics, world of economics, and they are also present in the esoteric considerations (Prime Energy).

Physicists have developed their own fundamental theoretical approaches and measurements of the ability of doing work. There is evidence that this category is subject to the laws of dynamics and thermodynamics. There is a set of original constants related to energy behaviour. But economics has its own cosmos since capital is embodied in many material and immaterial resources. Among them human resources, natural resources, physical resources, and institutional resources are the most important. Physicists deal with micro- and macocosmos but human capital or institutional capital do not belong to their field of study. It is exclusive space for economics. It is original field of study which can be perceived as exclusive domain of economic consideration. Therefore economics have some common part with physics (abstract abil-

ity of doing work and derivative concepts) but building economic theories is an original occupation. Economists have to have respect for the fundamental laws of reality, nevertheless economic theories describe their own world of capital flows.

The one of the most essential questions is how to interpret the law of thermodynamics in the field of economics and accounting? Double entry bookkeeping, which does not admit an increase of capital in internal operations (such operations are illegal), represents conservation principle conforming with the first law of thermodynamics but its domain is narrowed to economic unit, instead of the whole Universe, as is the case in physics. Increase of capital can happen in case of external exchanges only. Accountant using double entry will not allow for increasing value of production (Debit) without parallel decreasing of some kind of assets (Credit). In case of operations that is a sale of product double entry system matches outlays and realised price for sold product showing eventually increase of capital from outer space of the economic unit. Product with unit cost of \$50 sold for the price of \$70 in double entry will capture \$20 as an increase of capital. But capital as well as energy does not arise from nothing thus double entry accounting shows outer space as a source of capital increase. Double entry accounting operates in its own cosmos namely its economic unit.

Therefore double entry accounting invented ages ago is an effective measurement system quantifying changes to initial capital and reporting them periodically. It shows whether capital controlled by economic unit grows. Many historians have recognised this system as vital in the development of capitalism and democracy; particularly Nathan Rosenberg and Luther Earle Birdzell (19, p. 186–189). The awareness of the role of double entry accounting and financial statements shows a growing tendency.

Thus, the fundamental limitation is expressed in the first law of thermodynamics which points out that energy does not arise from nothing; the initial capital can be merely changed with the flow of time. The compound interest formula $C_t = C_0 e^{rt}$ is one of the most important patterns known in economy since it includes initial capital C_0 , which has to exist. The initial capital can only be changed by natural forces and human labour, as it is explained by the model of the capital growth (2, p. 89).

Initial capital and time are the essential factors of the compound interest formula. But a true challenge is the theory of rate (r). Recognising this structure we obtain powerful model indeed. According to the research done and the present knowledge, the rate of growth has three factors structure. Namely $r = p - s + m$. It denotes that an initial capital C_0 is influenced by the three subsequent factors as follows:

$$C_t = C_0 e^{pt} e^{-st} e^{mt} = C_0 e^{(p-s+m)t} \text{ and } p = E(s) = 0.08 [1/\text{year}].$$

The variables are defined as follows:

- t —is the coordinating (calendar) time measured by chosen cyclical movements, particularly of the Earth
- e^{pt} —is the factor of natural potential growth determined by the economic constant $p = 0.08$
- e^{-st} —is thermodynamic arrow of time
- s —is the rate of spontaneous random diffusion of the initial capital
- e^{mt} —is an influence of human labour and management, which can offset the natural diffusion of capital and it can save the potential for growth, changing it to profit.

To answer why $p = E(s)$ lets us note that p is deterministic constant and s is the random variable. The s is random since the Second Law introduces uncertainty explaining that each concentration of ability of doing work diffuses spontaneously and randomly. The s cannot on average exceed p because growth would be impossible. On the other hand without human work and management (inflow of m) economic value would not arise. Thus conclusion is that s can entirely disperse p . Having $s < p$, $s = p$, p —deterministic, s —random we conclude that $s = E(p)$. Let us note in addition that the first thermodynamic principle is mainly respected by the variable of the initial capital C_0 . The initial capital can only be changed or transferred but never created. Central Banks pretend that they are able to do it. But instead of a *perpetuum mobile* economies suffer from growing confusion.

Robert Solow (11) was right supposing deepness and complexity of the capital category (8). The powerful forces determining our reality appear in the model of the initial capital changes. We see how the Earth and the Sun guarantee essential potential for growth ($p = 8\%$), how this potential can be damaged by the forces described by the famous Second Rule being simultaneously the motor of changes. At last, we see how humans can prevent the diffusion by wise, productive labour, setting off dispersion forces and causing that potential growth becomes the real one. The model shows, among others, that economy is a non-zero sum game, and the added value can achieve the average rate of 8%, and this value concentrates in different resources, both material (goods, soil, devices) and immaterial as intellectual and institutional resources (laws, procedures among others). Albert Einstein had a good intuition in respect to the significance of the compound interest formula.

To illustrate how the model works we consider human capital in order to compute a fair minimal pay in case of the USA.³ Let us note that variables s and m represent active work of the natural forces (the $-s$) and active work that can restrain the dispersion (the m). Instead the constant p symbolises potential. The potential p can yield fruits provided the diffusion s is counterbalanced by the work m . Let us assume that a child is born in an American family (four persons). This child would die soon, if parents and society did not care for it. Fortunately, they do this and the m at least

³Theory of human is presented among others in the paper by Iwona Cieślak and Mieczysław Dobija (20).

offsets the s . Therefore human capital of the child can grow at the rate $p = 8\%$. This human capital is funded by outlays for the cost of living⁴ that is estimated at \$450 per month per person. We compute human capital and adequate fair pay taking into regard that legal minimal pay in the USA is presently \$7.25 per hour.

Future value of stream of outlays \$5400 for 17 years capitalised at the rate $8\% = \$195,456$.

Fair pay is equal to yearly diffusion of employee's human capital: $0.08 \cdot \$195,456 = \$15,638$.

Monthly pay = $\$15,638/12$ months = \$1303 per month.

Hourly pay = $\$1303/176$ hours = \$7.40 per hour.

Taking into account roughness of the estimations the right conclusion is that the current minimal pay in the USA is fixed at a fair level.

The presented model discloses some of mysteries of capital. Hernando de Soto (21) reminds that centuries ago a scholar speculated that we use the word "capital" because the head is where we hold the tools with which we create capital. The author (13, p. 65) writes: "... This suggests that the reason why capital has always been shrouded in mystery is because, like energy, it can be discovered and managed only with the mind ...". We needed time, more than three centuries in order to grasp the abstract substance of capital.

Having determined the model of capital one can compute its yearly increase (ΔC) in order to find a model and interpretation of periodic income.

$$\text{Income} = \Delta C = C_1 - C_0 = C_0 (p - s + m).$$

Thus, the sources of income are the initial capital working by year. The product of capital and time is called action, so the first source of income is to conduct the action. The second factor is impact of the potential constant of growth p . Without p nothing can grow. But $C_0 p$ is declined by diffusion s , so that profit would be close to zero $C_0 (p - s)$. Fortunately, human labour and management assure an inflow m , which can restrain s to its actual value s_a . Ultimately we get formula $C_0 = C_0 (p - s_a)$. Briefly speaking, we attain to income thanks to action and labour, which set off forces of uncertainty and of diffusion. If labour and management m limit the loss ratio s , the variable $p - s + m$ should be greater than zero. If this is the case, the model of capital will show growth of the initial capital.

The tendencies to disperse the initial value and loss-generating random events are—as it is commonly known—a manifestation of the Second Law. Exchanges made in a free market economy disclose, however, that there exists a premium, which allows preventing the natural processes of initial capital diffusion. This category is commonly known as the risk premium. Its existence is a reaction of the free market

⁴ Cost of living denotes the minimal outlays needed in order for a child to develop personal human capital according to standards.

to the uncertainty of reality. The most of research about the risk premium value has been done in relation to the capital markets.

The Second Law helps us to explain the nature of reality, which has an unavoidable but random dispersion of capital, that is to say the phenomenon of uncertainty. This explanation complies with Frank Knight's (22) well-known consideration of uncertainty as the source of profit. We can say that income is created in the game between uncertainty and constant $p = 0.08$. Moreover, the Second Law and the estimated value of the constant p realise that there exist fair values in economy, in the form of fair compensation and fair prices in particular.

7. Assessment of the economic constant of potential growth

Many studies estimate the size of the constant p . Research is still ongoing. There are different approaches to the issue, e.g. case studies and statistical estimation. Interesting evidence comes from the past. The constant $p = 8\%$ manifested as legal yearly interests in the ancient republican Rome (23, p. 41) where the fair size of interest had been established as $1/12$ of the initial capital. Therefore the interest rate was 8.3% per year (let us know that $e^{0.08} = 0.083$).

Capital market is a regular field of study for testing the constant p . There the p is called risk premium or capital premium and has a long history of research. In my opinion the most comprehensive general research has been systematically provided by Roger Ibbotson and co-workers. Results from one of the issues (8) are presented in Table 1.

Table 1

Summary Statistics for Total Returns in U.S. Stocks, Bonds, Bills and Inflation 1926–2004

| | Arithmetic Mean | Geometric Mean | Standard Deviation |
|----------------------------|-----------------|----------------|--------------------|
| Stocks | 12.39% | 10.43% | 20.31% |
| Long Term Government Bonds | 5.82% | 5.44% | 9.30% |
| T-Bills | 3.76% | 3.72% | 3.14% |
| Inflation | 3.12% | 3.04% | 4.32% |

Source: (8).

Using the data (Table 1) we obtain an assessment of the risk premium for the US capital market. This market can be seen as highly free and efficient, to a greater extent than the others. To compute the risk premium, we should deduct inflation 3.12% from the stock returns. Thus, the risk premium is equal to 9.27% ($12.39 - 3.12 = 9.27$)—using arithmetic return, and 7.39 ($10.43 - 3.04 = 7.39$)—according to geometric return. The range $[7.39, 9.27]$ can be discerned as the range covering the true value of the constant that is called the risk premium. It can also be proved that the value 9.27

computed as arithmetic mean is too high. It is drawn from inequality: $\ln(1 + x) < x$, for $x > 0$. Thus the true value of the premium is covered by narrower interval. Taking the arithmetic mean we get 8.33. Thus the constant is close to 8% since after a year: $e^{0.08} - 1 = 0.08328$. The data used for the risk premium estimation represented values at the end of the year.

Bartosz Kurek (24) conducted a statistical research concerning the rate of return for companies' assets. The author attained to adequate definition of the ROA ratio, which could serve as an estimator of the constant p . Data was taken from financial statements of 1500 American companies covering period of 20 years. Confidence interval included the obtained mean value 0.0832.

Wojciech Koziół (25) in his recent study examined the manifestation of the constant p using data from employees' work agreements of selected companies. Examination of 702 data points taken from two companies yielded mean value 8.13%, standard deviation 1.91% and 95 percent confidence interval [7.99%, 8.27%]. The author made also assessment of compensation earned by academics employed by universities (26). Research concerned the pay structure established by university and government administration. The study showed that the bottom limit of compensation assigned to a given position is not less than pay computed in line with human capital theory where the constant p is applied twice: at computing human capital and determining the salary (see section 8).

Human capital and adequate compensation are convenient fields of study for assessing the value of constant p . Because labour creates products so prices are also a good field for the constant p examination. The earliest assessment has been made by Mieczysław Dobija (27; 13). The author examined earnings or prices when employees or farmers had organised protests against inadequate wages. The studies always showed that the actual prices were lower than these derived with the use of 8% constant p .

The more systematic studies have been done by Iwona Cieślak and Renata Dyląg (28). The authors have examined job seekers. Interested people were questioned about their expected pay. The author assumed that job seekers are limited in their pay requests. On the other hand they expect a fair pay for their work. Having the expected pay W and some personal data allowing for computing human capital $H(p)$ the authors computed the p from the equation $pH(p) = W$. The average value of the p was 8.07%. It is clear that the constant should also manifest itself in the prices of goods. Many cases of farmers' protests in Poland have been examined. The study concerning the corn prices made by Iwona Cieślak and Małgorzata Kucharczyk (29), among others, has showed that the prices of wheat were significantly lowered in respect to indispensable costs of production. In case of the product prices the constant appears in human capital computations, then adequate pay, and as the third manifestation it settles on the expected profit.

Existing of the constant of the potential growth is a reason of an important opinion. Namely, all theories of the rate of return with an assumption of normality of

distribution and linearity of regression lines do not work well. The same can be uttered about linear relationship between risk and profit, when the risk is understood as pointed above. These reflections lead to graphic illustration of the rate of return in respect to different portfolios as it is introduced in Figure 2.

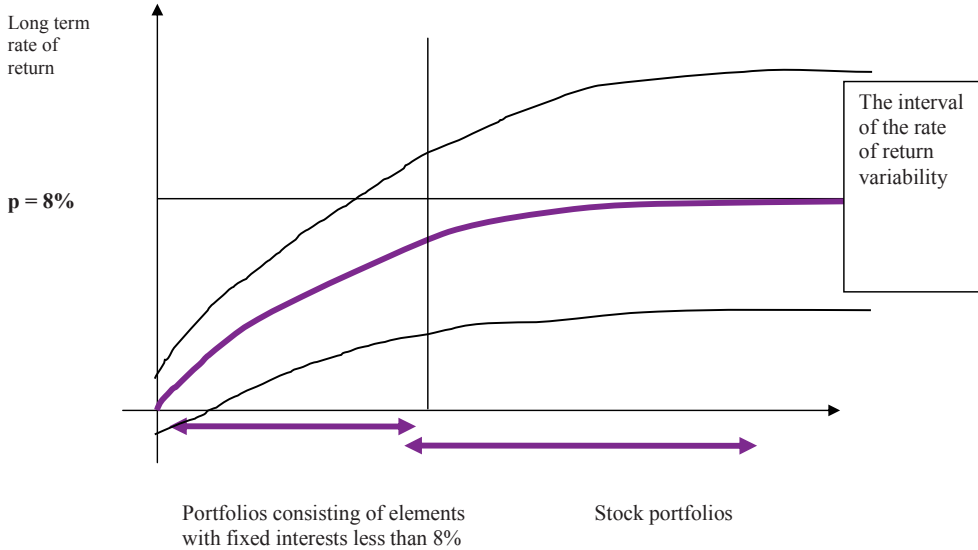


Figure 2. Graphic model of the different portfolios rate of a return in long term

Source: author’s own study.

Figure 2 shows on the left side that an investor can accept the rate less than the risk premium $p = 8\%$ choosing a fixed interest and shorter terms. On the right side there are portfolios consisting mainly of stocks chosen in line with some theory. These portfolios yield average long run rate close to 8% , provided a lack of global destruction of capital like wars and global catastrophes. A given portfolio can have less or greater rate of return since the existence of randomness that can be measured by variance. A choice of stock is significant for the rate of return but the greatest influence belongs to sufficient number of different stocks. Then the theory of capital can be adequately applied.

The model of capital in Figure 2 explains that the long term average rate of return is close to economic constant $p = 8\%$. If, for example, Down Jones goes up more than 8% by some subsequent years, then one can expect the unavoidable fall in order to the average rate of return has been close to 8% . It results from R. Ibbotson and B. Kurek computations and the above introduced general theory of capital.

The reasons of stock exchange sudden fall of indexes (as was the case in October, 2008) are strictly macroeconomics and monetary in particular. Creating money

without relationship with human labour by monetary institution *is an action against nature*. It is in opposition to the fundamental law of conservation. Understanding that the true source of money is human labour and labour productivity ratio is responsible for purchasing power of money as it is explained in (30) opens ways of stable economic development.

The model showed in Figure 2 explains why there are so many troubles with CAPM. Peter Bernstein (31, p. 165) wrote: "... Here is a paradox. In today's world of investing, the Capital Assets Pricing Model has turned into the most fascinating and perhaps the most influential of all the theoretical developments described in Capital Ideas. Yet repeated empirical tests of the original Sharpe-Treynor-Lintner-Mossin CAPM, dating all the way back to 1960s, have failed to demonstrate that the theoretical model works in practice ...". There is an answer for this paradox. Risk is not a kind of variability but spontaneous diffusion of capital concentrated in human related assets. It is not the risk as a source of income but the natural potential of growth as an attribute of Nature. It is determined by the economic constant p . Productive labour leads to the 8% long term average rate of growth per year. It is confirmed by R. Ibbotson and B. Kurek research in respect to the American economy. Such tests would never fail provided wars and catastrophes do not destroy peaceful economy and the Earth will maintain its constant orbit.

Introduced model of capital authorises to recognition the formula $C_t = C_0 e^{(p-s+m)t}$, $p = E(s)$, as the fundamental law of economic growth, where the flow of time denoted as t is creative factor as well. It is truth since natural forces represented by the constant p cause a growth, provided natural diffusion (assets' depreciation) of capital is limited by productive work m . These considerations lead also to an enlightenment of a fairness of the Physiocrats thought. There was a true kernel in François Quesnay's claims that Nature is the only source of wealth. Studying introduced model of capital one can detect that the source of a growth of wealth is the potential of the Nature determined by constant p . Every work by definition is only a transfer of capital and as the model shows, the labour only sets off the destructive forces determined by the thermodynamics arrow of time. Afterwards potential of Nature can change to a real growth and therefore economy is a non-zero sum game. This emphasis on nature can also be found in modern environmental economics as for example (32) that formulates "sustainability criteria" on the basis of the idea that Nature is the original source of wealth. Quesnay was right underlying creative nature of agriculture but was not right claiming that only the farmers' work is productive. Photosynthesis, which enables for capturing the Sun energy, belongs to all the humans, and not only to farmers.

8. Conclusion

Considerations presented above show economics on the crossroad. The old way is continuing old habits and maintaining a strong separation from fundamental laws

of reality. It is a way of producing cash money in order to inflame inflation with all bad and harmful effects for the economy. In such case economists and economics are pretending to care about right theory in service of society but they avoid discussion of the most significant concept as capital, labour and money. They do not bother such a concept as energy conservation principle. Therefore the border between economics and science is left intact. Economists are still beyond responsibility for their works and empty talking in media replaces real achievements.

The new road is the way of integration with science and holding responsibility for effects in practice. This is the road of respecting fundamental principles. Therefore a reform of the Central Bank to an institution that transfers salaries to public sector employees is a starting point. Consequently, as it is shown (10; 33), the economy with the new theory becomes deficit less and balanced. In the next step taxation of the fair compensations is withdrawn, unemployment disappears. Past experiences become only never repeating nightmare.

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Jak przeistoczyć ekonomię w naukę

Streszczenie: Cechą nauk fizycznych jest dążenie do oszczędności czasu i energii, czyli działania. Nauki całkowicie respektują fundamentalne prawa rzeczywistości. W naukach ekonomicznych spotykamy działania, jak tworzenie pieniądza gotówkowego, które są sprzeczne z fundamentalną zasadą zachowania energii. Odkrycie stałej ekonomicznej potencjalnego wzrostu, zrozumienie natury kapitału i pracy stwarza nowe warunki do ustanowienia naukowych podstaw teorii ekonomicznych, zwłaszcza teorii pieniądzy. Praca stanowi transfer kapitału, a pieniądze powstają jako potwierdzenie wykonanej pracy, czyli należności z tytułu pracy. Zrozumienie kapitału i pieniądzy prowadzi do odkrycia zjawiska samofinansowania się pracy, co pozwala na bezdeficytową gospodarkę z mniejszymi obciążeniami podatkowymi.

Słowa kluczowe: teoria ekonomii, praca, kapitał, pieniądz

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Management contracts in the company supervision and management system

Key words: management contract, corporate governance, business management theories, business model

S u m m a r y: The paper presents the essence, structure and significance of management contracts in the process of company supervision and management. The basic premises for introducing management contracts and supervisor contracts resulting mostly from the growth of the company have also been characterised.

In particular, the first part of the paper provides the definitions of corporate governance and ownership supervision, and mechanisms of this supervision have been identified along with statement of their effectiveness and efficiency. The theoretical grounds for management contracts have been broadly analysed, with special attention paid to the ownership rights theory, contractual view of a company (nexus contracts), the management productivity concept, the issue of trusting business partners, the theory of affectuation, the agency theory, and the stewardship theory. The predictive and projective functions of the agency theory have been criticised, which is commonly considered the leading concept in corporate governance.

As regards the essence and premises for introducing management contracts, organisational and legal forms of business management have been described in detail, namely management personalisation, management autonomisation, management deconcentration and decentralisation. The analysis of the issue has been mostly focused on the provisions of a business management contract, with a special view on the subject matter of the contract, duties of both parties, responsibility of the manager, costs of the agent (manager) and the method of their compensation. The components of the manager's salary and the methods of their determination have been defined. Finally, a postulate for building high culture of contracts in the economy in general and management contracts in particular has been included.

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1. Preliminary notes

Manufacturing products as the basic activity of the company is related to executing manufacturing (organic) and management functions (regulatory). The former are most often executed by employees and are assigned to them by the owners in the first order. As the enterprise grows, management functions are also delegated, until the ownership and management functions are completely separated. The owner of the company ceases managing it at a specific stage of business development, for various reasons.¹

When ownership is separated from management, or rather when the principal-plenipotentiary correlation arises, the problem of monitoring and control of the principal (owner) over the behaviour of the plenipotentiary (manager) comes to life. This problem in essence boils down to creating the appropriate supervision and management system for the company, which is called by the name of corporate governance.

Among many definitions of corporate governance reported in numerous and broad literature, at least some are worth quoting. In one of them, regarded as concise and usable, corporate governance is specified as “the method with which providers of finances for corporations secure the return rate on these investments (1, p. 73).

For the purpose of further analyses, the statement has been assumed that effective corporate governance consists in establishing control and stimuli, i.e. mechanisms of control over the highest management personnel, resulting from external and internal circumstances of the company, necessary to ensure protection of the capital entrusted to it by its partners or stockholders (2, p. IX).²

The researchers who deal with this issue have accepted the thesis that the organisation which observes principles of good supervision often achieves better results, is better perceived, enjoys trust and good reputation. It is confirmed with the research by Rafael La Porta, who declares that in the countries where better protecting is provided for stockholders, the financial markets are more developed and enterprises have definitely better possibilities of access to external financing and better conditions for development (3, p. 6). This issue may be summarised in brief with the thesis that building the proper systems of corporate governance is an important premise for development of enterprises and improvement of their productivity.

It is important that the movement initiated in the USA and in the United Kingdom in 1990s for improving systems of corporate governance has spread throughout the world. Many world-known corporations have recognised improvement of this system as a significant determinant of improvement of the results of the company and its

¹Unlike in case of entrepreneurs, that is the owners actively participating in managing the company, there is a large group of owners who have invested their capital by participation in the company and do not want, cannot or do not have time or possibility of managing this capital (passive owners).

²Ownership supervision means the system of institutions and corresponding inspection tools used by the owner of the capital in the process of company supervision and management. In short, it is a method of exercising supervision and management actions in the company.

development (2, p. IX). The premise has been assumed that many current concepts and mechanisms of corporate governance stated and recognised by the researchers become in practice a low-use management method for modern companies and institutions.

2. Mechanisms of corporate governance

The mechanisms resulting from the surroundings of the corporation cannot be omitted in the characterisation of various institutions of corporate governance. The select major of them are:

- political conditions;
- legal regulations and provisions which describe the role and scope of responsibility of the persons who manage the interests of the company or of other business entities;
- legal regulations and provisions which form the framework for activities of the supervision bodies, e.g. assemblies of partners;
- the financial market, especially the stock and bonds market;
- the enterprise inspection market, especially in mergers and takeovers;
- the manager services market as a mechanism verifying management talents;
- competition in the market of products.

Culture of corporate supervision understood as corporate governance was also expressed in the standards approved by the OECD Board. They are formulated in a way general enough to be able to include in their framework any model of a joint stock company which is provided for in the OECD legislation. At the same time, they do not have the nature of mandatory obligation. Their objective is to provide master patterns for state-level regulations (4, p. 345 et seqq.).

However, in terms of a single company, both in the private and public sectors, ownership supervision inside a company will play a dominant role. It may be executed with various methods like:

- Creating and developing supervision institutions in the form of supervision boards, administration boards, additional management levels, programme and advisory boards, revision committees, etc.
- Control over the actions of the plenipotentiary by, for example, introduction of the controlling system, internal audit, a strategic results card; expansion of such tools as the information system, budgeting, reporting, developing organisational structures, which means development and implementation of principles, procedures and rules for activities, included in traditional and modern methods of management and development of the organisation.
- Preparing contracts on the results of company activities which would be based on the results of these activities related to the stimuli system. Many research-

ers believe that the problem of ownership supervision should be solved on the level of pro-effectiveness of management and direction contracts.³

To end the discussion of a more general issue, that is concerning effectiveness of institutions and mechanisms of ownership supervision, the actions of the bodies of the European Union should be noticed. Three successive offices believe that administrative charges imposed on the EU companies should be restricted. Activities will be undertaken to simplify and modernise the business surroundings for the companies, especially to improve legal regulations concerning ownership supervision (*Monitor Europejski*, 2009, no. 51, p. 27).

The listed mechanisms and models of corporate governance, however important and absolutely necessary, are insufficient to perform this role in a satisfactory way, and constitute only general frames for detailed solutions which should take into consideration the specific nature of the organisation and its surroundings. In other words, a statement may be made that neither code provisions, nor market mechanisms, nor good practices codes, nor even appointed supervision institutions and developed control tools constitute corporate governance with sufficient level of effectiveness and efficiency. The reason for this is, among others, the specific nature and varied conditions of functioning of various organisations (agencies), which affects the choice of corporate governance tools. Conclusions and organisational and legal solutions appropriate and valid for the given organisation may not necessarily be applied elsewhere. Moreover, the said corporate governance mechanisms make up a set of limitations of negative nature, as they include a long list of don'ts, dos, recommendations, and even penal sanctions, without positive stimuli which would encourage the agent to employ functional actions in reference to the expectations and objectives of the principal. For these reasons, a large number of researchers in these issues understand the problem of corporate governance, or the theory of agency in a broader sense, as a theory of economic stimuli (tangible encouragements). The most important method of solution to this problem would be to prepare a contract on the results of activities, that is based on the outcomes related to the system of stimuli (5, pp. 1–5; 6, pp. 245–246). In short, the issue of supervision should be solved, according to these authors, in the field of incentive contracts.

All in all, the traditional problem of corporate governance, with special attention paid to effectiveness of ownership supervision, comes down to finding answers to the following questions:

- How to set up a system of stimuli which would make the plenipotentiary to execute the objectives of the principal in the most effective way, at the same time discouraging him/ her from pursuing his/ her own objectives?

³ Contract of direction shall mean a contract of employment concluded with the manager of organisational units within the given company. In-house contracts of direction create new organisational and legal forms of hiring managers of medium and lower levels of management. This situation highly affects effectiveness and efficiency of management and increase in effectiveness of the organisation.

- How and in which scope may the principal effectively control over and monitor activities of the plenipotentiary in terms of his/ her executing the appointed tasks and achieving the expected results?

Both these issues, or rather both aspects of corporate governance, seem to be of the same importance. Their solution proves to be a complex task which poses controversies and, in case of the public sector, even stirs up political emotions.

3. Theoretical grounds for management contracts

Among numerous concepts of management and interpretations of corporate governance which in particular take into account the issues of management contracts, there are: theory of ownership rights, contract-approach to the company, economic stimuli theory and the related productivity concepts.

The ownership rights theory perceives the company as a set of assets and rights to manage them. It focuses on the right of stockholders or shareholders to enforce control over the assets, the right to use them, as well as the right to residual claims (7, pp. 1047–1073). One of the definitions of corporate governance actually refers to the theory of ownership rights (see p. 1 of the paper).

The contract approach to the company regards the company as a set (bundle) of contracts (nexus contracts). In general, contract is understood as a voluntary agreement of mutual obligations related to interchange of goods between the parties (8, pp. 305–307). One has to emphasise here that the contract as a mechanism of executing obligations and, at the same time, a valid mechanism of ownership supervision, should be analysed from the point of view of explicit contracts and in the context of non-public, implicit contracts. The former aspect of the contract has formal nature and most often is the result of negotiations, and its enforcing is based on the adopted legal basis. The latter is based on informal rules, customs, assumptions as regards economic rationality of the parties, the skill of calculating risk, observation of behaviour of the parties over a longer period of time and, most of all, the level of social trust, with special attention paid to trust in business partners. These issues are described in more detail in the following text, with a view on the terms and definitions developed in the field of management.

The issue of the theory of stimuli is explained in the theory of economics in a very concise way, succinct. Its representatives have adopted an assumption of reasonable behaviour of business entities functioning under conditions of perfectly competitive markets. It means maximisation of profit by the owners and minimisation of costs, with the company being perceived as a black-box, without stating the phenomena and processes in it.

On the basis of the manager theories of company, the issue of stimuli is discussed within the framework of the concept of productivity. Their authors emphasise that this specific and efficient at the same time system of defining salaries in team work

for individual teams creates and stimulates productivity. Last but not least, the following statement is observed: if the relationship is maintained between expenditures and remuneration of employees, productivity of the entire team (which creates the salary pool) increases. If this relationship is rather loose, productivity of the team decreases (10, pp. 11–13; 11, p. 267).

To complete the presentation of the selected concepts related to corporate supervision, the stewardship theory should also be quoted. This theory, with psychological and situational factors of motivation included, assumes that managers act in the interest of their principals, owners, and may be trusted. To increase effectiveness of the organisation, the value for the stockholders, they should be given more authority, freedom of action, preferably by combining the CEO and board chairperson functions, thus creating a management board in a single-level system of supervision and business management.

The essence of this concept is the thesis that value is created not only by particular key resources and processes (components of the business model), but mostly their mobilisation and unique, creative configuration in the manufacturing process, which is the work of the entrepreneur or of the manager (the theory of affectuation).⁴

The presented concepts do not include the agency theory which is commonly considered the basic model of description and analysis of corporate governance. It assumes existence of the conflict between the owner and the manager, and its softer version refers to the discrepancy of interests between these entities. The problem of agency, according to its followers, results from many causes, some of more important of them include contradictory interests of stockholders and managers, asymmetry of information, different attitudes of stockholders and managers to risk and different degree of attitude to risk.

The assumed (pretty absurd) principle undermines the reasons for concluding contracts. The question arises, should business be made with someone who by definition will act against the expectations of the other party, i.e. stockholders? The problem of discrepancy of interests lies rather in the fact that stockholders do not want or do not have a properly precise model of business, or even a vision of this model, and they also differ considerably between each other in this respect. Whatever the angle, this group is highly differentiated (12).

Asymmetry of information between the owner and the manager is obvious and natural, resulting, among others, from separation of the supervisory and managing functions. Basically, each party in the conflict has hidden information: not all types of hidden information are necessary for the other party. Dwelling more on this issue,

⁴Managers as individuals (separately or in teams) are bodies of legal persons. In this meaning managers are representatives of the legal person who remain with it in the organisational relationship whose contents is execution of the function of the body in the way specified in the statutory provisions and in the bylaws of the given legal person. This is what differentiates them from plenipotentiaries acting for the company but not being its part and manager–employees who (even though included in the company) do not constitute its bodies in the meaning stated above.

one could state that far-reaching transparency (open access to information) is harmful for the company, which means to both parties of the contract. The problem is not in asymmetry of information and rather in using by the manager private information for actions which are contrary to the interest of the owner. This phenomenon of abuse of trust by managers is quite often, too often, yet it is difficult to see it as a standard, a principle of corporate governance.

As regards the idea of management contracts, the advocates of the agency theory have major doubts. Is there any point to conclude contracts when certain activities of the manager are hidden, invisible for the owner, when they cannot be stated in the contract because there is no way to verify them?

The trend to autonomise and decentralise management has been observed for a long time. As regards the managers, or even executive employees, the principle of management through objectives and freedom of selecting the method of execution is commonly applied. Monitoring behaviour of the manager analysed in this context seems to be peculiar and probably groundless, because what is the value of information for the contract on how hard the president is working?

Another appearing problem of the agency theory results from lack of physical possibility of foreseeing all the circumstances of the manager, which prevents the possibility of drafting a complete contract, that is one which would *ex ante* specify what activities may be undertaken by the manager under future conditions (14).

This issue has been seemingly satisfactorily solved. Usually there are two basic approaches to specifying the duties of the manager. Some outline them in general, detailing only areas of activities of the manager. Other strive to make a detailed letter of his/ her duties. In believe that, from the practical point of view, the indirect method is the best. It is known that foreseeing all future problems is difficult at the time of concluding the contract. Too general phrases may blur the actual objective of work. Combination of both options gives the advantage that the contract includes elements of obligation to act carefully and obligation of the result. On the one hand, the administrator may have very precise tasks assigned (resulting from strategy and long-term objectives of the company) and may be held accountable for the results, and at the same time may be obliged to apply increased diligence in other areas.

The presentation of the issues of management contracts in the light of the agency theory thus ends with indication of the costs of the agency which result from construction and application of contracts:

- the costs of contract structure;
- the costs of monitoring and inspecting activities of the agent by the principal;
- the costs of the agent—execution of the interests of the principal;
- the residual loss—the loss on the difference of values which results from discrepancies between the interests of the principal and of the agent which is incurred by the principal; it means the loss related to the fact that full execution of the contract exceeds the benefits which it brings about (15).

The following part of the paper includes an attempt at finding solution to these issues and answers to at least some of the above questions.

4. The essence of the management contract

The growth of the company is a process which results in changes in its organisational and legal form. This is what happens in case of legal persons which do not operate directly within legal regulations (from the point of view of the law they are only a contractual structure) but solely through their bodies. The bodies of legal persons are formed by individuals as single persons or teams of persons, e.g. the manager. In this meaning managers are representatives of the legal person who remain with it in the organisational relationship whose content is execution of the function of the body in the way specified in the statutory provisions and in the bylaws of the given legal person (16).

Moreover, there is a large number of owners in companies who have capital ready and who are looking for the opportunities of investing this capital by participation in a company (the so-called passive entrepreneurs). Both passive and active entrepreneurs are interested in finding persons who on their behalf, in their name and interest, as well as on their account and risk, would effect management functions. Entrepreneurs (stockholders) include the managers in their companies, use their knowledge, experience, skills, cognitive capacities, reputation in the market, in order to meet specific needs of the company to which they (the managers) bring income. It may be then assumed that the managers are representatives of the legal person and of the owners (the stockholders) who invested their financial capital in it, the representatives (the agents) who generate profits and other values for the stockholders (the stakeholders) or, in a broader meaning, who create agency benefits.

The following are among various organisational forms of enterprise management, which result from its development and at the same time constitute grounds for contracts:

- professional enhancement of management with manager services. Providing manager services has professional nature, and specific characteristics of these services justify the need to specify them in the management contract;
- management autonomisation by creating the managing body provided with competencies specified with the regulations of the law and with the provisions of the by-laws of the company (e.g. the board of directors, the proxy), which the owner cannot change, at least on the *ad hoc* basis;
- deconcentration of management by appointing plenipotentiaries who act on behalf of the owner in the scope of their authorisation and with legal consequences for him;
- decentralisation of management by assigning higher-level rights to the lower level, which is related to hiring professional management personnel with the

duties of effecting competent management over a part of the enterprise. In this case, too, performing a management function of the properly high level has professional nature, and the specific nature of these services may be described in the so-called contracts of management.

A management contract is a contract regulated with the law as the so-called in-nominate agreement. The legal source for this type of agreements is expressed in Article 353 of the Civil Code (PL abbr. k.c.) in the principle of freedom of agreements, on the basis of which the parties have more freedom in developing their contents, yet within the limits set forth in Article 58 k.c., i.e. that in a specific case this cannot be a contract contrary to the act of the law or aiming at bypassing the act of the law. In this contract, the individual undertakes to apply due diligence to achieve specific economic objectives. However, it is not a contract for achieving result (work), as diligence and not the result of the activities of the administrator will be the decisive measure in assessment of execution of the contract. In short, it includes, first of all, elements of the contract of mandate, with some elements of a contract for performance of a specific task.

Contract of management is different from contract of employment. The basic feature which sets the relationship of employment apart from other obligation relationships is the organisational hierarchy of the employee understood as the obligation of personal execution of work in a specified place and time, according to the recommendations of the employer. With the management contract, a relationship arises which is free of office dependency, and subordination of the manager is mostly the consequence of inspection rights due for the subordinate entity in reference to him/ her—on the one hand, and the reporting duties of the manager on the other hand. The Supreme Court indicated this in the sentence of 4 April 2002 (I PKN 776/00 OSNP2004/6/94), rightly stating that conclusion of a business management contract (the management contract) results in assigning the rights by the owners of this type of company on the managing person (the manager) to individually undertake actual and legal activities concerning management of the company, which means self-reliance in the scope of business management, freedom in selecting the method (style) of management, the possibility of taking advantage of the current trade contacts, professional experience, organisational skills, reputation, and own image. These features are absent in the relationship of employment, in which the employing entity is entitled to issue binding instructions to the employee. In case of the management contract, there is no permanent body which would regularly (daily) manage the work of the manager.⁵

It has to be stated that the contract on the basis of which work is provided cannot have mixed nature combining elements of a contract of employment and a civil law contract (see the sentence of the Supreme Court of 23 January 2002: I PKN 786/00, OSNP 2004 no. 2, Item 30). Thus, in case of disputes, if any, the court would decide what type of contract was used to connect the parties. Qualification of the given

⁵ According to practitioners, especially lawyers, contract of management means a civil law contract for provision of management services, and is based on Article 750 k.c.

legal relationship as a relationship of employment or a management contract is determined mostly by the method of execution of employment and the will of the parties who conclude the contract. The final qualification of the management contract as a contract of employment or a civil law contract depends on the circumstances of the specific case. It has to be stated that the name of the contract alone has no decisive significance.

The essence of the management contract, regarded as the contractual relationship of service, is the fact that one party (the service receiver: the manager, the manager group or the manager company) as a legally independent entity undertakes to manage the company of the other party on a fee-paid basis (for a consideration), i.e. the entrepreneur—the service provider, managing this enterprise as an autonomous entity—on behalf of the entrepreneur, for the benefit and in the interest of the entrepreneur and on his account and risk. The service of business management understood in the context of theory of organisation and management consists in executing the process of planning, organising, managing and inspecting the activities, using resources of the company for achievement of the defined objectives.

An important element of the definition of the management contract is the phrase “the contract for provision of services” (Article 750 of the Civil Code). Management is a typical service, therefore the standards of the civil code should be used to it in reference to the obligations of providing services, which mostly means regulations on the contract of mandate and the contract for performance of a specific task. These contracts differ basically due to the differences in the obligations.

The contract of mandate, just like the contract of employment, is based on the obligation of due action. A person receiving the order (mandate) is thus not obliged to act for the result that would be a specific result planned earlier by the parties, because his/ her due diligence would be enough to achieve the intended objective. The order is thus based on trust of the person issuing the order to the person receiving the order.

The said result is thus the basis of obligation which defines the contract for performance of a specific task, where the risk is shifted on the person receiving the order. He/ she undertakes to execute the defined work, in return for which the employer undertakes to pay the remuneration (Article 627 of the Civil Code).

The above differentiation is very significant, because the management contract is a mixed contract with elements of various mixed agreements. The obligations of due action and result often come side by side in them. Management contracts may also sometimes include elements characteristic of a contract of employment, which may often suggest their legal employment nature.

To summarise the above, it has to be emphasised that civil law gives broader grounds for free shaping of the legal relationship between a capital company and the manager(s) than the labour law. The name used for this relationship is of practical little significance, as it is not the name of the contract but its contents which is decisive. This is the reason why the analysis of the elements of the management contract in the context of rights and duties of the manager is important.

5. The costs of the agent and the methods of their compensation

Managing a company includes actual activities related to managing issues inside the company and legal activities which consist in representing the company externally. The degree of execution of these functions depends on professional competencies of the manager, i.e. on his/ her intellect, creative imagination, foreseeing and shaping the future, as well as the capacity to capture weak signals.

It may be noticed that the said designata of broadly understood manager qualifications (competencies) are of highly varied nature, yet they can be integrated into an orderly entity. Their essence is intangible and they feature multifunctionality, thus they may be used at the same time in many places and are not wearing out along the way or, quite on the contrary, even gain in value. The most significant is, however, that competencies of the manager properly used and incited by the entrepreneur create utilitarian value, i.e. they can satisfy the needs of the company by mobilisation and unique creative configuration of his/ her resources or continuous overcoming of barriers for development of the company, which ultimately brings income. Acquiring these competencies, their shaping and replication, require from the manager talents, investing in his/ her development in a relatively long period of time (time intensity), which highly increases the costs of the agent.

With the appropriate competencies and freedom of action, the manager can function independently and autonomously. These are some of the reasons why there are high requirements for the managers, as it is him/ her from whom as a professional high commitment to the growth of the company is expected, as well as bringing in new values and methods of management, such as his/ her own principles, effective forms of motivating employees, contracts with business partners and prospective clients. New, effective organisational solutions are valuable intangibles for the company, and these are significant costs of the agent.

Conclusion of the management contract increases his/ her responsibility towards the owner of the company for damages, if any. Even though the contract of management is basically a due diligence contract, the parties of the contract may include in it elements typical of contracts for performance of a specific task, that is contracts of result, imposing on the manager the obligation of achieving specific levels of profit, financial liquidity, increasing the share in the market, introduction of new products, restructuring the company. These criteria may be different and may depend on both parties, yet they should be in the form of precisely specified and easy to control economic indicators. As a result of such entries, the manager will be responsible not only for negligent execution of his/ her duties, but also for lack of the results. Moreover, the manager may be liable for the incurred losses, but also for the lost benefits which would be achieved provided diligence was applied by the administrator (16).

Concluding the contract, the manager is responsible with his/ her entire personal property (Article 471 k.c. et seqq.), and this type of contract features lack of limita-

tions in enforcement of these dues. The reigns of the management contract in the scope of responsibility of the manager are thus incomparably higher than these with responsibility of regular employees (Article 119 of the Labour Code). However, responsibility of the manager must be very precisely specified, because responsibility in the civil law is based on the principle of guilt, and suing claims for damages (on the basis of Article 471 k.c.) is pretty difficult and lengthy.

The costs of the agent are significantly increased with different protection measures which facilitate suing the manager for damages. If something is enjoyable, it cannot be forced. A blank bill of exchange with the statement specifying the basis of its activating, blockade over part of paid remuneration in a separate bank account, along with authorisation of the owner of the company to use it under specific situations, or payment of part of the remuneration in stock (shares) of the company being managed, on which pledge is established. The entity hiring a civil law administrator may protect its interests with a reservation in the contract of contractual indemnities or payment of the deposit.

Management contracts give the owner high freedom in concluding and terminating the contract with the manager. Although they are concluded for a defined period of time, as well as undefined (the objective is to ensure more efficient long-term management), the parties may add entries which specify the causes of termination of the contract. Otherwise, by virtue of Article 746 k.c., the person receiving the order and the employer may terminate the contract at any time. This facilitates the owner to release an ineffective manager.

The contract of management, just like the contract of mandate, may be fee-paid and free. The latter is a rare situation in practice, though.

The components of wages of the administrator may be shaped freely in accordance with the choices of the parties. Unlike in the contract of employment, the parties are not dependent on the existing salary regulations or collective systems of employment, which usually do not include sufficiently satisfactory flexible salary solutions. The parties may freely define the system and method of remuneration for the manager, the terms, the time and place of payment, the methodology of settlement related to the result, define the components of damages, if any, for delay in payment or unjustified diminishing, define the cases when and by how much it may be increased or reduced, define admissibility and amounts of deductions, the method of mediation in case of disputes in this respect, etc.

Usually, the remuneration is paid in two basic parts: fixed and variable. The fixed part is relatively small, yet paid regularly. The variable parts may be paid often or occasionally. Usually commission, royalties, appreciation bonus, options for securities or shares, and awarding shares and stock are also found in practice.

Commission means a specified percentage of share of the manager in the proceeds (turnover) achieved by the company in participation or with participation of the manager. It is calculated on a specific part of the proceeds of the company generated by the manager (e.g. from the proceeds on a group of products or clients, from a specific

territory or a specific organisational unit). Its amount is determined on the proceeds, linearly, progressively or degressively, usually also with factors reducing the commission included, i.e. the factors which limit its maximum allowed amount.

Percentage of profits defines the share of the manager in the profit of the company. It is one of these components of salary which depend on general productivity of the company. Percentage of profits does not give the manager the partner status, as the right to percentage of profits comes from the contents of the management contract and not from the deed of the company. It is interesting to note that percentage of profits is charged on the gross profit of the company and constitutes the cost of its obtaining, unless the provisions of the contract decide otherwise.

The statutory bonus is similar in essence to commission and percentage of profits. It partly depends on the results of work of the manager, as well as on the results of operation of the company. In the practice of concluding management contracts, it is used as a type of remuneration for execution of specific tasks of major significance for the company, independently of other components of remuneration. It has to be added here that it is characterised by a formalised method of defining the principles and conditions of awarding. If these are met by the manager, the bonus may be claimed.

On the other hand, if awarding the bonus is left to free recognition of the employing entity, then it has the nature of prize, even though it may be called a bonus. The so-called appreciation bonus is an example used in practice. Even though it is named a bonus, it actually is the award granted as a result of positive assessment of the effort of the manager. In such a case this effort cannot be precisely measured, e.g. good quality of work, execution of a task of special degree of difficulty, making improvements in work.

The right of the entity to demand such a bonus arises only at the date of the decision of the employing entity awarding the bonus (the award) to the manager.

Management option is an interesting item in the remuneration of managers of the highest level, used commonly in Western countries. These consist in entitling the manager to acquire or assume in the future, usually after a specific time, stock or shares in the managed company. Many contracts found in practice include additional motivational elements as well.

6. Conclusion

The basic premises for shaping management contracts as a mechanism of supervision and management are to be found in the growth of the company and in seeking profit by the entrepreneurs. The following are among various forms of business management, resulting from its development and at the same time constituting the basis for the contracts: management autonomisation, deconcentration and decentralisation of management and adding professional characteristics to the management. These or-

organisational solutions have created the management personnel of various levels who, managing the company, mobilise and creatively configure its resources, incurring in this process significant expenses and expenditures, specified as the cost of the agent. This co-operation of both most important stakeholders and creative combination of their capitals, financial and intellect, brings about income for the company. The duties of both parties included in the contract, as well as other provisions of the contract, are based on trust, and discrepancy of interests, if any, asymmetry of information, or different attitudes to risk, are natural and constitute the subject matter of negotiation of the contract. It seems that the properly constructed contract of management significantly eliminates the problems of agency and provides solutions as regards the issues of ownership supervision. The internalisation of organisational objectives and objectives of the manager and the system of stimuli included in it should effectively discourage him/ her from opportunistic actions. However, the practice in the Polish companies is different. Namely, the basic feature used in systems of remuneration in the Polish companies is emphasising long-term security of the managers and neglecting criteria of success. The boards rarely ever apply more aggressive instruments of motivating the managers. Fixed remuneration is the dominant factor in remunerating persons managing Polish companies. The variable component of salaries is most often related to the indicator of increase in sale which is safe for the managers. Occasionally companies apply components of salaries based on ownership, i.e. stock and stock options (17, p. 323).

Finally, it is noteworthy that high culture of the contract may also contribute to the reduction in the costs of corporate governance, for example by limiting the institution of supervision or numerous inspection tools which, as the practice shows, are not sufficiently effective and efficient.

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Kontrakty menedżerskie w systemie nadzoru i zarządzania przedsiębiorstwem

Streszczenie: W artykule przedstawiono istotę, konstrukcję i znaczenie kontraktów menedżerskich w procesie nadzoru i zarządzania przedsiębiorstwem. Scharakteryzowano również zasadnicze przesłanki wprowadzania kontraktów menedżerskich i kontraktów kierowniczych, wynikające głównie z rozwoju przedsiębiorstwa.

W szczególności, w pierwszym fragmencie artykułu podano definicje nadzoru korporacyjnego i nadzoru właścicielskiego, przedstawiono identyfikację mechanizmów tego nadzoru wraz z podaniem oceny ich skuteczności i efektywności. Sporo miejsca poświęcono na omówienie teoretycznych podstaw kontraktów menedżerskich, ze zwróceniem uwagi szczególnie na teorię praw własności (*ownership rights theory*), kontraktowe ujęcie przedsiębiorstwa (*nexus contracts*), menedżerską koncepcję produktywności, problem zaufania do partnerów biznesowych, teorię tworzenia wartości (*theory of affectation*), teorię agencji (*agency theory*), czy teorię stewarda (*stewardship theory*). Poddano krytyce spełnianie funkcji predykcyjnej i projekcyjnej teorii agencji, którą uznaje się powszechnie za koncepcję wiodącą w nadzorze korporacyjnym.

Nawiązując do istoty i przesłanek wprowadzenia kontraktów menedżerskich, scharakteryzowano formy organizacyjno-prawne zarządzania przedsiębiorstwem, takie mianowicie jak personalizacja zarządzania, autonomizacja zarządzania, dekoncentracja zarządzania i decentralizacja. Punkt ciężkości analizowania problemu położono na postanowienia umowy o zarządzanie przedsiębiorstwem, ze szczególnym uwzględnieniem przedmiotu umowy, obowiązków obu stron, odpowiedzialności zarządzającego, kosztów agenta (menedżera) i sposobu ich kompensacji. Zdefiniowano składniki wynagrodzenia menedżera oraz sposoby ich określania. W zakończeniu zawarto

postulat budowy wysokiej kultury kontraktów w gospodarce w ogólności oraz kontraktów menedżerskich w szczególności.

Słowa kluczowe: kontrakt menedżerski, nadzór korporacyjny, menedżerskie teorie przedsiębiorstwa, model biznesu

WOJCIECH KOZIOŁ*

Human capital dynamics: essence and determinants

Key words: capital, human capital, economic growth, fixed wages, household

S u m m a r y: The origin of the studies on human capital as one of the most important economic resources is presented in the first part of the paper. Then, the concept of human capital is discussed which explores the general model of capital by Mieczysław Dobija. In the light of this concept, human capital is the capital embodied in human resources. The rules for measuring have been also given which allow isolation of the structure of human capital. The principles of payment for work of human capital are given in the following part of the paper. These principles result from the nature of capital. The most significant impact to which human capital is exposed are the forces that fragment its value. Maintaining this value requires the appropriate compensating stream. Otherwise, the value of human capital will be degraded, which leads to a number of negative micro- and macroeconomic consequences. It has also been proven that the proper institutional solutions and attitudes of people may help human capital increase with benefits for the entire population. The process of increasing of human capital is happening in the family (household). The last part of the paper provides analysis of the factors which have positive or negative effect on the value of human capital. The entire discussion has been properly summarised.

1. Introduction

One of the objectives of basic studies in the field of economics and management is learning the economic aspects of human life. Formulating unanimous and coherent theories on the basis of research results constitutes the basis for further conclusions, recommendations and, finally, practical solutions. Problems of special importance are connected with issues directly related to people and living. However, one has to remember that the nature of these issues is very broad. In case of economic and re-

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lated sciences, the subject matter of the studies conducted in this area should be narrowed down to the issues of human capital. The most important issues in this respect include defining the “human capital” term and creating a model for its measuring. Detailing the model for measuring human capital enables the analysis of interactions which result in changes in its value. Isolation of the factors which affect dynamics of human capital constitutes the basis for human capital management in individual and macroeconomic approaches. The value of human capital directly translates to the condition of the economy, as it is the key resource in the micro- and macroeconomic approaches. The objective of this paper is to present the natural impacts on the value of human capital and the possibility of developing its value with the appropriate institutions and human attitudes. Achieving permanent economic balance requires implementation of mechanisms which allow maintaining or increasing the value of human capital. The unique nature of human capital is related to the special method of managing it. Human capital cannot be as freely transferred as it is in case of the capital embodied in material resources. Handing over human capital to successors is a long process which basically is happening within households. In the model approach, human being as the owner of human capital prepares his/ her successors to provide work and live in community. The length of this process and its major social significance require ensuring the mechanisms to facilitate its proper course.

2. Essence and measuring human capital

The basic subject matter of the economics studies are the rules which govern the allocation and multiplication of the national wealth. It means that any concept that brings important contribution to the description of these economic issues deserves attention and further growth. The model of measuring human capital presented in this chapter is no doubt one of these concepts. Human capital is defined as the capacity of human being to perform work. This model, in particular, presents the way human capital originates, the cost estimate of its elements, and the rules of its paying. Moreover, this model explains the material situation of the employee as the owner of human capital and a member of the household, and then coherently transfers these considerations to the macroeconomic ground. Thus allows capturing the relationships between the origin of the value in the economy and its allocation. It may be stated that the human capital model takes into account the principle of correspondence of wages with the value of the provided work.

In the last fifty years, human capital has become one of more important subjects of research in both economics and management. This interest resulted in developing numerous concepts of human capital which mostly come down to defining human capital as a set of features of a person or of a community which lead to specific economic consequences at the micro- or macroeconomic levels. This approach is correct, although it needs additional taking into account of the fundamental rights of capital

(5, pp. 160–174). Otherwise, unanimous and faithful measuring of human capital in monetary units is not possible.

One of the forerunners of the studies on human capital was Theodore Shultz who perceived human capital as a factor of economic development of the state. He defined it as a set of elements which determine the quality of the community. The quality of the community is increased by education, access to information, acquiring professional and life experience, as well as proper upbringing and health care. Human capital manifests in the acquired and inborn capacities and skills. Shultz assumed that spreading genes responsible for inborn skills is similar in all societies, thus the differences in the quality of the society between countries result from the differences in acquired skills (1, pp. 21–22).

Studies on the issues of human capital were preceded with the achievements of Garry Becker who analysed this problem from the point of view of the individual person. He believed that investments in education lead to increasing the amount of the future wages. Their guarantor is the competitive labour market which forces employers to properly pay the higher productivity of more educated employees (2, pp. 69–71). It is not a new view, as Adam Smith in “The Wealth of Nations” mentioned importance of knowledge and skills in employees who produce high quality goods. He remarked that wages should take into consideration not only the current effort and time dedicated on execution of work, but should also promote expenditures incurred on acquiring the skills which allow the employee to execute the tasks appropriate for his/ her place of work.

The truth in the statement that the market guarantees additional income on account of investments in human capital cannot be denied, however, two more aspects should be taken into account. The first is the noticed imperfection of the labour market and higher susceptibility to manipulations and erroneous economic assumptions in comparison with the market of goods. The other refers to the issue of specification of the regular income from the investment. The question should be answered what amount of additional income is to be expected as a consequence of the investments made in human capital. It is the key issue from the point of view of long-term social development and economic growth of the country. As it was noticed, as long as in the 1970s, T. Shultz observed that the level of development of the country and its further dynamics depend on human capital of its residents. It would be difficult not to agree that knowledge, experience and proper physical condition constitute the key factor of productivity of the given country. The value of human capital depends on its current resources and possibilities of further reproduction and development. Thus, it is necessary to create in the country such conditions which would allow the proper development of the stated designata of human capital. One of the conditions necessary to maintain the level and dynamics of human capital is ensuring the proper rate of return on human capital, that is fair wages.

The model of measuring human capital presented in this chapter was developed on the basis of the general model of capital by Mieczysław Dobija. It is important

that this concept ensures a broad view on the term of “capital”. One of the features which make it stand apart among most of approaches to the issue of capital is the fact that it is not limited to perceiving capital as common value. This concept takes also into account natural interactions which are the source of changes in the value of capital. In the light of this concept, the comprehensive analysis of the essence of capital requires the factor of time to be taken into account. The dynamic model of capital is represented by the formula (3):

$$C_t = C_0 e^{(-s+m)t},$$

where: C_t —the value of capital at the time t , C_0 —initial capital, s —natural capital loss index, p —economic constant, t —time passage variable, m —variable defining effect of work and management.

Capital is subject to three key effects of the environment: natural spread as a result of risk (s), increase as a result of work and good management (m) and 8% economic constant (p). With these effects, the initial value of the capital (C_0) may increase or spread. The scope of these effects is determined by the factor of time, because the formula of the capital requires application of the discount account.

One of the fundamental assumptions of the model of capital is the statement that capital is not generated out of nothing, that is it has its origin which allows its valuation in monetary units. This applies also to human capital which, according to the quoted author of the model, has its source in capitalised expenditures necessary for generation of economic potential to perform work which a person may have at disposal. These will mostly be the costs of professional vocational education, increased by the costs of living. Incurring the costs of living is absolutely necessary for physical preparation of the human capital medium which is the body. The properly developed human body is the necessary condition for emerging and development of inborn skills, capacities and possibilities during education and work. The expenditures are incurred at the time (t) necessary for preparation of the person for performing the given profession, that is from birth until readiness to undertake professional work. Although these expenditures are usually financed by the family and the society, the owner of the produced human capital is the person for the benefit of whom these expenditures were incurred. It is interesting that if the body is properly developed, and the young person has completed the pre-planned educational path, it means that the costs of risk (s) have been overcome by, among others, the efforts of the parents. These efforts are represented in the above formula by the parameter (m). Thus, introducing the category of ownership, that is assigning the capital to a specific person, we obtain the formula of the capital which belongs to the employee (H_t), which will depend on the initial expenditures (H_0), the economic constant (p) and the capitalisation time (t) (4):

$$H_t = H_0 e^{pt}.$$

It follows from the assumptions of the model that human capital is generated as a result of the expenditures incurred for the appropriate preparation of the person for work. Exploring the model of human capital allows presentation of this concept as the sum of the amounts representing capitalised expenditures for life costs (K) and education (E). These expenditures are the source of the capacity for performing specific work, and they are perfected along with length of service. This increase in skills and effectiveness in the place of work is represented by the experience factor $Q(T)$. One has to remember that the costs are incurred on the continuous basis, and that is why the expression H_0 representing their value has the nature of a stream of costs and not a one-time expenditure, as often is the case with material and financial investments. This rule is reflected in supplementary formulae which represent the process of establishing human capital from the costs of living K and from the education E . With the above taken into account, human capital defined as the source of financing human resources may be represented as the sum of three components:

$$H(T) = (K + E) \cdot (1 + Q(T)).$$

With the annual capitalisation of expenditures, particular components of human capital may be represented with the following formulae:

$$K = k \cdot 12 \frac{(1+p)^t - 1}{p} \quad \text{or} \quad K = k \cdot 12 \frac{e^{pt} - 1}{p}$$

$$E = e \cdot 12 \frac{(1+p)^t - 1}{p} \quad \text{or} \quad E = e \cdot 12 \frac{e^{pt} - 1}{p},$$

where: $H(T)$ —the value of human capital, K —the capitalised costs of living, E —the capitalised costs of education, $Q(T)$ —the experience factor, k —the monthly costs of living, e —the monthly costs of education, T —years of vocational work.

Acquiring experience in the process of work is happening in a similar way. Thus one can assume that the employee performing the same work will perform it in the next year easier and cheaper by (w) percent. Vocational experience understood in this way causes increase in the capacity to perform work, thus estimation of value of vocational experience and then including it with the structure of human capital is justified. The experience factor ($Q(T)$) is expressed with the function of years (4):

$$Q(T) = 1 - T \frac{\ln(1-w)}{\ln 2},$$

where: w —the learning index, T —years of vocational work, $T > 1$.

Transformations allow representation of human capital as the sum of the three components:

$$H(T) = K + E + D(T)$$

$$D(T) = (K + E) \cdot Q(T),$$

where: $D(T)$ —the value of the capital from experience.

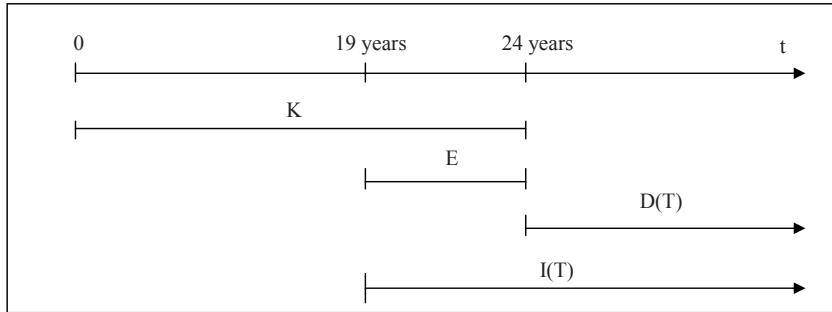


Figure 1. Model of increase in human capital

Source: author's own study.

The process of establishing human capital is presented in the graphic form in Figure 1. Breaking down the elements of human capital from the point of view of the period in its development is an alternative solution for presented classification of components of human capital. Initially, the increase in human capital is related to development of the human body which is accompanied by acquiring the basic scope of education. In developed countries, education is a commonly available and free good, thus at this stage the increase in human capital occurs as a result of capitalisation of the incurred costs of living. The resulting capital from the costs of living (K) constitutes the common and generally available component of human capital. Its value is equal to the capitalised costs of living incurred within 17–18 years. Then, the owner of human capital (K) makes a decision about initiation of gainful employment or undertaking further, professional education. Continuation of education causes further increase in human capital as a result of incurring costs of education and costs of living capitalised during education. In this case, the costs of living have a different economic meaning than they had in the initial stage of the increase in human capital. Moreover, during education, the value of human capital increases by the fair percent (p) on the capital resulting in the initial period (K). It is the equivalent of the value of time dedicated to education instead of gainful employment. In other words, it is the cost of resignation from undertaking gainful employment (the alternative cost) which increases the value of human capital. What results is the capital from education (E) calculated as the difference between the value of human capital ($H(T_0)$) and the costs of living (K). The third and last stage in the increase of the value of human capital is

the period of vocational activity characterised with the increase in the capital from experience ($D(T)$).

The presented model of measuring human capital allows for determination of the category of intellectual capital $I(T)$ as a derivative category. Its introduction requires presentation of the selected relationships between particular components of human capital:

$$\begin{aligned} D(T) &= H(T) - H = H \cdot Q(T) = (K + E) \cdot Q(T) \\ H &= H(0) = K + E \\ H(T) &= (K+E) \cdot (1+Q(T)) \\ I(T) &= H(T) - K = \dots = E \cdot [1 + Q(T)] + KQ \cdot (T) = E + H \cdot Q(T) = E + D(T). \end{aligned}$$

The value of the intellectual capital consists of the capitalised costs of professional education and the value of the gained vocational experience $D(T)$. All in all, the relationships between human capital $H(T)$, intellectual capital $I(T)$, and capital from vocational experience $D(T)$ are represented in the following formulae:

$$\begin{aligned} D(T) &= H \cdot Q(T) \\ I(T) &= E + D(T). \end{aligned}$$

The presented relationships between particular components of human capital enable the following additive model of human capital:

$$H(T) = H + D(T) = K + I(T) = K + E + D(T).$$

Figure 2 presents a sample course of the developing human capital of a person with higher education (equivalent to MA or MSc). The annual costs of living were estimated at the level of 7500 PLN, which will be capitalised for 24 years. Moreover, the annual costs of education were defined at the level of 4000 PLN, with the period of capitalisation at 5 years. This person, after completion of the studies at the age of 24, undertakes vocational work. During his/ her work, vocational experience is gained which translates into human capital from experience.



Figure 2. Increase in human capital of a person with higher education (equivalent of MA or MSc)

In some cases there are skills and qualifications which exceed beyond the capacity of the currently presented model of human capital, and the capital of creativity (C_r) is their source. The model of human capital including the component of the capital of creativity is presented in the following formula:

$$H(T) = K + E + D(T) + C_r.$$

The capital of creativity appears in the effective market which reports and appreciates increased productivity. In practice, the owner of this capital will receive remuneration in excess of the fair level of payment for his/ her formal qualifications, that is resulting from the education and vocational experience. More on this issue, see (5, pp. 94–96).

3. Principles of payment for human capital

The principles of remuneration of human capital are determined with the nature of the capital. Human capital is nothing more than capital embodied in human resources. Thus, the wages model must respect interaction of the environment with the changes in the value of capital and its natural capacity to increase. The fragmenting forces of risk affect the objects characterised with concentration of capital, that is the objects with economic value. This effect is random and in practice manifests with random losses. In case of material resources, the example of interaction of fragmenting forces is their continuous worsening as a result of time passage (e.g. rust appearing on metal surfaces). Keeping the capital substance requires continuous inflow of value, which will allow compensation of the effect of destructive forces of risk. The value of the capital will thus be maintained, on the condition that the assets in which capital is embodied will generate a stream of effects which will bring about the equivalent rate of return. Rate of return should not be lower than the index of capitalisation, otherwise the value of the capital will drop below the value of its historical acquisition (4). These principles refer also to human capital. The inevitable fragmentation of capital requires the appropriate action to enable compensation of the spread of the capital. The mechanisms of fragmentation of human capital and the possibilities of compensation of the spread of human capital are presented in the following part of the paper.

Human capital of an employee is reduced over time, and, additionally, giving it up for the employer's disposal causes its reduction as a result of the effort related to performing work. The compensation of this reduction requires remuneration determined by the size of the economic constant for prospective increase. Empirical studies show that this constant is at the level of about 8% per year. The capacity of the capital to generate value may be presented with the equation for the internal rate of return (IRR). The application of this equation for human capital as the source of annual wages may be presented as follows (6, p. 163):

$$H(T) \cdot (1+r) = W + H(T+1),$$

where: r —the internal rate of return, W —annual wages.

The left side of the equation indicates in the standardised way that human capital of the employee ($H(T)$) should increase within the year by the factor $(1+r)$. The right side indicates real values. In the given year, the employee will receive the wages (W) and his/ her human capital will increase as a result of the gained vocational experience to the amount of $H(T+1)$. On the basis of the above equation, the formula for wages (W) may be established:

$$W = H(T) \cdot r - H(0) \cdot [Q(T+1) - Q(T)]$$

that is $W = H(T) \cdot r - \Delta D(T)$.

This equation shows that the wages really constitute a percentage of human capital, but there is also a reducing factor because an employee gains professional experience from the performed work. According to the model, professional experience has a strictly specified value the increase of which will allow future financial promotions. Research on wages shows that increase in professional experience has major effect on the level of wages for persons who just start their professional career, yet it loses importance with passing time (see Figure 2). Therefore, in further analysis of development of human capital of the employee, the wages which are the manifestation of the model of wages based on the concept of human capital is of key importance for maintaining his/ her value. The following formula represents it:

$$W = H(T) \cdot r.$$

Further, it may be proved that fixed wages are specified with the payment index (r) equal to the 8% economic constant (p). For this purpose, the current value of the stream of wages is calculated:

$$PV = \frac{W}{d} = \frac{r \cdot H(T)}{d},$$

where: d —the relevant discount rate.

The question arises, what discount rate should be used to calculate the current value PV ? The discussions of capital show that the natural level of human capital loss is determined with the rate (s) in the general model of capital, thus:

$$PV = \frac{r \cdot H(T)}{d} = \frac{r \cdot H(T)}{s}.$$

Due to the relation $p = E(s)$, the current value (PV) may be calculated:

$$PV = \frac{r \cdot H(T)}{p}.$$

It follows from the above formula that $PV = H(T)$ if the rate of payment of human capital (r) is equal to the economic constant (p). Thus, the basic wages $L = p \cdot H(T)$ ensure that the current value of the stream of wages is equal to the initial value of human capital of the employee. It means that human capital with these wages has not been depreciated, that is its value was maintained.

The wages causing payment of human capital at the level of the economic constant enable maintaining of the value of human capital of the employed. If the level of payment of the capital drops below the 8% of economical constant, the value of human capital of the employed will decrease. It is noticeable for the employee and causes the feeling of harm and lack of justice which, enhancing, cause pressure and social dissatisfaction. In this way, the situation is coming closer to protests and strikes.

This regularity was confirmed during scientific research conducted in a 702-person group of employees. The research consisted in calculation of the value of human capital of each of the employees and then comparing it with the received one-year wages. The average value of the rate of return on human capital in the analysed group calculated in this way was 8.13% with the standard deviation equal to 1.91%, whereas the relative assessment error was at the level of 1.7%. The obtained empirical data will allow determination of the confidence interval for the estimated average value of the rate of return on human capital $[7.99\%; 8.27\%] = 0.95$. The value of 8% is within this interval, thus one may assume that the average rate of return on human capital is 8%. The above conclusion is completely justified due to the low relative error of the assessment (7).

The above analyses allow definition of the term of fair wages as the amount equivalent to the costs of risk, thus ensuring maintenance of the value of human capital. The adopted point of view may deviate from the definitions presented in the literature of economy and in the field of human resources management. The view is prevalent in these sciences which gives the market wages the original nature. It is often assumed indiscriminately that the market ensures balance by shaping the appropriate market wages.

4. Essence of human capital management

The unique nature of human capital requires the proper method of its management. This uniqueness results mostly from the non-disposable nature of human capital. This capital is individual or assigned to a specific person, the owner of human capital. However, this feature of non-disposability does not apply to a long period of time understood as time of exchange between generations. In this period, human being as the owner of human capital prepares his/ her successors (offspring) to provide work and live in the society. It means that he/ she gradually transfers them his/ her capital, both material and human. The subject matter of this point of analysis is the discussion of principles and mechanisms of transfer of human capital with a spe-

cial attention paid to the mechanisms which develop the value of human capital over a long period of time.

In the light of the above, the mechanisms need explanation which determine dynamics of changes of the value of human capital. In scientific works, the model of analysis of human capital is dominant understood as the resource which is at the disposal of the employee, that is the individual person, or as the macroeconomic resource. However, it is noteworthy that developing the structure and value of human capital of a person (employee) constitutes one of the processes happening within the household. “Household” may be defined as a management micro-unit based usually on family bonds which generates income allocated for various objectives, which produces goods, provides services and stores stock. Figure 3 presents the relationships of the household executing the function of maintenance and development of human capital (8, p. 34).

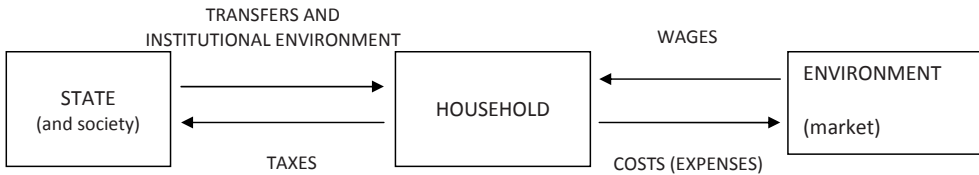


Figure 3. Economic balance of the household in the light of the model of human capital

Source: author's own study.

The level of human capital depends on the conditions of the family, especially on the income at their disposal, the level of expenses and the institutional surroundings which may facilitate or hinder growth of human capital. The household (mostly the parents) is the owner of human capital, and its task is replacement of human capital over a short and long periods of time. Replacement of capital over a short period of time means supplementing vital forces lost during daily activities (e.g. rest, meals, etc.). Replacement of capital over a long period of time means preparation of successors (children) for work and life in the society. Economic progress requires that system-based solutions will enable preparation of the following generations to perform work at the level not lower than that of their predecessors. From the point of view of dynamics of human capital, it means maintenance of the value of human capital in the context of exchange between generations. Achieving this objective is possible by the members of the household undertaking the appropriate actions in the economic dimension. It means, in particular, entering into economic relationships with other entities which consist its market and institutional environment.

The relationship of employment constitutes one of the most important elements of cooperation of the household with the environment. Household is the sole supplier of

human capital. It receives remuneration for making the medium of production available ($W = u \cdot H(T)$), whose amount in the effective market results from the value of the owned human capital ($H(T)$) and the level of payment for work (w). Household allocates the received wages mostly to cover the costs of restoration of human capital, in both long- and short-time perspectives. The amount of the stream of wages is thus not neutral from the point of view of long-term human capital dynamics of the household. Maintaining its value requires income in the amount which allows compensation of the costs of risk or fragmentation of the value of capital as a result of time passage. Achieving this objective requires undertaking active policy from the state which limits the consequences of the imperfect labour market. This applies in particular to the broadly understood system of minimum wages and responsible tax and social policy to motivate to enterprising behaviour.

As it was earlier stated, the passage of time is inevitably related to risk, which manifests in business activities in the form of loss of value due to random incidents. Maintaining human capital requires adequate stream of value which will allow full compensation of the loss of value. In the discussion of the wages model it was proven that the wages defined with the 8% economic constant give the owner of human capital the possibility of maintaining its value. Reducing the wages below 8% per year results in partial fragmentation of human capital at the disposal of the owner of the capital and his/ her family. Human capital is always fragmented at a similar rate, whether the person works or not. This applies to the modern post-industrial system of work. The costs of living of a modern family are similar in case of households with full employment, partial employment or none. The last case is related to the total loss of income. In this case, the possibility of compensation of fragmenting human capital in both long- and short-time period of time is dependent on receiving help from the outside, e.g. benefits. This situation is especially dangerous for the process of reproduction of human capital. From the point of view of human capital management in the situation of lack of work, human capital is not transferred to the places of work but to the environment, and is lost irrevocably.

In the light of this, the expenses of households are of the investment nature. This point of view is not a new one. Karl Gunnar Myrdal, one of the representatives of the so-called Swedish School, believed that the division of expenses into consumption and investments is harmful. This classification of expenses helped unfavourable allocation of income, which was justified with the necessity of accumulation of capital as the condition of a faster development. Myrdal argued that household expenditures for living and education are personal investments, although the traditional economists regard them as consumption expenditures (9, pp. 287–290).

The relations with the state are the second type of capital interactions of households, and these are most often conditions by the regulations of the law. The law imposes a number of taxes and other encumbrances, indirect and direct, on households. From the point of view of the capital analysis of households, taxes reduce the possibility of capital reproduction. On the other hand, taxes may constitute a source of

financing a public product (e.g. safety or creating state institutions) and transfers to households. Financing the basic education which improves the value of human capital of the youngest members of the households is the example of this type of activity. In this case, however, the issue appears of effectiveness of using the means released for the disposal of the state. This applies to both purposefulness of spending the funds and the method of their spending. The subject matter of the analysis is also effectiveness of the institutions created and initiated by the state. These institutions cover a wide range of areas of functioning of the state, including safety, education or the business field. The objective of the institutions, according to the definition of John R. Commons, is supporting individual entrepreneurship and preventing unfair competition and discrimination. Thus, good institutions will support effectiveness of collective activity or support economic cooperation between households and business entities. From the point of view of the family it means that the probability of good living and even increasing the value of human capital increases with good institutions. It is mostly done with the proper conditions of employment which allow fair level of remuneration. Thus, the analysis of human capital dynamics should in particular include labour market institutions. Susan Hayter defines labour market institutions as the ones which perform the function integrating the labour market with the process of establishing production (10). As it is stated in the first chapter, the institutional and intellectual capital of the society means the capacity for creative work and the ability to create the above defined good institutions. Such institutions contribute to maintaining balance, that is survival and development of the autonomous system.

Effective institutions, including labour market institutions, are the result of existence of institutional and intellectual capital of the state. At present, the “institutional capital” term is known and constitutes the subject matter of study in social sciences. The definition of institutional capital applied within the law of the European Union is a synthesis of the results of these studies, and it characterises with the following attributes (11):

- the capacity to concentrate on solving problems;
- the capacity to act;
- the pace of the decision process;
- the scope and flexibility of the information owned;
- the type of relationships between institutions and organisations.

High effectiveness of the institutions in any of the five listed areas contributes to increasing individual productivity, along with which productivity of the state increases.

The analysis of human capital dynamics across generations may be conducted with the general model of capital. The essence of the analysis consists in studying three basic interactions which develop the value of the capital, that is the costs of risk (s), the economic constant for prospective increase (p) and the management variable (m). With these assumptions, the dynamic model of human capital of the household may be presented with the following formula:

$$H_2 = H_1 e^{(p-s+m)t},$$

where: H_1 —the value of human capital in the first generation, H_2 —the value of human capital in the next generation, t —the period of one generation (the cycle of exchange between generations).

Maintenance of the value of human capital, especially in the context of exchange between generations, is the condition for long-term economic balance. It is the condition in which the equality $H_1 = H_2$ occurs. Adjusting the general model of capital to the specific nature of human capital requires an additional description of the elements of the formula. Every family has human capital at its disposal (H_1) which, according to the above formula, is subject to three effects specified by the parameters p , s and m . The next generation becomes the owner of human capital of the value (H_2) as a result of activities of the family and of the environment. Several observations come from the studied model. First, if the household is in existence, and the parents have specific capacity for performing work, it means that the family in the given moment has human capital with the value appropriate for this capacity (H_1). Fragmenting forces (s) impact the value of human capital randomly, and their effect may be scattered over a long period of time or at the present time. Maintaining the initial value of human capital (H_1) requires inflow which allows compensation of the effect of fragmenting forces (s). One of them is the remuneration obtained (W). If its value results from the value of the economic constant ($W = H_1 \cdot p = H_1 \cdot 8\%$), the household has a chance to maintain the value of human capital. Moreover, work and management represented by the variable (m) affect the value of human capital. As a result of creative and reasonable activity of the family members, the value of human capital may additionally increase. This activity may also have a different nature, for example negligence which consists in lack of care about health or using the available funds with harm to the family, e.g. alcohol abuse, may lead to reducing the value of human capital. As one can notice, the effect represented by the variable (m) is highly significant as it gives the household the possibility of increasing the chance for maintaining human capital or even achieving increase in its value. It is also interesting that the value of the variable (m) is mostly the result of existence of institutional and intellectual capital. Good institutions allow and even motivate to creative action by way of developing the appropriate attitudes of citizens.

The effect of work and management (m) often does not have nature of cash flow typical of wages (p). Most often, it is an additional increase in human capital represented, for example, by improving health condition or increase in the intellectual capital during increase of qualifications.

The issue of paying human capital from the point of view of the employer needs explanation. The employee provides work ordered by the employer, that is dedicates his/ her time for the subject matter of work. It means that human capital of the employee is transferred to the subject of work. As a result, the employer (the owner of

the subject of work) gains added value, and the employee receives remuneration as the equivalent of human capital provided. Thus economic balance may be said to need two general conditions to be met:

- the wages are fair;
- the employees work reliably.

It is interesting to quote the concept from the borderline of philosophy and economics, namely the theory of justice by John Rawls (12, pp. 110–115). Its major assumption is defining the just society by two rules. The first of them assumes equal access to the widest possible catalogue of freedoms. The other allows existence of inequalities only when their introduction brings about additional benefits to all. In the light of these principles, injustice means uneven allocation which brings benefits only to the chosen. The concept of wages based on the value of human capital in the light of the Rawls's theory is a good trend to equality. It is in line with both rules, thus it may greatly contribute to increasing the level of justice in the society. The existing differences in the value of human capital between people exclude the egalitarian system of equal wages. It is not a just system because such a stream of wages is not equal to the value of human capital transferred during work.

The said theory of justice is also the point of departure for explanation of the second condition of economic balance. This theory, apart from two general principles of justice, formulates also requirements for individuals. The most important is the so-called *principle of fairness*. According to it, an individual is required to do his/her duties if he/she voluntarily accepts the benefits of the arrangement or enjoys the possibilities offered by the society to pursue one's own plans and interests (12, pp. 171–184). Thus, in the light of the concept of human capital and the concept of value based on work, the principle of fairness gains practical significance.

5. Final remarks

Human capital is the capacity of a person to perform work. Human capital understood in this way has always represented the most important of economic resources, that is economic value of human resources. Effectiveness and stability of the economic system depends to a high degree on the course of the process of human capital management in the macro- and microeconomic approaches. The basis of effective management of the capital embodied in the resources is a credible and coherent measuring methodology. This applies in particular to human capital because study on the methodology of measuring human capital in monetary units is on a relatively early stage. One also has to remember that methodology of measuring human capital must be compliant with the general nature of capital and take into consideration the effect of the environment on its value. Identification of the factors which determine dynamics of the value of human capital should be the initial stage of the discussion of effectiveness of human capital management. Effective managing of resources and

capital embodied in them means first of all the capacity to maintain their substance, and then the skill of taking advantage of the potential increase specified with the economic constant. Maintaining the value of human capital is one of the most significant economic objectives. Its execution requires the appropriate payment for work and the responsible and conscious process of human capital management. It has to be added that good institutions may play a significant role in execution of this economic stipulation.

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Istota i determinanty dynamiki kapitału ludzkiego

Streszczenie: W pierwszej części artykułu przedstawiono genezę badań nad problematyką kapitału ludzkiego jako jednego z najważniejszych zasobów ekonomicznych. Następnie została omówiona koncepcja kapitału ludzkiego stanowiąca rozwinięcie ogólnego modelu kapitału opracowanego przez Mieczysława Dobiję. W świetle tej koncepcji kapitał ludzki to kapitał ucieleśniony w zasobach ludzkich. Ponadto podano zasady pomiaru, które umożliwiają wyodrębnienie

struktury kapitału ludzkiego. W dalszej części podano zasady opłacenia pracy kapitału ludzkiego. Zasady te wynikają z natury kapitału. Najistotniejszym oddziaływaniem, na jakie narażony jest kapitał ludzki, są siły rozprasające jego wartość. Zachowanie tej wartości wymaga odpowiedniego strumienia kompensującego, w przeciwnym razie wartość kapitału ludzkiego będzie ulegać rozproszeniu, co prowadzi do szeregu negatywnych konsekwencji mikro- i makroekonomicznych. Wykazano również, że dzięki właściwym rozwiązaniom instytucjonalnym i postawom ludzi kapitał ludzki może wzrastać z korzyścią dla całego społeczeństwa. Proces wzrastania kapitału ludzkiego przebiega w rodzinie (gospodarstwie domowym). W ostatniej części artykułu dokonano analizy czynników, które wykazują pozytywny lub negatywny wpływ na wartość kapitału ludzkiego. Całość rozważań opatrzone stosownym podsumowaniem.

S ł o w a k l u c z o w e: kapitał, kapitał ludzki, wzrost gospodarczy, płaca stała, gospodarstwo domowe

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Effectiveness of the training process in the collaborative learning method

Key words: cooperative learning, teaching methods, training effectiveness

S u m m a r y: Abundant and extensive literature on training and employee development contains, apart from description of training methods, more and more information about evaluation of effectiveness of this process. Cooperative learning involves deepened reflection of a learner and discussion with other participants of the course. Knowledge is created during the learning process and its aim is to comprehensively process the situation. A teacher is a participant in this process, an advisor who cooperates, searches and shapes the active learning environment. The aim of the article is to present the method of cooperative learning and determine the factors that may significantly influence the effectiveness of training based on this method. The article contains theoretical remarks regarding cooperative learning process as well as the nature of factors conditioning the effectiveness of the training process.

1. Initial remarks

The learning process is one of the most crucial thought processes taken by a human being. Resources of acquired and utilised knowledge depend not only on the availability but also on the methods of acquisition thereof. In the case of the training process, seen as a narrower element of the education process, there are many different methods to use. Appropriate preparation of the training itself increases the probability of obtaining the expected effects, which is obviously related to the higher effectiveness of such training. This process is extremely important in the case of new methods, which have not yet been utilised in a given training process.

For a longer period of time the education process and, therefore, the training process, was geared towards acquisition of knowledge by a learner from a teacher, with-

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out inclusion of the resources of knowledge of the co-learners. In the traditional education process the knowledge is seen as a non-material resource that is directly bound to the teacher.

This solution is used in the Kirkpatrick's model, which describes four grades of training effectiveness (1, pp. 511–512), namely reactions, learning, behaviours, and effects.¹

Kirkpatrick's model, although it is known and accepted by the authors, raises some doubts and objections. The most important one is the fact that the model has high requirements towards a researcher in the field of training contents and knowledge on practical reality. Moreover, low quality of information acquired from the average respondent of a survey research should be emphasised. Therefore, the cognitive perspective of the Kirkpatrick's model, diagnosticity of this tool depends on the competences of a researcher, his/ her professionalism.

This article presents the most important remarks regarding the improvement of effectiveness of training conducted with the use of collaborative learning method.

The article is addressed to both practitioners and theoreticians dealing with the issues related to human resources management. It may appear interesting to students of economic schools of any field of study, particularly the management.

2. The essence of the collaborative learning method

In the era of digitalisation of information resources and development of principles and ways of communication, knowledge becomes a more available resource in terms of time and space; however, still desired and diffused. The flow of information somehow forces forming of groups of learners, including those who learn together (2, pp. 59–67).²

Transfer of knowledge is no longer an imitative process but it has some constructivist characteristics (3, p. 35). Changes in the ways of thinking also cause the evolution of paradigms of pedagogy towards highlighting the importance of cooperation of all learners in the process of knowledge acquisition. On the one hand, some conceptions refer to the postmodernist views showing a lack of objectivism in perceiving the world, on the other hand, however, they are based on the necessity of forming a reflective way of building one's own knowledge. Being based on these paradigms, modern pedagogy turns to building an individual's mental image based on self-reflec-

¹ Levels of assessment proposed by Hamblin and levels defined by Kirkpatrick are interconnected. Training evokes a reaction, which leads to learning, and this changes the behaviour at work, giving defined effects at the individual or organisational level. More details about the levels of training assessment according to Hambling and Kirkpatrick (1, pp. 511–513).

² Largely, the E. Hutchins's diffused cognitive conception is used in this field, aimed at cognition of thought processes and qualification thereof as those generating the creation of new knowledge and those failing to produce such effect.

tion of a learner inspired not only by a teacher but also by other members of a learning group. Due to the complexity and extensiveness of the real world image, it is necessary to use the experience of a trained subject, and this, in turn, is based on the knowledge other group members have.

The process of collaborative learning is not only a group experience exchange but also a problem solving method,³ since it requires producing a mental construct which will allow to obtain a comprehensive answer. Due to the mentioned complexity of the world, creation of these mental constructs may be more effective through the process of a special kind of negotiation between different visions of the same fragment of reality. Methods of cooperative learning assume not only the future development of a reflective attitude towards perception of the world but also utilisation of assessments of that perception to date. These methods are characterised by several elements distinguishing them from strictly traditional as well as modern teaching methods (3, p. 42). Cooperative learning involves deepened reflection of a learner and discussion with other participants of the course. Knowledge is created during the learning process and its aim is to comprehensively process the situation. A teacher is a participant in this process, an advisor who cooperates, searches and shapes the active learning environment. Feedback is internally moulded, which means that knowledge, when generated by a sender (teacher), is subject to reflection of a recipient. The latter, however, does not receive it as an axiom but negotiates it with the sender. This results in a group interaction and exchange of mental constructs. A style of learning is open and based on network connections between participants of the interaction.

As human is not a *non-reflective* being, it is their natural feature to assess and bias the reception of the reality based on empirical experiences. Therefore, the learning process and knowledge acquisition uses background knowledge as well (4, p. 20).

Also, attention should be paid to the organisation of such process of knowledge acquisition itself. Cooperative learning has to provide an opportunity to accomplish certain goals set at the beginning of a training programme (5, p. 2–3). These goals may be modified and developed by both teacher/ trainer and learners themselves (trainees, course participants). Regardless of this fact, cooperative learning provides the learners with opportunities to jointly solve problems and broaden their knowledge. It is pointed out that the most valuable form of cooperative learning is the one in which the effort of participants is focused on a searching for solutions of a problem covered by the course, presented as a comprehensive thematic whole (6, p. 62). Therefore, the learners who learn according to a thematically planned training course, based on topics (e.g. traditional, already used) but geared towards a new method of broadening the knowledge resources, will be the most beneficiary ones.

³ World literature authors differentiate cooperative learning and collaborative learning. The former is focused on the result of teaching process, the latter on the learning itself. However, for the sake of simplification of this paper, it is assumed that both definitions are close to each other, particularly due to systematic reasons as well as difficulties in translation of both definitions.

It should be stressed that the role of a trainer transforms, in this particular case, from a controller and transmitter of knowledge into a coordinator of the organisation process and knowledge transfer among learners themselves. Cooperative learning is usually held in small groups under a watchful eye of a trainer. At the initial stage, learners have some knowledge which is split and incomplete. An increase in knowledge in a group is based mainly on experience exchange taking place within a group of learners as well as between a trainer and course participants. Joint knowledge is the result, which has usually already been of an organised nature (7, p. 20). The process of transfer and creation of knowledge may take place in different ways. Four basic forms should be indicated while qualifying these methods in terms of identity or differentiation of place and time (7, p. 20):

- the same time and place—*face-to-face* work;
- the same time, different places—teleconferences, a diffused system of documents (tools of synchronous work);
- different time, the same place—utilisation of tools for cooperative work planning as well as tools supporting decision making;
- different time and places—e-mail, news groups (asynchronous work tools).

Choice of conditions of knowledge transfer therefore becomes an integral part of appropriate knowledge transfer shaping, which in the case of methods such as cooperative learning is necessary to achieve a set goal.

3. Remarks regarding the effectiveness of the training process in the cooperative learning method

Effectiveness, in its nature, is defined as a relation of benefits achieved through actions to the effort that has had to be put in order to obtain those benefits (8, p. 42). Being oriented towards achievement of certain effects makes it necessary to plan in details not only training actions but also its goals and expected results. However, it is not easy due to the comprehensiveness of the training process (the most general aim of which is to increase the level of knowledge or develop a new skill) as well as the nature of the subject of these actions, namely a human being. The reference books point out that the effectiveness of the training process (and generally—education process) is very hard to define. It is so due to several reasons (9, p. 105). Education goals are changing very often depending on human attitudes, including learners themselves.

They result partially from expectations as well as established paradigms, which are often based on different epistemological or scientific attitudes. It frequently happens that there is a gap in the process of education between theory and practice, which is also influenced by internal inconsistency of the definitions or paradigms. However, any successful development of consensus (pertaining to a theoretical as-

pect) means a very difficult operationalisation of practical actions in a way that ensures consistency between each element of the elaborated theory. Moreover, many theoretical problems are complex enough to make the application of practical actions much harder. Despite the observed theoretical inconsistency it is common that the educational goals depend on trends, which causes that they may be indicated, and paradigms while they are not such at all.

While analysing the definition of effectiveness in the context of these remarks it is necessary to state that one should not omit the perspective from which it will be considered. Macroperspective, related to e.g. the entire system of education or training, is something completely different than microscale, related to e.g. individual training project. It appears that when preparing a course, while taking an increase in effectiveness into consideration, one must focus intensively on actions at the phase of planning thereof, especially if the training is to be carried out according to cooperative learning method (10, p. 102).

The main actions that need to be taken on that account are clustered in three areas: (1) *introduction to the training*, (2) *group*, (3) *climate of the exchange*. The first one comprises the following factors:

- principles of participation, including compulsory or voluntary participation;
- goals of participation;
- organisation information, including the topic of the training and its meaning for future vocational work.

The area referred to as the *group* focuses on the structure of a trained group and standards of cooperation which will have to be observed by its members. It is worth mentioning that in this scope, prior to commencing a training cycle, it is important to recognise and identify the level of cooperation, constructive support, sharing, participation, listening, and communication skills the participants demonstrate (11, p. 53). These skills are also pointed out as crucial in the case of cooperative learning.

Organisation (logistic) support and top-down support, which is obviously necessary in the case of training for employees, are highlighted in the last area, the *climate of cooperation*.

The effectiveness itself, as it is emphasised by some authors, is strictly connected with the vocational activity of the trainees. In this context, practicality is of particular importance in terms of both the contents and form of the training. Training, in its nature, includes practical elements; therefore, their inclusion in the programme seems to be an important element that may impact the effectiveness of a course. It results from a common opinion that training does not increase the knowledge or resources of skills of a trained person. Inadequate content presented during the training as well as wrong practical examples may be the cause. The reference books suggest that the case studies or examples should be suggested by the learners (10, p. 101).

In the context of cooperative learning it is a key aspect due to the necessity of use of background knowledge and experience by the participants of a course carried out according to this method. Possibility to re-analyse the already known contents and

their enrichment with experience and knowledge of other group members makes the knowledge more grounded than in the case of traditional examples, which are usually abstract.

This issue is linked with the specific role of a teacher, which in the case of collaborative learning differs from the traditional role of a guide and master. The effectiveness of work of a trainer depends on several factors, including (12, pp. 9–10):

- the scope of roles which are to be played by a trainer (not only during the training process itself);
- diversity of training goals defined in the programme;
- cognitive abilities of trainees;
- cultural and organisational context of the training;
- background of the lessons and realisation of the cognitive process of trainees.

Each of these factors in the case of collaborative learning imposes, different from traditional, attitude and behaviours of a trainer. Their role, which has already been mentioned, is not guidance and knowledge transfer, but stimulation of a group and supporting during the process of acquisition and shaping new elements of knowledge. General goals of training, despite some convergence with the goals in traditional education process, define different specific goals and may be focused on a quantified measurement of an increase in knowledge levels than it takes place in the traditional process. Cognitive abilities of trainees in the case of collaborative learning are no more such a significant barrier due to a fact that the participants use their own experience and knowledge and, while sharing it, they build new resources. The two last mentioned factors are a premise related to non-material nature of the training. Novelty and originality of this method causes that the entire event is of a different nature than it was the case in trainings conducted so far. Such training may be perceived not as a boring participation in classes or a break from the daily routine, but as a participation in something new. It gives an opportunity to focus on content and group integration, which in the case of vocational training may appear helpful and long-lasting, also after the training.

In the light of the above remarks, it seems that the Phillips's method is a good tool to estimate benefits of training. Specificity of such attitude is based on utilisation, in research on training effectiveness, assessments of estimations carried out by the participants themselves. Particularly, they may define financial benefits from the training together with a percentage credibility of such estimation, as well as give information about concrete actions and improvements which were introduced by a course participant. Description of actions and improvements makes a framework and gives opportunity to verify the financial benefits.

The research itself is based on five questions and answers (13, p. 175 and next):

1. What changes in one's work are visible after the training?
2. What benefits and achievements have been noted after the realisation of training?
3. What financial effects have been achieved upon introducing the mentioned changes?

4. What benefits from the introduced changes may be achieved in one year's time?
5. How do you assess the credibility of given estimations (in %)?

The Phillips's idea that a training participant will play the role of a grading person is quite interesting and controversial. However, the collected data regarding definition of changes in work after the training, results (immediate effects) of these changes and its impact (long-term effects) may appear reliable for accurate assessment of training effectiveness.

4. Conclusion

Collaborative learning is a new, extremely interesting tool of training of employees, where the manner of knowledge sharing is very innovative. The method may be an important element of the operationalisation of knowledge management. The effectiveness of training is a multi-dimensional and multi-thread issue. The diversity of aspects in which it is considered does not allow to indicate a closed catalogue of factors that define its increase. Particularly, the analysis of the definition of effectiveness is important in relation to new training methods. In the case of traditional methods there is a great probability that in the course of time of their utilisation the main goals and indicators allowing to define whether the course was effective are indicated. Using new training methods, such as presented collaborative learning method, at the very beginning of the course it is worth to precisely analyse the goals and expected results as they may appear different from the ones already realised. Opinions of the trainees should be taken into consideration because they, as a subject of all the training activities, will be the last instance of training assessment; therefore, opinion makers about its effectiveness.

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Efektywność procesu szkoleniowego w metodzie kooperatywnego uczenia się (*collaborative learning*)

Streszczenie: W licznej i rozległej literaturze dotyczącej szkoleń i rozwoju pracowników coraz więcej miejsca – oprócz opisu metod szkolenia – poświęca się problematyce oceny efektywności tego procesu. Uczenie się kooperatywne przeprowadzane jest poprzez poszerzoną refleksję osoby uczącej się oraz dyskusję z pozostałymi uczestnikami kursu. Wiedza jest konstruowana podczas procesu uczenia się, jego zaś celem jest kompleksowe przetworzenie sytuacji. Nauczyciel jest w tym procesie uczestnikiem, doradcą, który kooperuje, wyszukuje i kształtuje aktywne środowisko nauczania. Celem niniejszego artykułu jest prezentacja metody kooperatywnego uczenia się i określenie czynników mogących istotnie wpływać na wzrost efektywności szkoleń prowadzonych tą metodą. Artykuł zawiera uwagi teoretyczne odnoszące się do procesu kooperatywnego uczenia się, a także charakterystykę czynników warunkujących efektywność procesu szkoleniowego.

Słowa kluczowe: kooperatywne uczenie się, metody nauczania, efektywność szkoleń

ANNA MIKOS*

Importance of university-level educational facilities in developing innovative attitudes

Key words: enterprising university, innovativeness, innovative attitude

Summary: The author defines the terms of innovation, innovativeness and innovative attitudes in the paper. The text is based on three basic theses. First, due to the fact that the capacity to create innovation is an issue gaining more and more importance and it is becoming a function in the process of company management. Innovative attitude is a source of innovation, however, knowledge subjected to the proper processing is the necessary condition. Perception of the entity through its employees, and they in turn being assessed in terms of the acquired skills and inborn predispositions, is the guarantee of success in business activities and in developing the innovative potential. Every single entity is capable of being innovative, only the proper activities to stimulate creativity and creative thinking should be undertaken. This role may be successfully performed by any university-level educational facility, and the enterprise would continue the initiated process of developing and perfecting innovative attitudes.

Additionally, the paper presents trends in the changes that occur in university-level education and the role that universities perform in the economy based on knowledge. The enterprising university may be a place to gain knowledge and learn being innovative. Creativity and innovativeness of the student is developed there, and when he completes his studies, he will become a prospective employer or employee. The essence of developing the above features and assuming such attitudes has been presented, because this may contribute to an organisation being innovative, thus its achieving permanent competitive edge and further dynamic growth.

Additionally, combining science with business is one of the possibilities of propagating pro-innovative patterns in the economy. Emphasising the role of a university-level educational facility is a chance for making changes in education and in business at the same time. Finally, the author presents conclusions from the presented problem.

1. Preliminary notes

The process of globalisation that has been continuously running for several years in the modern economy forces changes in various organisations, following trends,

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competition or introducing a broadly understood novelties. As a matter of fact, almost all these changes are concentrated and have one common feature: innovativeness—which should be clearly differentiated from the term of innovation. Most of companies and institutions feature innovativeness, fewer manage innovative activities.

It is important to make the difference between these two terms. Innovativeness is understood as the skill of creation and implementation of innovation, that is a certain resource of knowledge and capacity to convert it into new market product, organisational and process applications (1, p. 18). According to the publication of the Polish Agency for Enterprise Development (PARP), innovativeness is a predisposition which manifests in the skill of learning, the capacity and willingness to make changes and their adaptation from the outside, susceptibility to external factors which determine such developments. The common denominator is increasing effectiveness of operation of the organisation (2, p. 20). One of the forerunners of this idea was Joseph A. Schumpeter. According to him, there may be innovations in the process of the so-called *creative destruction*, which manifest in introduction of a new product or use of a new method of production, entering into new markets, obtaining new sources of raw minerals and materials, creating new market structures (3, p. 32). The different meanings of the term “novelty” should be mentioned here—as novelty may be analysed in the macroscale (total novelty, pioneer) or in the microscale (copying, imitation). This division results from the fact that products, processes, and methods may be regarded as innovation which the given company developed as the first and such novelties which have been assimilated from other companies. Modern researchers in this problem state that innovation is “any supposedly beneficial change in different areas of activities of the organisation which brings about progress against the existing situation, resulting in the organisation or beyond it, which is the answer to the signalled needs or which satisfies needs not apparent before. It has the nature of developing improvements in the existing objects, of varied degree of intensity in the never-ending scale of novelty” (4, p. 64).

The literature has the concept of innovation as a system (3, p. 36). This approach analyses stimulative and destructive effect of various external institutions on innovative activities of the entity, taking into consideration social, political and cultural environments, including the basic educational system, the university-level education system, the scientific and research facilities, the legal and macroeconomic conditions, the communication infrastructure.

Innovativeness and innovations become the key factors of success for the economy focused on growth, which was reflected in the Lisbon Strategy of the European Union which stipulates creation of the model of effective economy based on knowledge. It is based on three pillars: innovativeness, entrepreneurship, sustained development (5, p. 99). Meeting this challenge may prove to be an effective recipe for success, for survival. Modern economy simply forces the entrepreneur to find innovative changes which will decide about his competitive position in the dynamic market which is difficult to foresee. This gives him the role of active participant in

the economy based on knowledge. This issue constitutes a wide and interesting area of study whose result is many new solutions, ideas and concepts.

Continuing the idea of innovativeness, attention should be paid to the term of entrepreneurship. Entrepreneurship is understood as “a set of features which characterise a certain method of human activity ... including dynamism, willingness to undertake risk, flexibility, the skill of perceiving and taking advantage of opportunities and willingness to support innovation” (5, p. 99). On the other hand, it may be a process focused on achieving a pre-defined objective with the economic dimension, determined with the opportunity manifesting at the given moment in time, up to effective use of the new idea, in the scope of business operations, with the subjectively acceptable level of risk. It is important that the entrepreneur’s attitude¹ may be shaped to some extent, or even learned. The discussion of this thesis is presented in the following part of the paper.

The thesis has been assumed in the document, according to which innovativeness in modern economy becomes the function of management which should be understood as commonly applied, typical and cyclic activities and decisions which were developed as a result of looking for effective solutions for continuously arising new problems. On the basis of a traditional approach which defines four basic functions of management (planning, organisation, motivating, control), this set may be enriched with innovativeness. The above functions of management mutually interact and supplement each other, thus creating a homogeneous management process. Dynamic conditions of the environment in which organisations function, force supplementation of the management process with the fifth element: the capacity to create innovation (which gradually becomes the condition necessary to achieve success).

Another adopted statement emphasises that knowledge is the heart and the driving force for innovations. Knowledge subjected to the appropriate “processing” becomes the ground for innovation (4, p. 62). Knowledge regarded as a set of theoretical information and practical skills is broken down into codified knowledge which assumes the form of products, services, patents, know-how, procedures and broadly understood technology (all this may assume the form of product, organisational, process, etc. innovations) and hidden knowledge manifested in competencies acquired in the process of education, by learning, from experience (4, p. 62). The relationship between these types of knowledge consists in hidden knowledge determining existence of consolidated knowledge. Gaining and using such arranged data (which are called information) about the company and its surroundings contributes to expanding knowledge in the field of organisation management and creating innovative ideas. The correct interpretation of information coming from the turbulent surroundings may facilitate the process of forecasting and assessment of the conditions in the future and appropriate reaction to the changes at hand. When knowledge is used and

¹ Resourceful (pro-innovative) attitude may be perceived as openness to new solutions, which manifests in, for example, willingness to learn, readiness to undertake risk, criticism towards cliché, solid behaviour patterns.

enhanced in the economic processes, it is expanded, contrary to traditional resources which are then used up. The other aspect is that knowledge is quickly becoming outdated (6, p. 38). Therefore access to knowledge and information² is the key, as they determine existence of the surroundings friendly to innovations.

Another issue tackled in the paper is the statement that every single unit is capable of being innovative.³ The one that has relatively strong financial, technical and personnel potential will lead the way in creation of innovation, but smaller companies are not doomed and have their own specific innovative capacity. Yet, more often they take the role of the follower instead of the innovator (that is they buy know-how, patents, etc., which is also regarded as one of aspects of innovative activities).

Over a short period of time, quality of technology and product seem to determine success of the company. However, in an extended period of time it is commitment and innovativeness of employees that decides about success of the company (8, p. 99). They are the authors of new products, new technologies, and the future proceeds of the company depend on them. There is a reason in the saying that people are the most important capital of organisations. Developing the attitude of enterprising and creativity is the key here, because these are the conditions necessary for innovativeness. It comes from the belief that creativity is not reserved for genius minds but is a domain available to every human being, only in various degrees of intensity. It is provided by the egalitarian current of routine creativity (the so-called *everyday creativity*) for which "creativity for everyone" is the motto, which means that creativity is not the attribute of outstanding individuals only but that everyone is entitled to it (2, p. 17). According to the Oslo manual, the knowledge management process means the activities related to acquiring knowledge, using it and making it available by the given entity and is an important element of the innovative process. The university-level educational facility with its mission and vision perfectly fits the role of the entity which manages knowledge pursuant to the above definition. Thus, one can state that the college facility as an organisation gaining, processing and spreading knowledge gains more and more in significance in the innovativeness system. The fact that it may be a place where the process of developing innovative attitudes may be started and improved is an important observation. This process will be more effective if such developed attitudes are cultivated and developed in a company with a well-organised innovativeness management system.

2. Scientific entity in the model of innovative economy

Broadening knowledge in the scope of innovativeness conditions at the time of economy based on knowledge gains in intensity. This issue is becoming more impor-

² Information exclusion (illiteracy) is a negative phenomenon discussed more broadly by Elżbieta Mączyńska (7).

³ It is important for this paper to remember that innovativeness is of acquired feature, not inborn.

tant not only in the field of company management, but it also crosses its boundaries and becomes the issue discussed on the regional and national level. The developed concepts of the system of innovation at the national and regional level, whose task is to determine innovativeness and competitiveness of economy, are examples of this.

The national system of innovation is a complex of selected institutions aiming at work for the benefit of development and spreading new technologies, creating at the same time the surroundings conducive for formulation and execution of pro-innovative policy of the government (1, p. 100). The national system of innovation is functioning on the basis of historical experience, systems of value, culture or knowledge and skills accumulated in the community. These factors have different characteristics in different countries.

To achieve better results in building the innovative potential, the national system of innovation is supplemented with regional context. In a specific territory, mutual interactions occur between actors who have the basic impact on the capacity of creating innovation. The system of entities, interactions and events are defined which lead to increasing innovativeness of the region as a result of synergy (Figure 1).

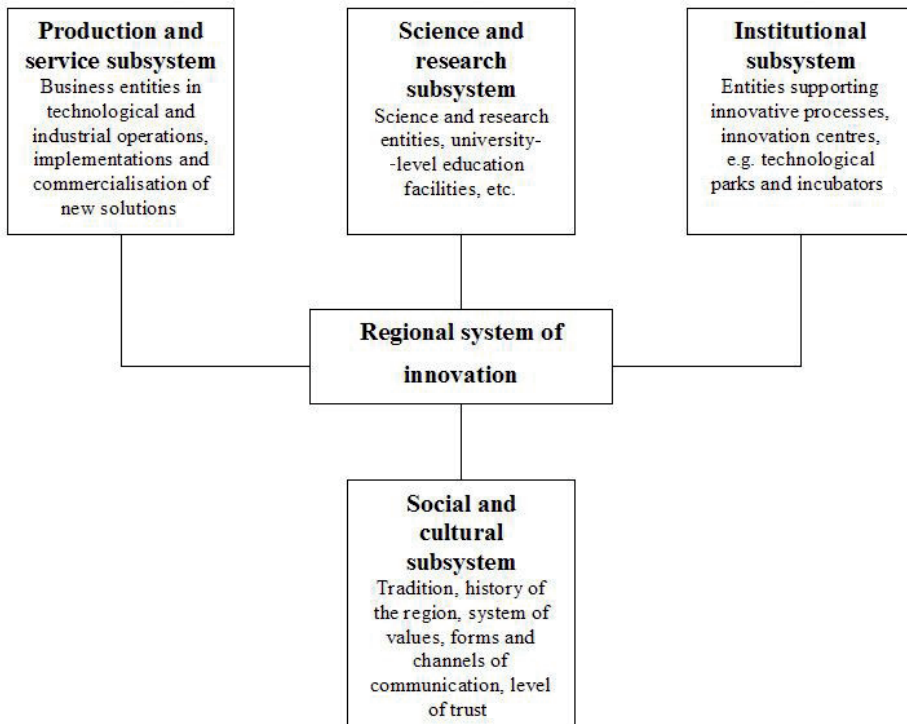


Figure 1. Model of the system of region innovation

Source: author's own study based on: (1, pp. 106–107).

The above comprehensive and system-based view of the problem of innovativeness of economy indicates purposefulness of existence of mutual interactions between subsystems. The point is, among others: 1) increasing dynamism, creativity and perfection of scientific research, which may result in a higher number of investments and general growth of companies, 2) reinforcement of human potential in the field research and technology by ensuring a higher level of education and a richer offer of trainings, 3) promotion of the profession of a scientist, 4) intensification of the dialogue between the domains of science and business, thus increasing social trust to science and improvement in quality of life, 5) supporting and effective use of external funds.

The phenomenon of innovativeness has not been studied exhaustively, and determinants of innovativeness and their conversion to the situation of the company are the subjects of many studies. However, the fact is common that the science and research subsystem begins to play the first-rate role because one of its links (which is the university-level education facility⁴) may be regarded as the original source in developing innovative attitudes, because it is there where people come with a higher or lower potential, resources of knowledge and experience. During the classes, identification of innovative attitudes may be conducted and the trend for the proper proceedings may be indicated. It is an opportunity for presentation of authorities, templates. This gives the possibility of following the appropriate directions of action, flexible adjusting methods of education aimed at consolidating some behaviours, which will be later translated into professional activity of the graduates. The learning process may be stimulated with the proper designing of practices of operation, teacher–student relations, cooperation of the student with the external surroundings where it is to encourage creation of new ideas and methods of operation. The science and research subsystem, with the possibilities of developing pro-creative thinking, operating with the appropriate facilities (libraries, laboratories, workshops), creates the atmosphere and the climate of the place of confrontation of various ideas, concepts, styles of thinking. It is a place of inspiration by the fact of presence of numerous personnel educated in different fields (2, p. 47).

Experts very often state that the company is the entity which creates or implements innovations, in products, processes or organisational issues. However, they should be viewed from the angle of people and teams who create them. In the economy based on knowledge, access to knowledge and information and the resulting intellectual capital, and not ownership of means of production becomes the key category. The new paradigm was developed due to dynamic changes in the surroundings. Quoting after E. Mączyńska: "... The future becomes more and more unclear, and the present time is not satisfactory ... Professions, work posts and positions in the manager hierarchy become impermanent" (7, p. 42). One could expect that the skills

⁴Higher education facility referred to in the paper means a scientific entity managing higher studies which may be of public or non-public nature, defined in the Higher Education Act of 27 July 2005 (Dz. U. 2005, no. 164, Item 1365).

of forecasting and creative destruction will gain more in importance. The attempts are certainly undertaken to define sources of innovativeness, but it is mostly human individual features that determines whether the given entity will be innovative, that is whether it will be successful in introducing innovation and achieving competitive edge in the given sector, industry or market. In other words, the innovative potential of the company is created by its employees and the conditions under which they operate. Creativity, entrepreneurship, experience, creative activity and individual talent of the person will decide about success of the whole. The learning capacity and orientation on change are the demanded features of the model employee. Creating the appropriate environment is conducive for development of these features and will give the possibility of taking advantage of other determinants of innovativeness (e.g. financial potential). During the process of learning, attitudes are developed which decide about creating innovative behaviour. Using the possibility of learning in the organisation allows development of pro-innovative attitudes, focused on initiating, creating and implementing changes, thus increasing economic effectiveness of the activities (1, p. 61). The pro-innovative attitudes of employees and owners of companies may be developed and the needs of assuming such attitudes may be incited, not when they already are in the organisation, but much earlier. The earlier link in the whole chain of connections should be engaged. The university-level educational facility comes first here, as its graduates may be in the market in the roles of entrepreneurs and employers or prospective employees. This approach may have many implications, mostly in the educational area. The focus is shifted from strictly professional education to developing creativity, stimulating processes of creative thinking, as they increase opportunities for innovative solutions, which in turn determines implementation of innovative processes (Figure 2). Additionally, finding one's place in the system of economy based on knowledge forces flexibility, continuous learning, development of skills in the scope of interpersonal and team communication and effective using of all achievements in the information management technology (1, p. 29).

Whether the educational facility will effectively use its possibilities and take over one of the main roles in the process of developing innovative attitudes (thus affecting the level of innovativeness in the region) will be dependent on support that it will receive from the state. One of the criteria deciding about where the stream of financial funds is directed is the categorisation prepared by Ministry of Science and Higher Education. The categorisation should be aimed at emphasising these scientific units which are especially involved in development of science and have successes in this field—so as to promote, support and prize (the financial aspect) the effort made. The number of publications, monographs, patents, the right to award scientific degrees, publishing a significant, prestigious magazine, etc., are assumed as the main assessment criteria. The effect of categorisation on the innovative potential in university-level education shall be subjected to criticism in the following part of the paper.

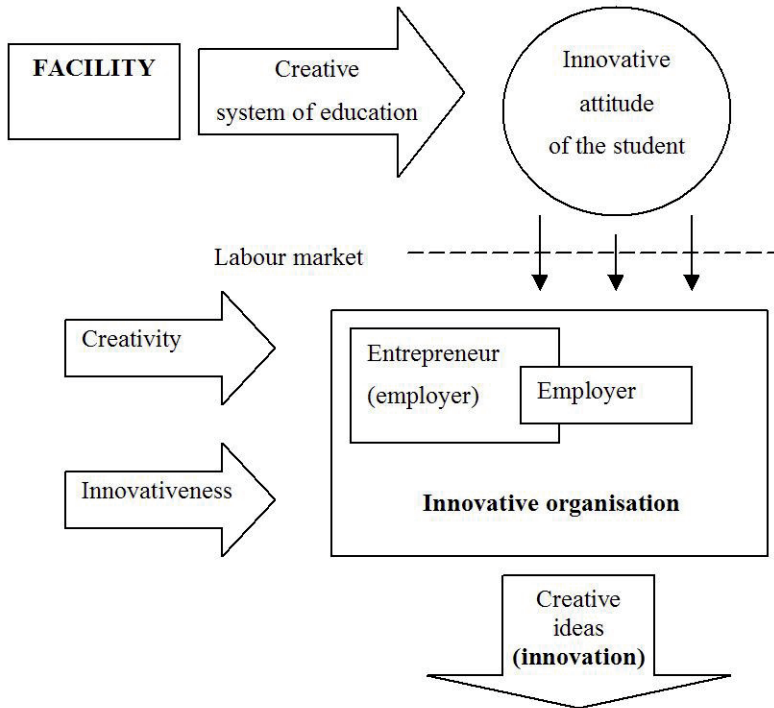


Figure 2. Model approach to the university-level educational facility concept as a place of developing innovative attitudes

Source: author's own study.

3. Premises for creating the innovativeness system and developing innovative attitudes

The university-level facility may fulfil its new mission with properly modified systems and curricula. Their objective is to increase the capacity of adaptation to new challenges with a multi-disciplinary process of education, teaching modern techniques for creative solving of problems, and making active cooperation of the facility with a company to combine knowledge with practical experience.⁵ These postulates result in the model of the 21st century university whose scientific staff and graduates have definitely better chances in the labour market, but for this reason that the innovative capacity of the employee becomes more and more often the subject of assessment in the recruitment process.

⁵ A broad interpretation of the issue is given in (1).

The academic circles face execution of a special mission, because their product, that is knowledge, becomes a significant factor in the development of the economy (1, p. 171). Basing on strong relationships with the surroundings, creating networks of mutual interactions with the business and with the administration is the feature characteristic of the model university of the 21st century.⁶ Additionally, moving away from the stiff bureaucracy is to allow meeting dynamic changes which occur in the surroundings. To be able to effectively develop pro-innovative attitudes, the scientific facility in itself should be innovative. Therefore, following the model of American college facilities (which are regarded as forerunners), significant transformations and reforms are introduced, among others in the scope of scientific research, the methods of their financing, management over the intellectual property in the college facility, cooperation with the business. One has to remember that these changes are to contribute to the development of a university-level facility which will skilfully come close to the economy, which will improve effectiveness and efficiency of innovative processes in it, with simultaneous creation of a better image and competitive position, without losing the consolidated academic traditions (1, p. 180). The 21st century university in itself is to be innovative and resourceful,⁷ providing the personnel which will feature deep awareness of assuming pro-innovative attitudes.

4. Results of the analysis and assessment of innovativeness in educational facilities

One of the main problems which basically decide about innovativeness of a university is its solid, conservative structure. This contributes to developing disturbances in the process of mutual interactions between the subsystems, thus translating into the number and quality of executed ideas. Long channels of communication and excess bureaucracy are further obstacles which should be overcome in the process of improving university-level education. Lack of formalised guidelines as regards management over intellectual property developed in the facility does not work in any way motivating young personnel, does not encourage them to creating own innovative ideas and executing the assumed career path. On the other hand, as regards age structure of sci-

⁶ In recent years often the so-called “enterprising university” is referred to, that is the one which develops and popularises new knowledge for new markets, quickly reacts to changes in the surroundings, has at its disposal a rich offer of educational services and training closely related to the directions of development of the economy (multi-discipline education, practise in education, higher share of active [project-focused] classes), and has strongly developed channels of communication and cooperation with business.

⁷ The examples of innovativeness and resourcefulness of the college facility: establishing spin-off and spin-out companies, open professional career paths for academic teachers and ambitious graduates, incubation programmes for companies of beginning graduates, centres of transfer of technology, the intellectual property management system, the network cooperation with local and regional companies (periodical meetings, joint conferences, seminars, research), activity of inter-discipline research teams.

entists, the personnel close to pension age is in majority, which is assessed critically and translates into stagnation in the process of scientific growth. One could assume that the results in developing innovative attitudes at the stage of studies by a teacher of low entrepreneurship and creativity will be negligible. The teacher should assume the role of the animator, directing his/ her students and inciting in them the need of gaining knowledge and being creative and resourceful. These stipulations support introduction of cooperative learning and in-depth modification of teaching programmes and methods. The current teaching programmes are not free of defects, thus critics should mostly apply to too low number of hours for particular subjects which quite often play a major role in the process of developing innovative attitudes.

The *Diagnoza stanu szkolnictwa wyższego w Polsce* (A diagnosis of higher education in Poland) report prepared by Ernst & Young Business Advisory and the Institute for Market Economics states that higher education is becoming more and more popular in Poland, which negatively affects quality of education. The activities of many college facilities have become limited to offering mass and cheap studies, with scientific activities pushed to the background. According to the statistics, 19 students come for one academic teacher in general. Broken down into scientific titles, 83 students come per one professor, and several hundred students per one assistant professor (8, p. 6). Additionally, multiple employment of teachers destructively affects scientific activities. Often lack of time and commitment to another place of work makes the employee not engage in scientific activities and thus makes modernising the didactic process difficult. According to the report, mobility between facilities, between sectors, and most of all of the international personnel in Poland is at a low level, even though the possibilities in this respect are large⁸ (8, p. 7).

Another imperfection of the education system is categorisation of the departments which is used for assessment of the innovative capacity of universities. With subjective weights and points, departments are classified into one of three groups: A, B or C, and the group A includes the units with high impact on innovativeness of the economy. The higher the category, the larger stream of financial funds may be expected by the units. It has to be remembered that the assessment done in this way does not reflect the actual condition of development of science in Poland and the chance for obtaining financial aid and growth of units in the lower categories is considerably limited.

The motto of the 21st century university is to make cooperation of science with business. At present this process gains in intensity, yet college facilities still face unwillingness and limited trust of companies. The earlier studies show that the companies themselves have low opinion about scientific and research units (including academic facilities) and do not treat them as a source of information which may be used for increasing innovativeness, assessing them as being of low use (10, p. 283). If companies decide to cooperate with such a unit, these will only be the ones with

⁸ The detailed description of university-level education disfunction is given in the report (9).

high value of the so-called potential index which consists mostly of: the degree of advancement of information systems, the tools supporting knowledge management, research and development operations, patents registered and provided, trademarks, expenditures for training events, etc.⁹ Companies thought that lack of experience in this type of partnership as well as unsatisfactory information about the offer of research units and barriers of financial nature were the basic barriers which made such cooperation difficult (10, p. 284). The lack of system of intellectual property management in a company is another limitation.

The observations over several years make it clear that promoting innovation and its importance for development of the economy is gaining momentum, yet formulating general strategies and concepts of systems of innovation is insufficient. It is important for the state to be active in the activities aimed at creating the climate friendly to innovations. Poland assessed from the angle of R&D expenditures to the GDP, the degree of modern technology in the research infrastructure, the number of the hired employees in the R&D sector in comparison with countries leading in these fields, is ranked in the final places. All efforts should be made in this respect, because decisions and activities for the benefit of development of science will reduce the gap to the countries leading in these fields and will provide a long-term evaluation for social and economic development of the country.

5. Final notes

The following conclusions come from the analysis:

1. Innovativeness is a factor increasingly determining the processes in modern economy based on knowledge. The concept of innovation as a system emphasises the role of external participants, institutions which affect innovative activities of organisations and other participants of the process (including people and teams that they create) with mutual interactions. The university-level educational facility is the external institution which can stimulate innovative processes in its surroundings (which may be later translated to the whole economy). It will play a major role, as transfer and diffusion of ideas, skills, knowledge, and information may be successful along the college facility–student line.
2. Developing innovative attitude during the studies provides the graduate of a resourceful university with the proper knowledge and experience for entering the employment market. He is aware of the effect of being creative and enterprising. He understands purposefulness of the innovative attitude and he knows that it may be his advantage in further professional activities. One of the premises is that studies will let him gain knowledge which he will skilfully use

⁹This issue has been presented more broadly in (10).

in the process of creating innovation. The organisation with such motivated and prepared employees will be successful in creating new products, processes, methods. Over an extended period of time, it will translate into growth of the organisation, definite improvement of the financial situation and achieving permanent competitive edge.

3. Turbulent nature of the current economy forces changes in the institution of university-level educational facility. In the process of transformation into the 21st century, the following are regarded the main concepts: making changes in the current programmes and methods of teaching so as to increase quality of the offered teaching, with the expectation that this will translate into the increase in the level of knowledge and qualifications of students, leaving the solid and bureaucratic structure, more intense activities for the benefit of development of science (publications, promotions in science, patents, etc.). Additionally, change in categorisation, leaving the template assessment process and focusing on the actual innovative potential of the given unit, are one of the directions in modernisation.
4. Undertaking cooperation of college with companies will result in increase of innovativeness. The barriers to overcome are: lack of funds for execution and participation in sponsoring research, lack of the system of protection of intellectual property which would result from such cooperation. The worst thing is, however, low awareness among entrepreneurs of such variant of cooperation and belief that this initiatives will not bring about positive results.
5. College facilities should not be alone in execution of all the above statements. Strong support of the state may result in mutual benefits and contribute to economic growth of the region, of the country, of the general development and of increasing quality of life. Debates over innovativeness have contributed to formulation of long-term strategy which take into consideration the important mission of education, its modernisation, and to development of systems of innovation in national and regional dimensions. The properly taken direction of the state policy is clear, but it should also take into account the stipulations, among others better care should be applied to the development paradigms: education, science, R&D, innovations, tele-IT technology, irrespective of whether this applies to scientific entities or companies (which have limited access to financial funds), promoting entrepreneurship, educational and scientific achievements, supporting activities for the benefit of the information community. One of the ideas is making better law, without friendly and mild legal conditions and support of the state, and developing effective interactions between the main actors of the system of building innovativeness of the economy (where the educational facility plays one of foreground roles) will be a great challenge.

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Znaczenie uczelni wyższej w procesie kształtowania postaw innowacyjnych

Streszczenie: Autorka artykułu definiuje pojęcia innowacji, innowacyjności i postaw innowacyjnych. Praca opiera się na trzech podstawowych тезach. Po pierwsze, z uwagi na to, że zdolność do tworzenia innowacji jest kwestią zyskującą coraz bardziej na znaczeniu, w procesie zarządzania przedsiębiorstwem urasta ona do rangi funkcji. Postawa innowacyjna jest źródłem innowacji, niemniej jednak warunek konieczny to poddana odpowiedniej obróbce wiedza. Gwarancją sukcesu w działalności gospodarczej oraz w tworzeniu potencjału innowacyjnego jest postrzeganie podmiotu przez pryzmat jego pracowników, a ci z kolei oceniani są pod względem nabytych umiejętności i wrodzonych predyspozycji. Każda jednostka jest zdolna do bycia innowacyjną, należy zatem podjąć odpowiednie działania stymulujące kreatywność, twórcze myślenie. Tę rolę z powodzeniem może pełnić uczelnia wyższa, a przedsiębiorstwo kontynuowałoby rozpoczęty proces kształtowania i doskonalenia postaw innowacyjnych.

Ponadto artykuł przedstawia trendy zmian, jakie zachodzą w szkolnictwie wyższym, oraz rolę, jaką odgrywają uniwersytety w gospodarce opartej na wiedzy. W przedsiębiorczym uniwersytecie możemy zdobywać wiedzę i uczyć się, jak być innowacyjnym. Kształtowana jest kreatywność i innowacyjność studenta, który kończąc studia, staje się potencjalnym pracodawcą lub

pracownikiem. Przedstawiona została istota kształtowania wyżej wymienionych cech i przyjmowania takich postaw, ponieważ może się to przyczynić do bycia innowacyjnym przez organizację, a tym samym do osiągnięcia przez nią trwałej przewagi konkurencyjnej i dalszego dynamicznego rozwoju.

Dodatkowo powiązanie nauki z biznesem jest jedną z możliwości propagowania zachowań proinnowacyjnych w gospodarce. Wyeksponowanie roli uczelni jest szansą na przeprowadzenie zmian jednocześnie w edukacji i w biznesie. Na zakończenie autorka przedstawia wnioski, jakie płyną z prezentowanego problemu.

Sł o w a k l u c z o w e: przedsiębiorczy uniwersytet, innowacyjność, postawa innowacyjna

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Use of renewable energy carriers in development of the region of Eastern Slovakia

Key words: biomass, rural landscape, the potential of renewable sources of energy

Summary: One of the key factors of agricultural production is the more efficient use of biomass, which significantly contributes to improving the economic and social situation in economically disadvantaged regions including Eastern Slovakia. The potential of biomass, which in Slovakia is unused, represents more than 163 PJ of energy. In addition to the power potential that the biomass hides in itself, there is also a significant multiplier effect, which is creating new jobs, establishment of partnerships in business, support in science and research, a network of energy, energy without crisis and a significant contribution to environmental protection.

1. Introduction

Agriculture is one of the oldest manufacturing industries, which for centuries has been co-creating the image of the Slovak countryside. Economic and social priorities of agriculture result from its irreplaceable role in maintenance of our largest wealth, which is agricultural land and related natural environment. The main task of agriculture is creation and provision of population, as well as sustainable cultural landscape where agriculture is irreplaceable.

The agricultural sector in Slovakia stays on historical crossroads, which raises needs for adaptation to constantly changing conditions. Agriculture in bulk is facing competitive pressure in consequence of entering the global market, therefore it is necessary to introduce changes in corporate structure built on competent business management and penetrative managing products in the sector. Changes will lead to increasing economic efficiency of production, a wider choice of agricultural products,

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to the consistent cooperation, collaboration and a diversification of activities engaged also in suitable biomass energy production.

As a result of a heavy-handed approach in the transition period and lack of strategy by the practices of individual institutions, the renewable energy carriers (also named: ONE) find themselves at the periphery of society interests.

Slovak economists must think about the phenomenon, which is highly discussed theme in Europe and which shows the basic economic problem of our agriculture. Specifically, meaning the impossibility of transformation of capital in agriculture as it is in other sectors. The reason is the basic means of production, namely land, which is not easily relocatable from one place to another. Therefore a permanent exploiting of the potential of the land is necessary.

It is important from the governments side to accept steps which enable using the agricultural land for energetic purposes without help of the transformed capital.

Agricultural businesses and farmers must behave in market conditions as market players, and must respect ethical principles of the land management. Their priority should be to continue the primary production of food crops. Motivation to gain income from secondary sources should be the cultivation of energy suitable plants or the recovery of the balances of plant and animal production.

2. Agriculture and energy policy

The Energy Policy of the EU in ensuring basic objectives of further development consider these key factors:

- employment;
- increasing the proportion of energy from renewable sources;
- Sustainable Development.

Energy policy is based on strategy 3×20 :

- 20% savings on non-renewable carriers;
- 20% share of the use of ONE;
- about 20% increase of the current energy consumption.

High prices of oil and natural gas forces the EU to reduce dependence on imported fossil fuels and replace them with the highest percentage of the representation from renewable sources. With the reference to this fact, the energy policy should observe (thus also in Slovakia) three main specific objectives:

- competitiveness;
- Sustainable Development;
- security of energy supplies.

The agricultural biomass as a key medium in the countryside discharges all these aims. Based on the analysis, the primary task for agriculture was—and will also be—to provide enough food for the population.

In Slovakia, ONE has the biomass of the greatest potential of all. The Action plan of trading the biomass for the years 2008–2013 was approved in 2008. Unfortunately, the activities of government officials in this area are not supporting the rapid filling of the action plan and adopting similar measures to increase the use of ONE.

On the other hand, it is striking that other options for farmers are not in use, especially the potential of soils, which would help the farmers to diversify activities, reduce their production costs and thereby increase the competitiveness on the EU market.

Agriculture will therefore continue to meet the fundamental role of food security for the population, in addition it can significantly contribute to securing energy production from biomass, thus obtain an additional source of agricultural income, as well as an opportunity to use their knowledge of crop production.

It turns out that the poor (mainly) agricultural areas without proper financial decentralisation will continue to pay the highest price for disproportions, and thus it will be getting poorer and lagging behind. Slovakia is a country that neither uses nor supports the exploitation of ONE, which is fully concerned mainly to biomass, that is used only by 2.6%, while biomass produces annually 163.2 (PJ) of energy. On the other hand, the country is struggling with lack of fossil fuels, which are obtained mostly from imports, and with their high price. According to the experts of the Research Institute of Agroecology in Michalovce, the production of energy carriers more than 400,000 hectares of farmland, which represents a considerable energy potential used by now only in 4–5%, is available in Slovakia. The State must therefore pay an increased attention to improving results of foreign trade, agro-food commodities and a maximum utilisation of land and forest fund for the production of renewable sources of energy.

3. Biomass

Biomass energy is chemically bound to the sun, used by plants to grow under photosynthesis. It is one of the most versatile and most widely used energy sources on earth.

The biomass is materials of animal or plant origin, suitable for industrial and energy use, variable and multi latent, which can satisfy energy demand in the production of electricity, heat or fuel market. The advantage of biomass in Slovakia is obvious, it is produced each year and evenly distributed throughout Slovakia. Farmers possess technical means for its cultivation, collection and treatment, and last but not least there is a growing interest in using biomass from the farmers.

4. Biomass potential

Biomass in Slovakia—as it is shown in Table 1 and Figure 1—has the greatest technical potential within ONE. In doing so, its use is insufficient and in comparison with neighbouring countries, it is pathetic. Only 6.3% of the total biomass potential is used to heat, fuels, biogas and electricity. This situation must be improved, because SR has committed itself to achieve the proportion of energy from ONE to 14% of total energy consumption by 2020 and to 24% in 2030.

Table 1
Total energy potential of biomass in Slovakia

| Type of biomass | quantity (t) | Energy potential (PJ) |
|--|-------------------|-----------------------|
| Farmers' biomass burning on | 2,031,000 | 28.6 |
| Forest dendromass | 2,432,000 | 26.8 |
| Wood processing industry | 1,835,000 | 22.0 |
| Biomass for biofuel | 200,000 | 7.0 |
| Municipal wood waste | 300,000 | 3.6 |
| Mouldings and burnouts in the production of biofuels | 400,000 | 8.4 |
| Manure from livestock | 13,700,000 | 10.0 |
| Purpose-grown biomass for energy production | 4,050,000 | 56.8 |
| Total | 24,948,000 | 163.2 |

Source: TSUP Rovinka, 2010.

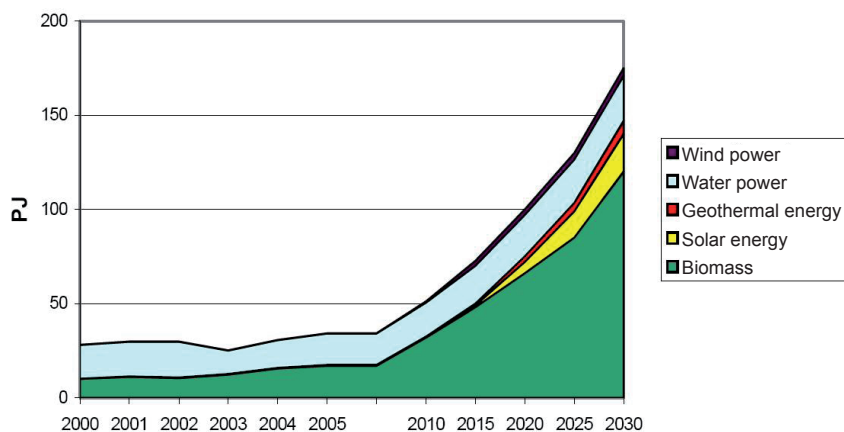


Figure 1. Use of different types of energy for the following years in the Slovak Republic

Source: Strategy for greater use of renewable energy SR, Bratislava 2007.

5. Possibilities of using the biomass for energy purposes

Agricultural biomass in terms of energy use can be divided into three basic groups. Biomass is suitable for:

- combustion (production of heat, heating technology and household water, drying of agricultural products, possible production of electricity), phytomass of plants (straw), wood waste (orchards, vineyards, trees raid on permanent grasslands especially in mountainous and foothill areas), energy crops (*Miscanthus Chinese*, sorghum, marsh dock, cannabis);
- production of biofuels in the form of methyl esters of vegetable oils as an ingredient in diesel fuel (produced from rapeseed or corn), or in the form of bioalcohols as an ingredient in gasoline (derived from corn, cereals, sugar beet, potatoes);
- producing of biogas, followed by combined heat and power cogeneration (obtained from excrements of animals, green plants, or silage).

6. Multiplier effect of biomass

Biomass as a significant source of energy also creates more multiplier effects, which include:

- the contribution of organic agricultural production;
- providing new jobs;
- creation of the synergic effects in the form of regional partnerships between government, businesses and associations;
- support for science, education, technical and technological innovations in the country;
- support for heating networks at local and regional level;
- contribution to climate protection;
- sustainable development of the region—improving of the management in the region, landscaping, replacement of soils, water flows and reducing the erosion of soil.

Multiplier effect is focused on the following areas:

- creation of new jobs (biomass production in terms of disadvantaged regions can significantly contribute to creating new jobs. The experience of Germany in every 1000 ha shows that it is possible to create 7–10 new jobs and more jobs can be created within firms oriented at the production of equipment and technology for biogas and biomass boiler. An important contribution to it can be gaining experience and job skills for marginal social groups);

- contribution to organic agricultural production (turnaround lands, secure of, environmental foods and improving the categorisation of land development);
- synergy effect in terms of regional partnerships between the government, businesses and interest groups acts as a strong pull element not only for businesses but also for municipalities, industrial and construction companies. They may participate to use the biomass energy potential in the region;
- support for science, education (to help stimulate creation of technical and technological innovations in the country and contribute to the emergence of new production fields, companies orientated towards use of ONE, production of technological equipment for treatment, processing and utilisation of biomass);
- supporting networks of heating at local and regional level (production, processing and utilisation of biomass in the region will tend to that the money obtained from biomass energy production will remain in the region, especially in rural areas. There will be a network of heating creation, to which a newly built heat distributions will serve, or modified original routs. Energy from biomass will be cheaper which is also confirmed by practical examples of the countries such as Austria, Sweden, or Germany);
- providing a stable supply of electricity and heat within built up networks. (There is a chance within ONE today—one carrier is replaced by another and so it ensures a continuous supply of standard heat or electricity, or fuel for cell energy resources);
- contribution to climate protection (biomass as an energy carrier is in compliance with the optimal recovery of both—as a fuel for direct combustion, or as a feedstock for biogas production or fuels for automobiles behaves neutrally, which means that it does not pollute the environment but contributes to the landscape and strengthening rural significance in terms of its role in tourism);
- creation of new businesses and professions—development of engineering, building industry, chemistry and biology;
- use of rich experiences and skills from people in the region.

These effects are difficult to fulfil if they are not involving the development of educational institutions such as universities, leaving the university-educated young people with no practice. The level of theoretical knowledge of university students is contingent on acquirement of practical knowledge from the areas of research.

7. The role of universities in changing minds

Educational institutions should particularly play an important role in this regard, and they themselves should take more responsibility for enforcing the idea of higher utilisation of ONE in practice. Developing science, research and education with

mostly young people, and transferring their knowledge into practice in the area of using ONE, can be a driving force for rural development, and thus contribute to the strategic aims of SR in using ONE. Examples of such solutions may be a teamwork of University of Economics in Bratislava—VVICB EU Kapušany near Prešov and TU in Košice, Faculty of BERG, in preparing and implementing a project of building a research development and bio-information centre in Kapušany near Prešov. One of the main tasks of the Centre will be a practical introduction for the students with various possibilities of using ONE and an opportunity of monitoring the processing of various types of biomass.

Research exhibition and information centre is focused on bio-energy in the following tasks:

- creative support in the education of university students;
- research and verification of research results in practice within projects for universities in the Eastern and Central Slovakia;
- demonstration of particular energy carriers;
- advice and consultancy;
- conferences, seminars, workshops and excursions.

The components of the Centre are the offices:

- biogas station with a cogeneration unit for the performance of 180 kW/h;
- laboratory of solar energy-photovoltaic and solar water heating collectors;
- laboratory and workplace modifications or processing of dry biomass on dry-formed solid fuels (briquettes, pellets);
- laboratory and workstation of liquid fuels for biodiesel and bioethanol;
- physical-chemical laboratory testing of biomass.

The main focus of VVICB will be the research, development and optimisation of energy production from biomass by thermal combustion and anaerobic digestion in conditions of Eastern Slovakia. In Slovakia, there are only six biogas stations in operation by this time, and one of them is also a part of the EU VVICB Kapušany. Bioenergy Centre collaborates with leading research institutions and firms in Slovakia, the Czech Republic, Austria, Germany, Poland, Sweden, Ukraine and Hungary. It also participates in the preparation and implementation of several international projects intent on utilisation of ONE, within the challenge OPVandV-2009/2:2/02-SORO ITMS code 26220220063. Project title: “New technologies for energetic environmental and economic cost-effective utilisation of biomass.” VVICB EU is equipped with the latest techniques and technologies for the exploration, research and development of ONE, including information and communication technologies.

8. Conclusion

The utilisation of biomass is a major benefit for companies and local governments in the region, because it enables innovation, contributes to job creation and reducing social tensions. An important element of using biomass in agricultural sector is also marketing, which is a tool for communication between farmers, consumers and the state. In this situation, the role and mission of farmers is gradually changing from farmer—which is shown by the practice in developed countries—to manufacturer, supplier and distributor of energy from ONE. This fact just enforces the importance and role of the rural regions such as Eastern Slovakia. The countryside is increasingly becoming an important partner for urban settlements in the sustainable development of the country. The exploitation of biomass is also an important contribution to climate protection.

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Využitie ONE pri rozvoji regiónu východného Slovenska

A b s t r a k t: Jedným z kľúčových faktorov zefektívnenia poľnohospodárskej výroby, je využitie biomasy, čo môže významne prispieť aj k zlepšeniu ekonomickej a sociálnej situácie v ekonomicke znevýhodnených regiónoch, medzi ktoré východné Slovensko patrí. Potenciál biomasy, ktorý je na Slovensku nevyužívaný, predstavuje vyše 163 PJ energie. Okrem významného energetického potenciálu, ktorý biomasa v sebe ukrýva, je biomasa aj významným multiplikačným efektom, ktorého využitie predstavuje vytváranie nových pracovných miest, vznik partnerstiev v oblasti podnikania, podporu v oblasti vedy a výskumu, vznik sietí energií, energiu bez kríz a významný príspevok k ochrane životného prostredia.

K ľ ú č o v é s l o v á: biomasa, vidiecka krajina, potenciál obnoviteľných nosičov energie

ŁUKASZ POPŁAWSKI*

Role of territorial marketing in development of rural communes in the context of competitiveness of the region

Key words: economic potential, competitiveness, region, local development, territorial marketing

S u m m a r y: This paper presents the role of territorial marketing in development of rural communes in the context of competitiveness of the region. Under the present conditions, increasing significance is gained by the conditionings of the development of particular regions, which should constitute the basis of the directions of development of given provinces. For this reason, this study presents the idea of factors and elements of territorial marketing of a region present in the literature on the subject in the context of competitiveness of the region. For several years territorial marketing, whose subject can be a commune, a district, a region, a state and also a special spatial unit with exceptional social and political, tourist and historic meaning, in particular landscape and national parks as well as nature reserves and protected landscape regions, has started to play a significant role in development.

The efficiency of affecting partners can be noticed not only in companies on the market of consumption goods, but also in service companies, investment sector, farms, social institutions, social organisations and non-profit institutions. This fact has stirred interest in territorial marketing. What has a significant meaning in the development of the analysed marketing is the specificity of a given state (region). Strong regionalisation and increase in competitiveness between centres is a meaningful stimulus for local marketing development, particularly in the face of economic backwardness of some regions, increase in the unemployment in those areas, the lack of services, etc. Furthermore, there is a demand for social support of local authorities as well as strong identification of inhabitants with a region (area). Strong identification is especially noticeable in the case of states and regions which up till the present day had strongly marked their local specificity, especially in terms of culture. In numerous countries or territories in the case of inhabitants' satisfaction, there is also a high degree of presenting outside support for local authorities in a number of undertaken enterprises.

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1. Introduction

At the end of 2003 spatial forms of nature and landscape preservation constituted 33.1% of the total Poland area (1). Landscape parks and protected landscape area should constitute natural enclaves of eco-development where basic rules of nature preservation are observed. Therefore the formation of principles of an appropriate regional development based on the concept of constant and moderate development, especially in valuable areas where nature is preserved, is particularly significant. Development conditions of the protected areas are the result of both the potential of natural resources of those areas as well as of objective exterior factors shaping the position in the whole area.

Local development can be defined as a process of economic, social, cultural and political changes leading to the rise of the level of residents' prosperity through the process of transformation from less advanced states to the ones more advanced and complex (2). What belongs to the tasks of a commune is especially securing a harmonious development, i.e. balance between social and material elements of the commune, as well as between economic and ecological ones. In order to achieve that, the commune performs a variety of its own tasks, which boil down to four groups (3):

- economic, spatial and ecological order; shaping economic development, space planning and protection of the environment;
- technical infrastructure (roads, water-supply, public transport, etc.);
- social infrastructure (educational system, social welfare, etc.);
- order and public safety (for instance fire-fighting service).

Communes may, and even are obliged to, prepare and accomplish strategic plans on their own as well as search for the most efficient strategies of local development (4). The strategy of local development embraces certain purposes and a general way of acting of a subject within the scope of the most significant and crucial decisions concerning the future of a given area. For several years territorial marketing, whose subject can be a commune, a district, a region, a state and also a special spatial unit with exceptional social and political, tourist and historic meaning, in particular landscape and national parks as well as nature reserves and protected landscape regions, has started to play a significant role in development.

The efficiency of affecting partners can be noticed not only in companies on the market of consumption goods, but also in service companies, investment sector, farms, social institutions, social organisations and non-profit institutions. This fact has stirred interest in territorial marketing. Simultaneously, as a result of extending marketing knowledge, independent scientific disciplines have come into being, including ecological marketing (5), whose elements may play a role in eco-development. Marketing activities are chiefly undertaken by local authorities, aiming at creating such conditions of functioning of a territorial unit, which make its further development possible.

This paper presents the role of territorial marketing in development of rural communes in the context of competitiveness of the region.

2. The scope and method of research

The research consisting in pointing to directions of development of protected areas in Świętokrzyskie Voivodeship has been conducted by the author since 1998 and has lasted till the present day. The research embraces, among others, differentiating factors affecting multi-functional development as well as eco-development of protected areas. The theme of the research was finding marketing instruments which could attract the interest in this examined area. Statistical data as well as materials obtained from the communes constituted a complementary element of the research.

3. Competitiveness on a community scale

In the present economic situation and global trends there are constant changes of the conditions of development. Those changes of economic conditions are related to the situation on global and national markets and therefore a new perception of development, defined through building competitiveness on a given area, and especially a new region, came into being. This new paradigm of development related to competitiveness of the region is currently extremely emphasised in regional research, including Poland. The concept of competitiveness is associated with a theory of microeconomics and the economics of enterprises (6). The definition of competitiveness was examined by many authors and in dictionaries it is defined as “rivalry, competition between particular people or groups interested in achieving the same goal” (7). In economic activity competitiveness means rivalry between companies competing in order to gain customers or markets (8). Considering the issues of competitiveness, it is indispensable to pay attention to the fact that the whole regional units compete with one another directly, like enterprises, since they do not offer a similar product, being in nature diverse and having their own regional properties (11). Competitiveness of a region is a measure of its superiority or distance separating it from other regions which together create a sort of a strategic group with defined, similar strategic goals and the strategy of competitiveness is undertaken by them consciously. The superiority in competitiveness is achieved by those regions whose products in a higher degree meet expectations and requirements of recipients (12).

Regions as a part of a public sector are subject to the rules of the market and competition in the range of implantation and location of various subjects in their area as well as in the range of their mobility and gaining resources (13; 14). In this way regional economies participate in a market and competition play, which, according to Alain Fayolle (15), means activities, whose essence is creating new values, which is

significant from the perspective of regional development. By way of analogy, it is indispensable to consider this issue (enterprise) on a local level, where spatial organisational units, such as communes or districts, try to compete directly and indirectly.

According to Tadeusz Markowski (16), competing reveals itself in rivalry for external benefits, which are marked by: aptitude for competing for external investors or for different means of assistance and subsidies. Apart from indirect competing, those subjects compete also directly through using and creating new and favorable conditions for enterprising, especially enterprises in order to make it possible for them to achieve competition superiority over subjects from their surrounding (from outside a given region). The final aim is assuring greater effectiveness, which results in a higher level of development of the whole region.

According to Kazimierz Kuciński (17), a region is “a group of areas adhering one to another (elementary units of geographical space) possessing—in terms of some criteria—as many as possible common features and showing possibly the greatest number of differences in relation to surrounding areas.” In the opinion of Kazimierz Dzięwoński (18) a region is: “a spatial social and economic group, mainly a manufacturing one, developing in time and finding permanent reflection in the forms of managing of a given area.”

4. The influence of protected areas upon local development: selected aspects

The Act on environment protection defines aims and principles of environment protection and especially defines activities aiming at preserving, proper employing and renovating elements of nature as well as natural complexes and eco-systems. This legal act defines nature protection as a part of ecological policy of a state. The idea of creating protected areas itself is closely related to nature protection and the protection of water resources as well as the abodes of flora and fauna which may be found there. The superior aim of any activity in protected areas is submitting it to nature and landscape protection. The Act on nature protection depending on the degree of a legal discipline allows for conducting a given man’s activity in a concrete protected area.

The basic purpose of creating a system of protected areas is maintaining natural processes, eco-systems’ stability and, in particular, preserving bio-variety. In Poland, according to the regulations which are binding, the areas of landscape parks and protected landscape are the most predisposed to introducing the idea of sustained development. The idea is particularly meaningful for natural protected areas, which perform various roles; especially they constitute a natural shelter for environment values. In concordance with the idea of permanent sustained development, what constitutes an alternative for intensive agriculture are forms of activities based on ecological and integrated agriculture (19).

In the question of agricultural economy in protected regions, much space is devoted, next to the issue of ecological agriculture, to agro-tourism and eco-tourism. Tourism is generally recognised as a chance for rural areas within multi-functional and sustained development, which may constitute a basic non-agricultural function of farms and the residents of villages, particularly in protected regions (in national and landscape parks).

5. Territorial marketing in development of rural communes in protected areas

Traditional approach referring only to the activity of enterprises has been completed by an approach taking into account and including into marketing subjects also other non-profit organisations, as well as self-government communes (20).

What had a decisive influence upon a dynamic increase in the interest in territorial marketing were various general factors, being a reflection of contemporary processes of social and economic changes (21). According to Andrzej Szromnik (22) among such elements one may enumerate:

- increase in social awareness of belonging to separate local communes as well as regional, national and ethnic ones;
- separating and distinguishing in terms of ownership settlers' units of different grade;
- the rise in decision autonomy and economic independence of space and administration units;
- the development of marketing way of thinking and acting not only in the sphere of commercial activity;
- increase in competitiveness between states and state groups, regions, areas and communes in obtaining factors of perspective development;
- initiation of contemporary knowledge and managers' experiences in the management of settlers' units;
- increase in social and economic awareness of the society and the development of claim attitudes towards organs of territorial self-government related to that;
- increase in expectations and requirements of territorial communes' members with reference to quantity and quality of received public services.

What has a significant meaning in the development of the analysed marketing is the specificity of a given state (region)—it is different for France and different for Germany. Strong regionalisation and increase in competitiveness between centres is a meaningful stimulus for local marketing development, particularly in the face of economic backwardness of some regions, increase in the unemployment in those areas, the lack of services, etc. Furthermore, there is a demand for social support of

local authorities as well as strong identification of inhabitants with a region (area). Strong identification is especially noticeable in the case of states and regions which up till the present day had strongly marked their local specificity, especially in terms of culture. In numerous countries or territories in the case of inhabitants' satisfaction, there is also a high degree of presenting outside support for local authorities in a number of undertaken enterprises. The role of local marketing through promoting a city increases, due to, among others, a greater role of globalisation processes in economy, which is related to disappearing identification with a given territory. This factor will cause necessity in presenting one's own culture or identity with the aim of attracting capital or tourists' interest in a given region (23).

Territorial marketing is strictly related to ideas which are present in a given region and which result from particular features or kinds of business in a given region. Those ideas support the development of a region as a whole or its organisations and inhabitants. In the case of territorial marketing in protected areas, there is a strong interdependence between marketing and ecological, social and economic ideas resulting from the concept of eco-development.

The territorial marketing allows for:

- satisfying the needs and wishes of subjects located in a given unit with the aim of satisfaction and development at the action which stimulates their desired behaviour;
- recognising needs and creating such an offer for investors, which will present the qualities and attractiveness of a given unit in such a way that subjects will invest in the area of this unit.

Activities with the use of marketing instruments have particular significance in the development of a commune or a region. Local authorities appear in the role of the chief subject which prepares, organises, realises, coordinates and controls all marketing enterprises concerning a region in which a specific territorial unit is the main reference point for profits offered to partners.

In implementing constant and sustained development it is ecological marketing that plays a significant role and it appears as an economic category in market economy with a high awareness of economic subjects. Its role is related to consumers' interest in the condition of the environment and embraces promoting: products and services friendly to the environment, the idea of employing recyclable materials and promoting the idea of the development of pro-ecological manufacturers (24). Besides, one may promote ecological behaviour and the needs of economic subjects, especially consumers. What constitutes a significant question is informing consumers and manufacturers about ecological influence of products upon the environment.

What plays a special role in ecological marketing are ecological trademarks, ecological advertisement and ecological goods declarations. Those instruments are particularly significant for two reasons, i.e. the consumer's consciousness and the development of a given region.

6. Brand as the basis for promoting protected areas

In present economic conditions the consumer, having a wide choice of goods, in the case of high ecological awareness takes into account the origin and the way of manufacturing a given product. What plays a significant role in this area is a trademark or a logo of a product. Product's symbol is frequently an element confirming, for instance, the quality of a product. What proves the fact that market is perceived in such a way by consumers is available marketing research, which evinced the following hierarchy of consumers' requirements: product safety (its detailed description), presence or lack of quality system, production method, product presentation and geographic origin. Apart from main marks guaranteeing quality, conformity to binding certificates or ecological production, what plays a meaningful role are local marks (peasants' product, regional product, a product of a regional park) (25). Those marks are related to products strictly associated with a given region. What one should include into products which will contribute to the development of protected regions are material and non material goods connected, among others, with qualities of natural environment, tourist attractiveness, location offers, ideas of local society. Furthermore, one may also add to that social service, different kinds of plans, projects, expert opinions, advising services related to the development of a given region (26).

A meaningful instrument in the presented subject is ecological advertisement which identifies and emphasises proecological qualities of products and social attitudes related to that. The aim of those activities is promoting a given product or a region (area) with the aim of increasing its sales or drawing attention to that, for instance attracting tourists.

What plays a significant role in the question of protected regions' development is trademark. A trademark may constitute an important element of preserving cultural identity of a given region. Such a mark may be a stimulator of local development because of specificity and originality which cannot be found anywhere else. Besides, such a mark may be used in the process of introducing constant and sustained development, especially in the area of a landscape park or a national park. Marking this exceptional, because of a region's specificity, product may be a visiting card of such a park or area.

What has been presented in Popławski's paper (23)—opinions of the inhabitants of rural communes in protected areas concerning above mentioned marketing elements. Results analysis explicitly shows that all the answers proposed in closed questions are regarded as favourable towards the increase in attractiveness of a protected region. The respondents want to introduce the slightest changes in inhabitants' mentality and create promotion sign defining identity of the protected region (Piekoszów, Brody and Daleszyce). What they consider to be the most profitable is extending tourist base and building such a base as well as roads. What is interesting are respondents' answers regarding promotion where they pay more attention to ensuring a region's promotion than to a commune promotion.

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Rola marketingu terytorialnego w rozwoju gmin wiejskich w kontekście konkurencyjności regionu

Streszczenie: W obecnych warunkach istotnego znaczenia nabierają uwarunkowania rozwojowe poszczególnych regionów, na podstawie których powinny opierać się kierunki rozwoju danych województw. Dlatego w niniejszej pracy zaprezentowano czynniki rozwojowe i elementy marketingu terytorialnego spotykane w literaturze przedmiotu w kontekście konkurencyjności regionu. Od kilku lat marketing terytorialny, którego podmiotem może być gmina, powiat, region, państwo, jak też specjalna jednostka przestrzenna o wyjątkowym znaczeniu społeczno-politycznym, gospodarczym, przyrodniczym, turystycznym, historycznym, a w szczególności parki krajobrazowe i narodowe oraz rezerwaty przyrody i obszary chronionego krajobrazu, zaczyna odgrywać rolę w rozwoju danego obszaru. Skuteczność oddziaływania na partnerów występuje nie tylko w przedsiębiorstwach na rynku dóbr konsumpcyjnych, ale także w przedsiębiorstwach usługowych, sektora inwestycyjnego, gospodarstw rolniczych, przedsiębiorstwach komunalnych, organizacji społecznych oraz instytucji non-profit. Ten fakt wpłynął na zainteresowanie się marketingiem terytorialnym. Istotne znaczenie w rozwoju analizowanego marketingu posiada specyfika danego kraju (obszaru). Silna regionalizacja i wzrost konkurencyjności pomiędzy ośrodkami jest liczącym się bodźcem dla rozwoju marketingu lokalnego, zwłaszcza przy gospodarczym zafocaniu danych terytoriów, wzroście na nich bezrobocia, braku usług itp. Ponadto istnieje zapotrzebowanie na wsparcie społeczne przez władze lokalne oraz silna identyfikacja mieszkańców z regionem (obszarem). Silna identyfikacja jest szczególnie widoczna w wypadku krajów i obszarów, które do tej pory silnie wyodrębniły swoją lokalną specyfikę, zwłaszcza w zakresie kultury. W licznych krajach czy terytoriach w razie zadowolenia mieszkańców występuje również wysoki stopień prezentowania na zewnątrz poparcia dla władz lokalnych w zakresie różnych podejmowanych przedsięwzięć.

Słowa kluczowe: potencjał ekonomiczny, konkurencyjność, region, rozwój lokalny, marketing terytorialny

Table 1
Inhabitants' opinion on what actions should be undertaken in order to make a protected region more attractive in terms of tourism (in %)

| Commune | guarantee the region's promotion | | guarantee the commune's promotion | | create a promotion mark of a protected area defining its identity | | obtain financial and advisory assistance from authorities | | extend tourist base | | guarantee tourist attractions | | extend tourist base, including roads | | take care of natural environment | | change people's mentality | |
|------------|----------------------------------|-------|-----------------------------------|-------|---|-------|---|-------|---------------------|-------|-------------------------------|-------|--------------------------------------|-------|----------------------------------|-------|---------------------------|-------|
| | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No | Yes | No |
| Bačkowice | 78.81 | 10.17 | 74.58 | 12.71 | 66.98 | 16.98 | 72.64 | 16.04 | 77.97 | 14.41 | 78.44 | 12.07 | 71.68 | 15.93 | 71.43 | 15.18 | 57.41 | 18.52 |
| Bałtów | 88.16 | 1.31 | 86.84 | 0.00 | 84.51 | 0.00 | 84.29 | 4.29 | 88.46 | 1.28 | 90.91 | 0.00 | 89.04 | 1.37 | 89.61 | 1.29 | 80.82 | 6.84 |
| Bliżyn | 91.49 | 1.06 | 88.89 | 3.33 | 74.65 | 11.29 | 92.50 | 3.75 | 91.21 | 2.20 | 92.05 | 4.55 | 89.66 | 5.77 | 93.10 | 4.60 | 79.27 | 4.88 |
| Bodzechów | 78.00 | 5.00 | 79.17 | 8.33 | 69.77 | 8.14 | 71.91 | 7.87 | 75.51 | 13.27 | 76.09 | 6.52 | 73.12 | 10.75 | 73.91 | 9.78 | 63.74 | 18.68 |
| Bogoria | 64.41 | 5.08 | 61.40 | 6.14 | 57.52 | 8.85 | 56.38 | 3.19 | 60.68 | 4.27 | 61.86 | 4.24 | 59.83 | 0.85 | 57.76 | 4.31 | 48.57 | 10.48 |
| Brody | 52.83 | 31.13 | 41.58 | 31.68 | 44.34 | 33.96 | 93.10 | 6.90 | 74.53 | 9.43 | 71.17 | 9.91 | 74.29 | 9.52 | 98.00 | 2.00 | 54.17 | 45.83 |
| Daleszyce | 33.70 | 32.61 | 40.86 | 32.26 | 40.22 | 30.43 | 33.70 | 29.35 | 46.32 | 28.42 | 42.27 | 32.99 | 40.00 | 26.32 | 36.56 | 26.88 | 38.04 | 30.43 |
| Gnojno | 93.52 | 3.70 | 90.65 | 4.67 | 77.91 | 5.81 | 86.59 | 2.44 | 90.72 | 4.12 | 90.82 | 4.08 | 84.54 | 4.12 | 89.47 | 5.26 | 82.47 | 5.15 |
| Górno | 75.76 | 12.12 | 70.59 | 15.29 | 56.79 | 24.69 | 62.86 | 18.57 | 73.68 | 9.47 | 74.42 | 5.81 | 66.67 | 12.82 | 69.74 | 13.16 | 69.62 | 13.92 |
| Imielno | 81.97 | 4.92 | 82.14 | 5.36 | 70.83 | 8.33 | 84.00 | 4.00 | 74.07 | 9.26 | 74.55 | 3.64 | 79.63 | 3.70 | 84.75 | 1.69 | 71.15 | 9.62 |
| Iwaniska | 84.29 | 5.71 | 86.11 | 8.33 | 88.33 | 3.33 | 90.00 | 3.33 | 90.00 | 5.71 | 89.39 | 3.03 | 89.86 | 7.25 | 86.96 | 5.80 | 74.14 | 10.34 |
| Kije | 85.71 | 2.38 | 90.00 | 2.50 | 78.57 | 4.29 | 81.94 | 2.78 | 87.67 | 4.11 | 86.49 | 2.70 | 78.67 | 1.33 | 74.67 | 1.33 | 71.23 | 0.00 |
| Kluczewsko | 78.13 | 7.81 | 88.89 | 4.17 | 81.67 | 6.67 | 80.85 | 8.51 | 86.67 | 5.00 | 85.19 | 7.41 | 90.16 | 4.92 | 89.66 | 5.17 | 64.91 | 19.30 |
| Krasocin | 56.76 | 17.57 | 61.33 | 14.67 | 50.72 | 20.29 | 63.77 | 21.74 | 55.84 | 23.38 | 65.79 | 13.16 | 64.29 | 17.14 | 64.29 | 17.14 | 48.57 | 34.29 |
| Lagów | 89.74 | 3.85 | 89.47 | 2.63 | 73.13 | 10.45 | 83.10 | 4.23 | 88.61 | 2.53 | 89.61 | 2.60 | 89.74 | 2.56 | 85.33 | 2.67 | 77.78 | 5.56 |
| Lopuszno | 84.15 | 4.88 | 79.45 | 8.22 | 72.13 | 9.84 | 82.09 | 5.97 | 87.84 | 1.35 | 79.41 | 7.35 | 84.21 | 2.63 | 81.94 | 9.72 | 67.65 | 14.71 |
| Masłów | 88.89 | 6.06 | 87.78 | 7.78 | 79.01 | 9.88 | 83.72 | 8.14 | 90.43 | 6.38 | 87.63 | 6.19 | 85.23 | 10.23 | 88.89 | 6.67 | 80.49 | 8.54 |
| Michałów | 84.09 | 11.36 | 83.15 | 10.11 | 71.95 | 17.07 | 74.39 | 13.41 | 78.05 | 12.20 | 80.49 | 15.85 | 77.78 | 16.05 | 78.82 | 11.76 | 72.29 | 16.87 |
| Mirzec | 86.59 | 6.10 | 82.05 | 8.97 | 72.37 | 18.42 | 76.00 | 6.67 | 75.29 | 5.88 | 78.48 | 10.13 | 82.05 | 8.97 | 83.54 | 8.86 | 68.83 | 12.99 |
| Mniów | 90.41 | 2.74 | 90.14 | 2.82 | 83.02 | 5.66 | 90.00 | 0.00 | 89.55 | 1.49 | 86.15 | 3.08 | 92.75 | 0.00 | 86.36 | 3.03 | 79.25 | 5.66 |

| | | | | | | | | | | | | | | | | | | |
|---------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| Nowy Korczyn | 58.24 | 23.08 | 56.82 | 19.32 | 61.80 | 25.84 | 53.93 | 17.98 | 60.87 | 23.91 | 60.64 | 26.60 | 64.04 | 17.98 | 59.55 | 28.09 | 54.65 | 25.58 |
| Oksa | 84.62 | 8.55 | 83.02 | 5.66 | 70.00 | 9.00 | 75.25 | 6.93 | 75.44 | 8.77 | 81.25 | 2.68 | 81.36 | 5.93 | 84.07 | 3.54 | 69.61 | 5.88 |
| Opatowiec | 85.90 | 5.13 | 85.71 | 5.19 | 66.67 | 12.50 | 86.67 | 2.67 | 83.12 | 5.19 | 84.00 | 2.67 | 84.62 | 0.00 | 88.75 | 0.00 | 75.00 | 6.58 |
| Pacanów | 89.71 | 4.41 | 88.71 | 1.61 | 81.13 | 5.66 | 87.27 | 7.27 | 90.16 | 3.28 | 92.06 | 1.59 | 87.04 | 0.00 | 91.38 | 0.00 | 74.55 | 14.55 |
| Pawłów | 93.20 | 3.88 | 92.08 | 3.96 | 81.52 | 4.35 | 91.49 | 2.13 | 94.00 | 5.00 | 94.12 | 2.94 | 88.51 | 4.60 | 93.81 | 3.09 | 81.52 | 8.70 |
| Piekoszów | 53.00 | 24.00 | 52.53 | 27.27 | 40.21 | 31.96 | 44.57 | 27.17 | 48.00 | 16.00 | 45.92 | 24.49 | 49.48 | 18.56 | 47.47 | 26.26 | 39.39 | 28.28 |
| Pierzchnica | 89.80 | 3.06 | 90.91 | 2.02 | 75.51 | 6.12 | 72.90 | 2.80 | 85.71 | 2.04 | 79.80 | 5.05 | 81.82 | 4.04 | 77.55 | 4.08 | 68.37 | 6.12 |
| Radoszyce | 76.25 | 8.75 | 74.68 | 11.39 | 69.74 | 14.47 | 77.50 | 7.50 | 75.61 | 10.98 | 77.11 | 9.64 | 76.54 | 9.88 | 72.94 | 7.06 | 65.38 | 16.67 |
| Raków | 89.53 | 2.33 | 89.41 | 0.00 | 86.30 | 1.37 | 85.00 | 1.25 | 90.70 | 0.00 | 91.86 | 0.00 | 89.41 | 2.35 | 89.77 | 2.27 | 83.54 | 2.53 |
| Ruda Maleniecka | 83.08 | 9.23 | 86.15 | 6.15 | 70.59 | 11.76 | 77.55 | 14.29 | 84.62 | 7.69 | 83.33 | 5.00 | 79.69 | 9.38 | 84.75 | 8.47 | 73.58 | 11.32 |
| Sitkówka Nowiny | 61.63 | 13.95 | 62.03 | 15.19 | 51.47 | 13.24 | 53.62 | 13.04 | 54.93 | 14.08 | 58.67 | 13.33 | 61.43 | 14.29 | 58.57 | 10.00 | 52.70 | 13.51 |
| Skarżysko Kościelne | 84.62 | 7.69 | 78.38 | 12.16 | 76.19 | 15.87 | 82.09 | 10.45 | 84.00 | 10.67 | 88.00 | 4.00 | 93.42 | 2.63 | 85.33 | 8.00 | 68.12 | 15.94 |
| Słupia Jędrzejowska | 87.76 | 0.00 | 90.48 | 0.00 | 67.86 | 3.57 | 94.59 | 0.00 | 83.78 | 0.00 | 88.24 | 2.94 | 84.21 | 2.63 | 94.44 | 0.00 | 70.00 | 17.50 |
| Słupia Konecka | 89.06 | 6.25 | 88.52 | 6.56 | 85.00 | 8.33 | 90.00 | 5.00 | 89.84 | 5.08 | 90.00 | 5.00 | 89.23 | 6.15 | 91.93 | 3.23 | 85.25 | 4.95 |
| Smyków | 91.78 | 4.11 | 93.51 | 3.90 | 77.08 | 6.25 | 93.75 | 1.56 | 88.71 | 3.23 | 91.18 | 0.00 | 85.45 | 5.45 | 93.33 | 0.00 | 86.54 | 5.77 |
| Sobków | 81.93 | 12.05 | 83.53 | 7.06 | 75.34 | 12.33 | 84.42 | 14.29 | 82.93 | 6.10 | 86.25 | 10.00 | 82.67 | 12.00 | 83.33 | 10.26 | 73.85 | 12.31 |
| Solec Zdrój | 93.62 | 3.19 | 93.55 | 2.15 | 85.71 | 5.95 | 87.80 | 2.44 | 92.31 | 4.40 | 94.79 | 1.04 | 92.31 | 4.40 | 93.48 | 4.35 | 80.68 | 7.95 |
| Stąpnica | 97.87 | 0.00 | 95.92 | 2.04 | 87.88 | 3.03 | 93.94 | 0.00 | 95.92 | 2.04 | 97.78 | 0.00 | 90.24 | 0.00 | 95.74 | 2.13 | 84.62 | 7.69 |
| Strawczyn | 94.12 | 3.53 | 92.86 | 3.57 | 82.54 | 6.35 | 95.95 | 2.70 | 97.73 | 0.00 | 95.24 | 2.38 | 90.54 | 6.76 | 94.87 | 2.56 | 73.24 | 14.08 |
| Szydłów | 89.53 | 3.49 | 85.19 | 4.94 | 80.00 | 4.00 | 89.61 | 1.30 | 89.02 | 1.22 | 90.80 | 2.30 | 87.80 | 3.66 | 92.59 | 1.23 | 86.08 | 6.33 |
| Tuczepy | 80.00 | 5.45 | 85.45 | 3.64 | 77.27 | 2.27 | 63.04 | 10.87 | 80.00 | 5.45 | 78.43 | 3.92 | 74.47 | 2.13 | 82.35 | 5.88 | 74.07 | 11.11 |
| Wiślica | 96.59 | 1.14 | 97.56 | 0.00 | 90.41 | 0.00 | 96.10 | 0.00 | 96.55 | 0.00 | 96.43 | 0.00 | 94.19 | 1.16 | 95.18 | 1.20 | 88.89 | 4.94 |
| Wodzisław | 78.95 | 4.21 | 76.60 | 3.19 | 53.93 | 13.48 | 69.66 | 7.87 | 77.08 | 2.08 | 75.53 | 4.26 | 72.34 | 6.38 | 77.17 | 2.17 | 66.30 | 9.78 |
| Zagnańsk | 92.47 | 4.30 | 92.00 | 5.00 | 84.15 | 8.54 | 87.50 | 3.41 | 93.48 | 3.26 | 91.30 | 5.43 | 88.42 | 6.32 | 85.57 | 5.15 | 79.78 | 8.99 |
| Złota | 98.00 | 2.00 | 98.02 | 0.00 | 86.36 | 3.41 | 95.70 | 2.15 | 95.79 | 0.00 | 96.94 | 3.06 | 96.81 | 0.00 | 96.91 | 2.06 | 87.88 | 7.07 |

Source: (23).

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Potential of applying databases in the planning process of sustainable development

Key words: database, region, sustainable development, strategy

Summary: This work presents an original and previously unpublished analysis of database use in the process of sustainable development planning. Planning of sustainable development is conditioned by external and internal factors. The basis for such planning is the spatial research, which can distinguish groups of similar units and value their stage of development.

This work shows several suggestions for database employment in sustainable development planning. It has been suggested to employ the databases in the consecutive stages of the sustainable development planning in sample strategic documents of several authors. In the present conditions, the main problem for the correct usage of the resources and their protection is the lack of identification of the problems, especially the social and economic ones, and the natural valuation which could be made more efficient with the help of a database. Creation of information or conveying the information and later applying the gathered information will be a favourable factor in a wider employment of databases in different domains of life, especially in planning of sustainable development.

1. Introduction

Creating databases constitutes a significant element of introducing subsequent stages of eco-development into real life, particularly on a local level. Circumstances in which units and organisations gather information and knowledge have been researched to a small degree (1). What is significant in the process of acquiring knowledge and information is verification thereof, including possible, if existing, data. Cre-

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ating each database should be carried out on the basis of a defined procedure, which should also verify the information contained therein.

At the same time, such research requires applying a concrete model. At present, it is assumed that what constitutes such a model is an interactive model, which favours innovation in economy (2). In this model, basic processes may influence one another and different participants contribute to those interactions (1). A significant feature of this model is dynamism as well as inter-relations between elements of the system occurring in this model (3). From the point of view of eco-development, any research in this scope is to be based on the dynamic nature of development, reversible relations, and interdependencies (4).

The aim of this article is to present the potential of applying databases in the planning process of sustainable development.

2. The range and methods of the research

A descriptive and analytic method has been applied in the paper.

A descriptive method was applied as an initial tool. It was based on isolating a certain phenomenon out of the already known entirety, describing this phenomenon, comparing thereof to similar phenomena, distinguishing common and separate factors.

The reality has been presented, features and tasks pertaining to the subject of the research have been compared. The results of the research carried out have been presented in a tabular system.

3. Planning eco-development on the local level

A strategy, as a management tool, enables us to work efficiently and to select appropriate solutions and directions of actions. Working out a strategy of commune development requires an active participation by involving commune authorities, its administration, external experts, representatives of local communities as well as district (*powiat*) and voivodeship government and also the voivode (5).

Communes may, and even are obliged to, prepare and accomplish strategic plans on their own as well as search for the most efficient strategies of local development (6). A strategy of local development embraces certain purposes and a general way of acting of a subject within the scope of the most significant and crucial decisions concerning the future of a given area. The basis of strategy efficiency is accepting it by the society, which can be achieved through involving the local community in the process of strategy building, especially local authorities as well as opinion-forming circles. During the preparation of the strategy one has to take into consideration both specific internal conditions as well as realistic possibilities of encouraging local

initiatives and external conditions. The internal factors embrace: natural conditions, commune resources, the level of infrastructure as well as the labour market, while the external ones include: national strategy and development policy, social and ecological policy and the legal system. The strategy of local development embraces certain purposes and a general way a subject is to act within the scope of the most significant and crucial decisions concerning the future of a given area.

During the preparation of a commune strategy one should take into account not only opinions of the commune inhabitants and concrete assistance of the outside environment, most frequently consulting companies, but also scientific authorities. The strategy of commune development should be quite stable, independent of personal changes in commune authorities, but it should also be flexible in terms of changing social and economic conditions. (7).

The reference literature on planning development is very extensive. One of the basic rules is the periodicity and the repeatability of planning. The very fact of periodicity is not a problem in the traditional methods of regional and local planning (analysis-evaluation-synthesis), but it already exists in the ideal pattern method (synthesis-analysis-evaluation), which is very often used for the protected areas. This problem arises because of the quality changes; the traditional method is based on the diagnosis of the existing state, while the method of the ideal pattern is based on the construction of the desired picture of reality, which could exist in an ideal situation, that is without internal and external limitations. Tadeusz Kudłacz (8) proposes both methods to be used simultaneously in the regional and local development planning. The ideal pattern method should be used for the qualitatively new processes (e.g. sustained development), without a continuation resulting from the up-to-date state and conditions, while the traditional one for the continuation of the existing development of a unit with the annihilation of barriers and threats. A new qualitative phenomenon is also the participation of local environments.

The methodical standards of the preparation of strategy are commonly known in the traditional method, and the example can be the proposition from Figure 1, where the employment of databases in this process proposed by the authors has been included. The problem of preparing a strategy based on the method of the ideal pattern is still in the research phase, but the framework already exists. The problem in this method, often proposed within the range of sustained development, is the issue of *ideal pattern*, or else, the lack of practical interpretation based on concrete models and indicator frames, as well as the tools for their realisation, with a far-fetched postulation and varied interpretation of this concept (9).

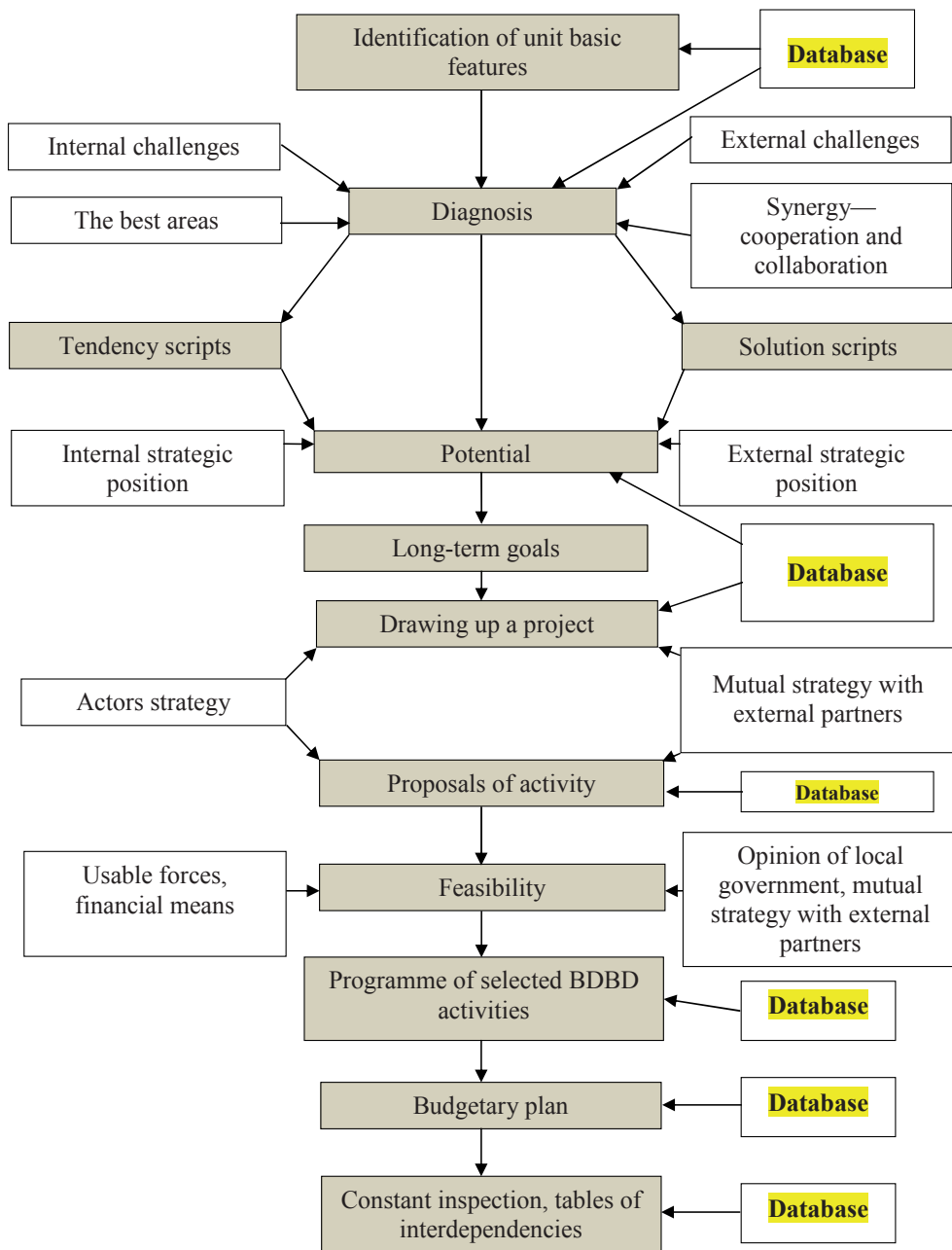


Figure 1. Planning strategy with the use of database

Source: authors' own study with suggestions of (12).

In the process of planning development, what is taken into account at present is a significant participation of local environments, with the involvement of the most significant representatives of this community. Within partnership planning (with the participation of inhabitants) in the form of workshops the following items have been accepted (Figure 2) successively as a result of consensus (10):

- a report on the eco-development state;
- a mission and vision of the eco-development;
- a structure of goals with the main goal of the eco-development (strategic plan);
- a plan of tasks/ activities (operational plan);
- a management system of strategy realisation.

According to the guideline of Agenda 21, the eco-development strategy is based on a socialised communication plan, which has been recognised as a key tool in the development of local democracy. A standard in the strategy on the local level is building the capacity of self-governments for partnership, as well as creating solid bases for social communication in the process of creation, verification, and realisation of a vision of development, which is to be achieved by two social pillars:

- building a strategy in a process of partnership planning;
- building institutional foundations for social monitoring in the eco-development strategy realisation (10).

The basis for socialising the process of strategy building and strategy realisation is creating partner understanding, not infrequently with the help of: conducting questionnaires among inhabitants, social consultations, as well as collecting opinions on a given subject. The aim of socialising the process of strategy building and of monitoring its realisation is to take inhabitants' opinions and ideas for the development into consideration. The involvement of inhabitants into the process of planning and acting for the benefit of local development is significant in terms of its effects, since only then the inhabitants identify themselves with those activities. Conducting partnership planning requires creating databases, which are employed for monitoring a process of achieving goals (4).

According to a procedure proposed by Krystyna Dubel (11) and commonly accepted in the process of environment management in a commune, the following proceedings in eco-development planning on the local level (Figure 3) are adopted:

1. Analysing environment, economic and social conditions of commune development.
2. Conducting inventory of wildlife habitat in a commune.
3. Creating wildlife habitat monograph of a commune and its facilities.
4. Conducting demographic, social and economic valuation.
5. Defining a vision and working out a strategy of commune development.
6. Creating a programme of eco-development of a commune, which is influenced by investment and modernisation projects, as well as conservation projects of nature and landscape protection.

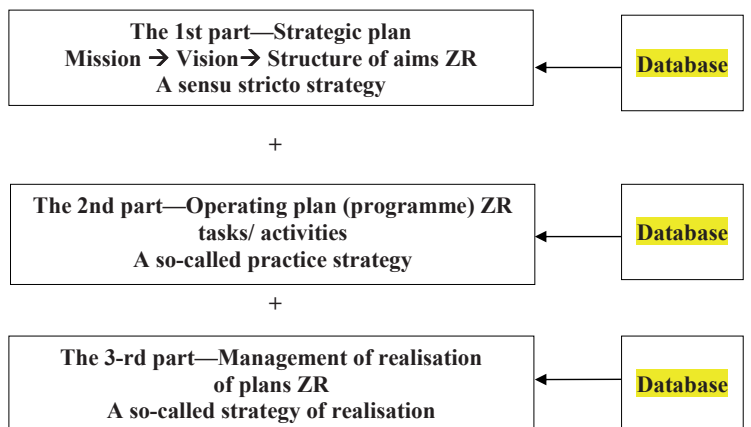


Figure 2. Range of strategy in local planning of sustainable development using of database

Source: authors' own study with suggestions of (10).

7. Creating a study of conditions and directions of space planning of a commune.

8. Introducing a system of space and environment management in a commune.

In at least six of the mentioned stages, there is a necessity of creating databases for the realisation of commune development in accordance with the eco-development conception.

At present this problem has and is going to have more significant meaning, namely participation of local communities in creating their own development. Creating databases constitutes a significant element of introducing subsequent stages of eco-development into real life, particularly on a local level. The most significant in the process of acquiring knowledge and information is verification thereof, including possible, if existing, data. Creating each database should be carried out on the basis of a defined procedure, which should also verify information contained therein.

The authors indicated the basis of eco-development in accordance with the recommendation of Agenda 21, i.e. being based on the social communication process, regarded as a key tool of the development of local democracy.

This will be an especially important element in implementing eco-development in situations involving conflicts, where different groups will represent different approach to the same issue.

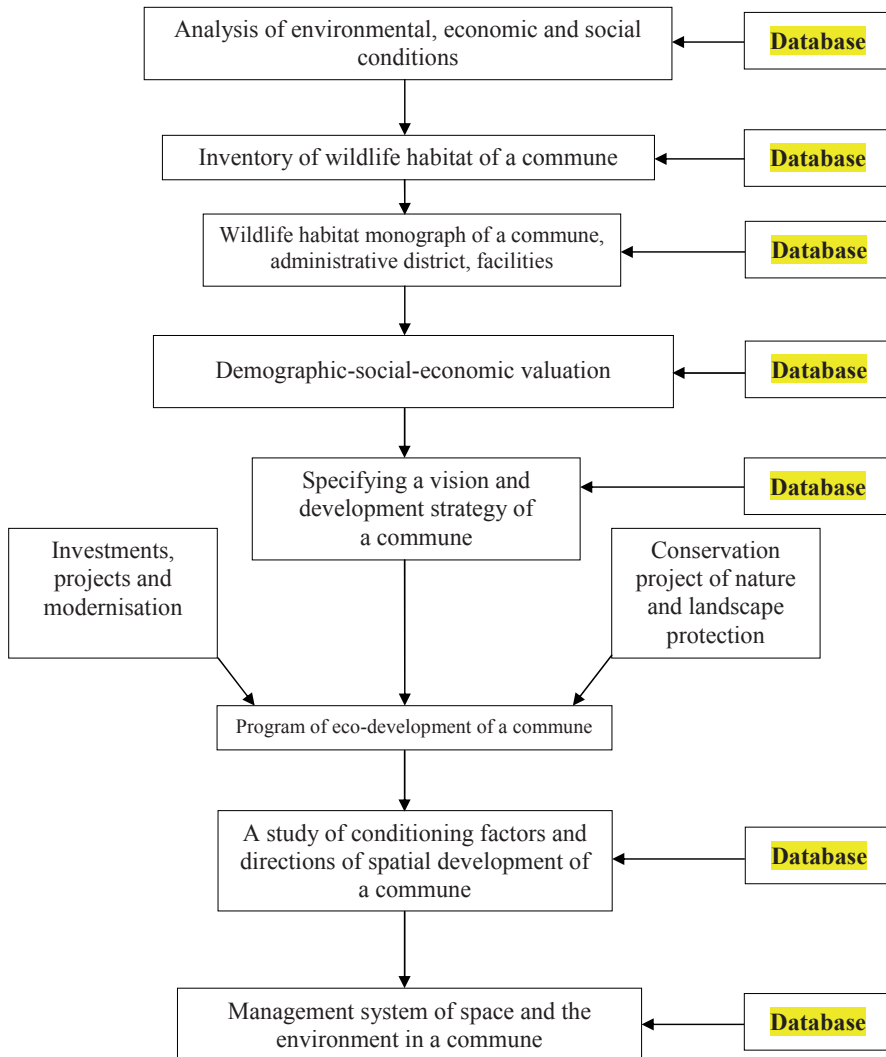


Figure 3. Selected process of environmental management instruction using of database

Source: authors' own study with suggestions of (11).

4. Conclusion

The proposed employment of databases consecutive stages of sustainable development planning, with participation of the inhabitants and based on their opinions, is an element of a broader research problem. In the present conditions, the lack of

problem identification, especially social and economic ones, as well as the natural valuation is the main problem of the correct usage of the resources and their protection. The total lack of the communities' participation in the realisation of sustainable development will require a thorough change of the orientation of all the parties involved. This problem already has and will continue to have a growing importance, because it will no longer be possible to prevent the participation of local communities from creation of their own development. Undoubtedly, one of the instruments used for the realisation of the sustainable development idea will be the employment of databases on a broader scale.

On the basis of the conducted analysis of the databases employment potential, the following suggestions can be presented:

- in the majority of the recommended procedures, there is a potential for database employment;
- at many stages of these procedures, the database employment seems more a necessity than a suggestion;
- the kinds of those databases should be based on the interactive model;
- in the interactive model, the basic processes may influence one another, and the various participants may contribute to those interactions. It is characterised by the dynamism together with its interdependences occurring between the elements of the system (3).

From the point of view of the sustainable development, the basis of all research in this field is accepting as the base the dynamic character of development, the reversible relations and interdependencies, as well as monitoring the processes. The creation of knowledge, or conveying thereof and then the employment of knowledge will favour the wider use of databases in various branches of life, especially in the sustainable development planning.

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Możliwości wykorzystania baz danych w procesie planowania zrównoważonego rozwoju

Streszczenie: W pracy przedstawiono oryginalną i wcześniej niepublikowaną analizę wykorzystania baz danych w procesie planowania zrównoważonego rozwoju. Planowanie zrównoważonego rozwoju uwarunkowane jest czynnikami zewnętrznymi i wewnętrznymi. Podstawą takiego planowania są badania przestrzenne, które mogą wyodrębnić grupy jednostek podobnych oraz zwaloryzować stan ich rozwoju.

Opracowanie prezentuje propozycje wykorzystania baz danych w planowaniu zrównoważonego rozwoju. Zaproponowano wykorzystanie baz danych w kolejnych etapach planowania zrównoważonego rozwoju w przykładowych dokumentach strategicznych kilku autorów. W obecnych warunkach brak identyfikacji problemów, zwłaszcza społecznych i gospodarczych, oraz waloryzacji przyrodniczej, które można byłoby usprawnić za pomocą baz danych, jest głównym problemem właściwego wykorzystania zasobów i ich ochrony. Tworzenie wiedzy – czy przekazywanie wiedzy, a później jej zastosowanie – będzie sprzyjało w szerszym zastosowaniu baz danych w różnych dziedzinach życia, a zwłaszcza w planowaniu zrównoważonego rozwoju.

Słowa kluczowe: baza danych, region, zrównoważony rozwój, strategia

DANIEL PUCIATO*

Selected aspects of the body culture in hotel enterprises

Key words: cultural aspects, organisation, tourism, hotel enterprise, Opole Voivodeship

S u m m a r y: Organisational culture is one of the most important aspects of management in modern enterprises, related especially strongly with the strategy of the organisation and its human resources. The issues of organisational culture seem to be of special importance in reference to tourist enterprises, including hotel ones. Tourism is related to spatial mobility of people which is due to voluntary change of the place of stay. A major part of tourist traffic is also of international nature and applies to tourists moving to the countries which are not their countries of residence. Thus, intending to meet the needs of tourists from various countries, hotel enterprises must take the cultural aspect into consideration. Therefore, their organisational culture must be based on such values as tolerance, hospitality, flexibility, innovativeness or the skill of combining tradition with modernity.

The objective of the paper was to characterise selected aspects of organisational culture in hotel enterprises in the Opole Voivodeship. The analysis covered 20 hotel enterprises. Empirical material was collected with diagnostic survey with a questionnaire of organisational culture by Lidia Zbiegień-Maciąg as the research tool. The results of the research were used to determine the average profile of organisational standards in hotel enterprises. The respondents best valued creation of relations with clients by the enterprises and innovative nature of the offered tourist products. In the respondents' opinion, much attention is also paid to the quality of the offered products and good interpersonal relations within the enterprise. Viewing the research results in the light of the Harrison typology, the organisational culture of the analysed hotel enterprises is based on tasks and people. In the time of progressing globalisation and internationalisation of many national economies, the shaping of the proper organisational culture may be expected to be one of more important objectives in modern hotel enterprises in the future.

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1. Introduction

Organisational culture is one of the most important aspects of management in modern enterprises, related especially strongly with the strategy of the organisation and its human resources. The research of empirical results indicates (1, p. 42) that the enterprises which are successful in the market allocate more time for briefing new employees with the secrets of their cultures. According to Agnieszka Sitko-Lutek (2, p. 50), organisational culture may be viewed from both microperspective (identified with the system of management in the enterprise), and macroperspective (related to the effect on organisational culture of the enterprise in the national and social context). The issues of organisational culture seem to be of special importance in reference to tourist enterprises, including hotel ones. Tourism is related to both spatial mobility of people which is due to voluntary change of the place of stay. A major part of tourist traffic is also of international nature and applies to tourists moving to the countries which are not their countries of residence. Thus, intending to meet the needs of consumers (tourists) from various countries, hotel enterprises must take the cultural aspect into consideration. Therefore, their organisational culture must be based on such values as tolerance, hospitality, flexibility, innovativeness, or the skill of combining tradition with modern approach.

In the context of the above, the objective of the paper is to characterise selected aspects of organisational culture in hotel enterprises in the Opole Voivodeship.

2. Organisational culture

Management practitioners and theorists perceive organisational culture as a “soul” of the enterprise that is a “live” part of every organisation, and all the activities as well as initiatives undertaken in the company pass through that soul. Organisational culture is also an axiological system of organisation which emphasises its individuality and originality, yet differentiates it from other entities in its surroundings. Many theories surfaced within the recent years which attempt to define the “organisational culture” term. Undoubtedly, the most popular of these definitions is the one proposed by Edgar Schein (3, p. 12) who defined “a pattern of the shared basic premises, learned by a group during solving of the problems of its external adaptation and internal integration, working well enough to be considered valuable, thus instilled with the new members as the proper method of perceiving, thinking and feeling in reference to these problems.” Organisational culture is thus a certain system made up of different elements with various relationships possible between them. The components of organisational culture may be broken down into three groups according to Sikorski (4, p. 25): thought patterns, behaviour patterns and symbols. With thought patterns, members of the organisation have assessment criteria for various phenomena

and situations. Behaviour patterns provide the appropriate forms of reaction to these phenomena and situations, and symbols allow spreading and grounding thought and behaviour patterns within the members of the group. Organisational culture grows sequentially, which results in the consecutive stages: forming, developing, functioning and maturity (5, p. 37). In the forming stage, the role of the leader is decisive, as members of the organisation follow him. Its borderlines are still quite liquid, the fight for influence continues, members strive to gain acceptance for their attitudes, and the group is looking for its identity. At the developing stage, mostly the items which are binding the members of the group are sought and this binding force is exposed. The differences between the members of the group are not subject to strict judgement yet. In the stage of functioning, the organisational culture is already established. The focus is here on observing its standards and behaviour patterns. Maturity of organisational culture is related to its complete stabilisation and concentration on maintaining the organisation. Thus reluctance to new ideas and the resulting differences in opinions and behaviour come up.

Culture is of major importance for both the interior of the body and its environment as it has certain functions in every one of these areas, which may be divided into internal and external (6, pp. 23–30; 1, pp. 33–37). The following may be found within the internal functions of the body culture: integrative, learning and information, and adaptive. The body culture integrates the members of the body, generates in them the feeling of safety and stability, and participates in building the identity of the entire the body. One of important functions of the body culture is also its delivery of knowledge. People who stay together share their knowledge, experience and skills. Organisational culture also provides new adopted methods of coping in life, thus helping reduce uncertainty. External functions of organisational culture consist in the effect of internal arrangements on external contacts (e.g. with the mission and strategic objectives of the organisation) and in the effect of the environmental factors (e.g. with the organisation joining various other organisations).

One of the most known typologies of organisational culture is the one formulated by Roger Harrison (7, pp. 122–126), the basis of which is juxtaposing such terms as individuality and collectivism and enforcing external control and internal control. The author selected the types of organisational culture focused on:

1. Power—the culture typical of organisations which are competitive and uncompromising and strive to dominate their surroundings. Employees strongly compete with each other and managers treat them like objects.
2. Role—the culture characteristic of bureaucratic organisations in which lawfulness of action and the feeling of responsibility are important. The scopes of duties and rights are precisely defined and depend on the work post occupied. Predictability of human behaviour is high, and the highest value is stability of activity and its compliance with the regulations in force.
3. Tasks—this type of culture is in flexible organisations focused on a fast reaction to changes in the surroundings. The predominant feature in human rela-

tionships is in this case the capacity to achieve the objectives of the organisation under changing conditions of the surroundings.

4. People—the culture typical of organisations focused on meeting needs of its members. The distance of the authority is small, and making decisions is based on social consensus. Interpersonal relationships are based on cooperation, mutual support and sharing experience. Fixed behaviour patterns and customs are the basis for formal rules.

3. Hotel enterprise as an entity in the tourist market

The tourist market may be analysed in two ways: objective and subjective (8, pp. 67–68). The objective approach refers to the process of defining the subject matter and conditions for the transaction of purchase and sale of tourist products executed by the entities in the tourist market. The subjective approach treats the tourist market as a sum of entities in this market, and these include: producers of tourist products (tourist enterprises), buyers of tourist products (individual and institutional customers) and institutions and organisations which execute tasks related to state interventionism in tourist economy (the subjects of tourist policy). Considering the added value generated to the tourist economy by the hotel industry, as well as the place of hotel services in the tourist chain of values, hotel enterprises are the most important group of tourist enterprises. They may be defined as a system made up of both resources (human, information, capital and financial) and processes which occur between particular resources and inside these resources. The subject matter of the operation of this system is managing business activities in an organised and continuous way, the activities which consist in generating hotel products, and the most important its objective is maximising economic benefits of the owners. The hotel product is a combination of all values which hotel enterprises offer to their buyers, which is composed of both material and intangible components (9, p. 73). The material elements include: goods acquired by hotel guests (e.g. a meal in the hotel restaurant, cleaning agents in the bathroom, notepads, pens or advertising brochures in the room), goods without which the service could not be provided (the hotel facility, elements of equipment or hotel interior design) and goods which are the material basis for the services provided (gastronomy equipment, computer hardware, ATMs). The dominant intangible items of a hotel product include, for example: safety of guests and of the goods brought in by them, hospitality, the proper atmosphere, providing information or making bookings.

Hotel enterprises are varied in many respects and are continuously undergoing changes under effect of many factors of internal and external nature. The most important of these factors, according to Daria Jaremen and Aleksander Panasiuk (9, pp. 52–53), are: the economic system, the degree of market balancing, the level of development of the economy, intensity of competition, business legislation (including related

to tourism), the degree of openness of the economy, valours of nature, culture and the condition of tourist development and the resulting tourist attractiveness of the area, the culture and traditions in the area of providing hotel services, the volume and time and space structure of demand and competencies of tourist entrepreneurs. The numerous set of hotel enterprises may be classified based on various criteria, the most popular of which are: the organisational and legal form, the size and type of the conducted business operations. Considering the organisational and legal form, hotel enterprises may be divided into: individual ownership companies, civil law partnerships and commercial companies, cooperatives and, to a small degree, state-owned enterprises. With the classification of hotel enterprises based on the size criterion, both number aspects (e.g. the number of employees, size of the annual net income, total balance sheet assets, the number of rooms and beds) and quality aspects (e.g. the domination of the owner in a company, operation in a market relatively close geographically or psychologically, or the degree of formalisation of the organisational structure) may be taken into account. The most often found division of hotel enterprises is the classification formulated by Zenon Bładek (10, p. 95). The author assumes the number of rooms as the size criterion. According to him, small hotels are those with up to 100 rooms, medium-size are those with 101 to 350 rooms, and large hotels have more than 350 rooms. The most common criterion in the hotel enterprises typology is, however, the type of the conducted hotel operations. According to the tourist industry legislation in Poland, the hotel enterprises may be divided into: hotels, motels, boarding houses, hostels, youth hostels, tourist houses, caravan sites, camping sites, and other facilities which provide hotel services. Table 1 presents synthetic characteristics of individual types of hotel enterprises.

Table 1

Characteristics of individual types of hotel enterprises

| Name of hotel enterprise | Characteristics of hotel enterprise |
|--------------------------|---|
| Hotel | Facilities with at least 10 rooms, including most of the beds in single and double rooms, providing a wide range of services related to the customers' stay |
| Motel | Facilities located close to roads, with parking lots, with at least 10 rooms, with most of them in single and double rooms |
| Boarding house | Facilities with at least 7 rooms, providing all-day feeding for its clients |
| Hostel | Facilities located outside of developed areas, close to tourist trails, providing the minimum range of services related to stay of clients |
| Youth hostel | Facilities allocated for individual and group youth tourism, appropriate for self-service clients |
| Tourist houses | Facilities with at least 30 beds, appropriate for self-service clients and providing the minimum range of services related to stay of clients |

| | |
|---|---|
| Caravan site | Guarded facilities for night accommodation in tents, caravans and trailers, preparing meals, parking cars, as well as providing services related to stay of clients. These facilities may additionally enable night accommodation in tourist houses or other permanent facilities |
| Camping site | Unguarded facilities allowing night accommodation in tents |
| Other facilities providing hotel services | Facilities which meet the requirements for size, equipment and range of services provided and sanitary, fire fighting requirements and other specified in separate regulations |

Source: author's own study based on: the Act of 29 August 1997 on tourist services, Dz. U. 1997, no. 133, Item 884, as amended.

4. Characteristic of the selected aspects of organisational culture in hotel enterprises in the Opole Voivodeship

Empirical material in the paper comes from the data obtained as a result of research conducted in hotel enterprises in the Opole region in February 2011. The analysis covered 20 enterprises, including 17 hotels and 3 boarding houses. Nine of the analysed hotel enterprises were located in the countryside, five in the cities of 20,000–100,000 residents, five in the cities of 100,000–200,000 residents, and one in the city of less than 20,000 residents. The largest number of companies in the discussed group were microbusinesses (8) and small businesses (7). Four of them were medium-size and one was a large business. The most frequent legal and organisational form of the businesses was a privately-owned enterprise (15), with two registered partnerships, one civil law partnership, one limited liability company and one joint stock company (Table 2).

Table 2

Characteristics of the analysed hotel enterprises

| Description | Number | Percentage (%) |
|---------------------|-----------|----------------|
| Type | | |
| Hotel | 17 | 85.00 |
| Boarding house | 3 | 15.00 |
| Total | 20 | 100.00 |
| Location | | |
| Countryside | 9 | 45.00 |
| <20,000 city | 1 | 5.00 |
| 20,000–100,000 city | 5 | 25.00 |
| 20,000–100,000 city | 5 | 25.00 |
| Total | 20 | 100.00 |
| Size | | |
| Micro | 8 | 40.00 |
| Small | 7 | 35.00 |

| | | |
|-------------------------------|-----------|---------------|
| Medium-size | 4 | 20.00 |
| Large | 1 | 5.00 |
| Total | 20 | 100.00 |
| Organisational and legal form | | |
| Private ownership individual | 15 | 75.00 |
| Civil law partnership | 1 | 5.00 |
| General partnership | 2 | 10.00 |
| Limited liability company | 1 | 5.00 |
| Joint stock company | 1 | 5.00 |
| Total | 20 | 100.00 |

Source: author's own study.

The diagnostic survey with a questionnaire of organisational culture by Zbiegień-Maciąg as the research tool was used in collecting empirical material. The auditorial questionnaire was used, whose feature is that the pollster is in continuous contact with the respondents during filling in the questionnaires and explains to them all ambiguities and helps in filling in the questionnaire on the ongoing basis. The organisational standards questionnaire proposed by Zbiegień-Maciąg (1, p. 266) was used in the work. Five respondents were questioned in each of the analysed companies: the owner, the manager and three employees. On the basis of the obtained results from the conducted research and in accordance with the methodology suggested by the author of the questionnaire, the average profile of the organisational standards in the researched hotel enterprises was drawn.

Among the analysed hotel enterprises, none of the aspects of organisational culture taken into account was assessed definitely negative by the respondents. The respondents best assessed the activities related to building good relationships of the companies with their clients and the degree of innovativeness of the tourist products offered by them. The results of empirical research (11, pp. 76–79) confirm the noticed trend and indicate that instruments of relationship marketing are more and more often used in hotel enterprises. High competition in the tourist market forces on the entities providing services offering innovative hotel products which can satisfy more and more refined needs of the buyers. The thesis is confirmed also with the fact that the analysed hotel enterprises paid much attention to high quality of the offered products. The proper interpersonal relationships in the hotel enterprise were also very important, as the respondents positively assessed such aspects of its functioning as team work, friendly relationships with colleagues, openness of the organisation to the surroundings and development of human resources executed mostly with training events. The respondents assessed worst such aspects of the organisational culture as pride with the organisation, leadership and effectiveness (Table 3). Viewing the obtained empirical results in the context of the typology of organisational culture by Harrison (7, pp. 122–126), similarities may be found in the analysed hotel enterprises to the culture focused on tasks and persons. These enterprises are flexibly adjusting

to changes in the surroundings, paying much attention to quality and innovativeness of their products and to proper and continued relationships with clients. Human resources are highly significant for the analysed hotel enterprises. Warm relationships, camaraderie and team work skills are of special value. The owners also highly value the development of their employees, offering them various training events, which undoubtedly translates into quality and competitiveness of the offered hotel products.

Table 3

Profile of organisational standards in the researched hotel enterprises

| Aspects of organisational culture | -100 | -75 | -50 | -25 | 0 | 25 | 50 | 75 | 100 |
|-----------------------------------|------|-----|-----|-----|---|----|----|----|-----|
| Organisation (personal pride) | | | | | X | | | | |
| Execution (quality) | | | | | | X | | | |
| Team work (communication) | | | | | | X | | | |
| Leadership (supervision) | | | | | X | | | | |
| Benefits (effectiveness) | | | | | X | | | | |
| Colleagues (camaraderie) | | | | | | X | | | |
| Relationships company–client | | | | | | | X | | |
| Innovativeness (creativity) | | | | | | | X | | |
| Training (development) | | | | | | X | | | |
| Openness | | | | | | X | | | |

Source: author's own research.

5. Conclusion

In the time of progressing globalisation and internationalisation of many national economies, dynamic technological progress and increasing competition in the world tourists markets, the shaping of the proper organisational culture may be expected to be one of more important objectives in modern hotel enterprises. Shaping organisational standards focused on the development of human resources, as well as on increasing innovativeness and improving quality of the offered products, will translate into the level of competitiveness of hotel enterprises. Combined with high flexibility of organisational structures and striving to satisfy more and more refined needs of the

buyers may be the condition of survival and growth of hotel enterprises, which will in consequence contribute to creating new value for their stakeholders.

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Wybrane aspekty kultury organizacyjnej przedsiębiorstw hotelarskich

Streszczenie: Kultura organizacyjna to jeden z najważniejszych aspektów zarządzania współczesnymi przedsiębiorstwami, związany szczególnie mocno ze strategią organizacji oraz z jej zasobami ludzkimi. Problematyka kultury organizacyjnej wydaje się szczególnie ważna w odniesieniu do przedsiębiorstw turystycznych, w tym hotelarskich. Turystyka wiąże się bowiem z przestrzenną ruchliwością ludzi, związaną z dobrowolną zmianą miejsca pobytu. Znacząca część ruchu turystycznego ma także charakter międzynarodowy i dotyczy przemieszczania się turystów do krajów niebędących ich krajami zamieszkania. Chcąc zatem zaspokoić potrzeby turystów z różnych krajów, przedsiębiorstwa hotelarskie muszą brać pod uwagę aspekt kulturowy. Ich kultura organizacyjna musi być oparta na takich wartościach jak: tolerancja, gościnność, elastyczność, innowacyjność czy umiejętność połączenia tradycji z nowoczesnością.

Celem pracy jest charakterystyka wybranych aspektów kultury organizacyjnej przedsiębiorstw hotelarskich z województwa opolskiego. Analizie poddano 20 firm hotelarskich. Zbierając materiał empiryczny, zastosowano metodę sondażu diagnostycznego, w której narzędziem badawczym był kwestionariusz ankiety kultury organizacyjnej autorstwa Lidii Zbiegień-Maciąg. Na podstawie uzyskanych wyników badań wykreślono średni profil norm organizacyjnych przedsiębiorstw hotelarskich. Ankietowani najlepiej ocenili tworzenie relacji przedsiębiorstwa z klien-

tami oraz innowacyjność oferowanych produktów turystycznych. Zdaniem respondentów dużą wagę przywiązuje się również do jakości oferowanych produktów oraz do dobrych stosunków interpersonalnych w samym przedsiębiorstwie. Rozpatrując wyniki badań w świetle typologii Harrisona, kultura organizacyjna analizowanych przedsiębiorstw hotelarskich ma charakter zadaniowy i osobowy. W dobie postępującej globalizacji i internacjonalizacji wielu gospodarek narodowych należy się spodziewać, że ukształtowanie odpowiedniej kultury organizacyjnej będzie w przyszłości jednym z ważniejszych celów współczesnych przedsiębiorstw hotelarskich.

Sł o w a k l u c z o w e: aspekty kulturowe, organizacja, turystyka, przedsiębiorstwo hotelarskie, województwo opolskie

LESZEK RUDNICKI*

Behaviour patterns in buyers as a premise for creating communication strategy between the company and the market

Key words: consumer, communication, advertising, market, strategy, social and cultural factors, internal factors, consumer's behaviour patterns

Summary: The consumer is in the centre of interest in the market economy. Success of the company producing and selling products depends on his/ her market decisions. Knowledge of consumer's behaviour patterns and factors which shape him/ her constitutes the basis for formulating the company's marketing strategy.

The paper addresses significance of having information about consumer's behaviour patterns for creating the marketing strategy of the company. It indicates the role of social and cultural factors in defining the promotion strategy. Their effect on the concept of the message, and the selection and role of various types of media in its execution is highly significant. The paper discusses, in particular, the effect of education of the society on the type and on the scope of application of advertising messages. The importance of colour or graphic symbols in perception of the message and success of the advertising campaign is discussed. Interaction of reference groups and opinion leaders is an important factor affecting consumer behaviour patterns, taken into account in designing promotional actions, especially in the field of advertising. The paper emphasises major significance of the effect of these factors on purchase of a product in the communication policy.

The paper also describes psychological factors which shape consumer's behaviour patterns and their effect on the strategy of communication between the company and the market. It indicates usefulness of information about motivation in consumers in designing the communication message by the company. Knowledge of their nature allows selection of the appropriate instruments which stimulate purchase of the product. Attention has also been paid to the mechanisms of consumers' perception of advertising messages and their features recommended to make it attract their attention. The paper discusses the effect of learning on consumer's behaviour patterns and the role of this factor in the communication process. It also discusses the role of attitude and personality in developing consumers' behaviour patterns and usefulness of information about at-

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titudes and personalities of prospective buyers in preparation of the contents of communication messages. The paper indicates also usefulness of information about lifestyles in building communication strategy, mostly in designing advertising messages.

1. Introduction

Knowledge of consumers, their needs, the mechanisms behind market decisions, and behaviour patterns is the basis for activities of the company in the market economy. Consumers, with their purchases, decide about success or failure of the company. From the point of view of the company, consumers are the main source of uncertainty, therefore their behaviour patterns require systematic research (1, p. 256). The research provides the basic premises for formulating the marketing strategy of the companies. Companies, intending to formulate marketing strategy so that it results in the appropriate outcome in the form sought of the expected behaviour patterns of the consumers, must be aware of the factors which shape them and of the degree and nature of the changes in behaviour under specific changes in these factors. A general relation between knowledge of consumers' behaviour patterns and marketing strategy of companies is presented in Figure 1. Without knowledge of these issues, formulating marketing strategy is basically impossible.

2. Information about consumer's behaviour patterns in creating the marketing strategy

The need of information about the consumer and his/ her behaviour patterns in developing marketing strategy applies to all stages of formulating this strategy. The reason is that it is used in selecting the target market segment, the product policy, the pricing policy, the distribution policy and the promotion policy.

Knowledge of principles of consumers' behaviour patterns in the market is necessary also for formulating communication strategy between the company and the market. Knowledge of internal as well as social and cultural conditions on which consumers' behaviour patterns depend is used especially broadly in formulating this strategy.

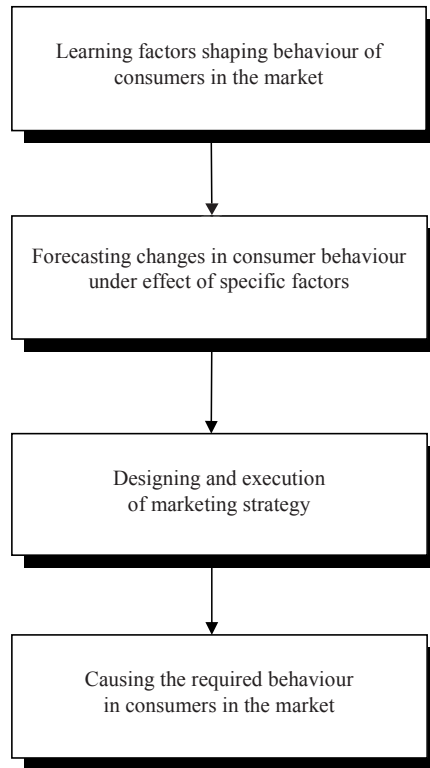


Figure 1. The relation between research in behaviour patterns in consumers and marketing strategy of companies

Source: author's own study.

3. Role of social and economic factors in building communication strategy

To formulate communication strategy of a company with the market, knowledge of social and cultural conditions for consumers' behaviour patterns is necessary. What values and forms of behaviour are accepted by consumers depends on their belonging to a specific culture or subculture. It has a major effect on the concept of the message, the selection and role of various types of media in its execution.

In American and European cultures, television is a very important, broadly used advertising medium which is less appreciated and used on a smaller scale in, for example, Islamic countries. The type of the used message is also highly dependent on the level of education of the society, and this applies in particular to the scope of

printed advertising. Advertising in the form of various types of publications, leaflets and flyers is addressed to social groups of higher level of education. On the other hand, external advertising proves better its grasp for groups of low level of education, e.g. posters. Extensive use of graphic symbols on packages is also recommended as much as it is possible.

Success of an advertising campaign depends also on the use of the proper colour or graphic symbol. For example, white in majority of countries expresses peace, innocence, and purity, but in Japan and Pakistan it stands for mourning. Green is associated with hope, youthfulness, but in Switzerland it means something unwanted, immature, and in Malaysia it is related to danger and death in the jungle. Thus, execution of products or packages in unwelcome colours causes their rejection by consumers. In this country, using green colour by a water sports company to identify its products would thus prove to be ineffective. The meaning of some colours in selected countries is given in Table 1.

Interaction of reference groups and opinion leaders is an important factor affecting consumer behaviour patterns, taken into account in designing promotional actions, especially in the field of advertising. Major significance for defining communication policy comes especially from determining the effect of these factors on purchase of a product. If the effect of a reference group or opinion leaders on consumer's behaviour patterns is clear, the advertising should present the purchase of the promoted product by persons from these groups. It is especially important in case of promotion of products related to ostentatious consumption. The reason is that purchase of these products, as the research shows, remains under strong effect of reference groups and opinion leaders.

4. Effect of psychological factors on designing communication strategy

How the signals will be received which are broadcast by a company in a promotional campaign depends on such factors as motivation, perception, learning, attitude, personality or lifestyle. These factors affect the form, contents and frequency of messages. They also affect the nature of arguments used in communication messages. They decide about size, colour and shape of the objects perceived.

4.1. Knowledge of consumers' motivation and designing communication strategy

In creating an advertising message for the given product, we should have information about motivations which induce consumers to make a purchase decision. Knowledge of the nature of the motivations underlying consumer's behaviour patterns allows designing the appropriate instruments stimulating to the purchase of a given

product. The nature of motivations indicates also their susceptibility to shaping by activities of the company.

Table 1

Colour geography

| Country | Colour | | | | | |
|-------------|--|-------------------------------------|--|------------------------------------|---|------------------------------|
| | Black | White | Red | Green | Blue | Yellow |
| Austria | Mourning | Innocence | Anger, love, passion, fire | Hope | Fidelity | Jealousy |
| Brasil | Mourning, death, secret | Peace, purity | Warmth, passion, hate, fire, anger, violence | Hope, freedom, immaturity, illness | Peace, coldness, indifference | Joy, sun, happiness, illness |
| Denmark | Mourning, worry | Innocence, purity | Love, danger, fire | Hope boredom, health | Quality | Danger, falseness, modesty |
| Finland | Worry, jealousy | Innocence, purity | Anger, love, passion, fire | Hope modesty | Coldness, without money, innocence | – |
| France | Worry, drunkenness, jealousy pessimism | Purity, youth | Anger, heat, pleasure, sobriety | Something young, fear | Anger, fear | Illness |
| Italy | Depression | Innocence, fear, failed love affair | Anger, danger, fire | Youth, lack of money, anger | Fear | Anger |
| Pakistan | Mourning, helplessness | Mourning, sobriety, elegance | Promise of marriage | Happiness, piety, eternal life | – | Virginity, weakness, anger |
| Portugal | Mourning, worry, hunger | Peace, innocence, purity | War, blood, passion, fire | Hope | Jealousy, difficulties, problems to be solved | Despair, plague |
| Sweden | Mourning, worry | Goodness | Anger, madness, fire | Inexperience, goodness | Recklessness, something frozen, cold | Without money |
| Switzerland | Pessimism, something illegal | Purity, innocence | Anger, fire | Something unwanted, immature | Madness, anger, love affairs | – |

Source: author's own study.

Thus, if the underlying reason for the consumer's behaviour pattern is his/ her own pleasure, which means that he/ she is internally motivated, it is difficult to change. If this is the case, the company must adjust the appropriate promotion strategy to them, and should strengthen it with the appropriate advertising message. It refers to the products acquired for hobby time and the products acquired with a strong

internal pursuit of a goal. However, if the consumer's behaviour pattern is motivated externally, e.g. it comes from the intention to win a prize, these motivations are more susceptible to be shaped by the market. Thus the consumer is more susceptible to advertising of products of competitive companies.

Breaking down the motifs into rational and emotional in planning a promotional campaign is also useful. The concept of the advertising message calling upon rational motifs requires displaying quality parameters of a product or economic benefits from the purchase. In the concept of advertising calling upon emotional motifs, coming from instincts or feelings, the company strives for attracting and keeping attention and generating positive feelings for the product.

4.2. Perception and communication process

Effective communication of a company with the buyers depends on perceiving advertising messages by them. The company, creating an advertising message, must take into account the fact that consumers cannot perceive all the stimuli addressed to them. The stimuli addressed to them are filtered, thus only some of them are perceived. Usually, attention of consumers is attracted by stimuli related to their unsatisfied needs, especially when these are current needs, as well as stimuli not fully unanimous, surprising and such which clearly differ from the ones received before, e.g. significant reductions in prices, advertisements which incite interest and are intriguing. Also, the stimuli which consumers expect are easier perceived.

Stimuli addressed to prospective buyers are often distorted. This is due to the fact that people are inclined to interpret information so that it is in line with their established opinions and beliefs.

Subjectivity and selectivity of perception makes attracting attention of prospective buyers very difficult. For a marketing offer to arouse interest of the consumer, it must be clearly distinguished from among other offers existing in the market. The message thus must be properly constructed and include elements which the consumers will accept. It follows from the research by Bogusław Kwarciak that the most important positive features of advertising for the average recipient are:

- elements of entertainment;
- understandable transmission of information important for the consumer;
- warm, sensual atmosphere giving the recipient good moods (2).

On the other hand, pieces of information which cause fear, anxiety, etc., are not welcome.

Apart from the content, physical features of the advertising message are also important in advertising, such as: size, colour, shape of the advertised objects, use of motion, contrast, etc. The proper shaping of these features may broaden the scope of perception of the consumer.

If advertisement does not result in a satisfactory consumer's reaction, the stimuli addressed to him may be enhanced. It may be achieved by increasing the frequency

of emission of the advertisement in television or radio, increasing intensity of sound, increasing dimensions of external advertisements or by introducing contrast with a different colour or typeface, etc.

Knowledge of sensitivity thresholds should be the basis for increasing intensity of advertising stimuli (3, 4, 5, 6), especially the upper threshold of perception whose exceeding causes lack of reaction or results in a typical reaction on a standard level. In accordance with the Weber-Fechner law, if the strength of the stimulus increases exponentially, the impression increases linearly (cf. 5, p. 326; 6, p. 61). It allows determination of the degree of enlarging a press advertisement to attract attention of recipients and of increasing intensity of voice in television or radio commercials to win a larger auditorium.

4.3. Importance of learning in designing communication strategy

Learning mechanisms form another factor significantly affecting the process of communication of the company with consumers. These mechanisms are expressed by relationships between stimuli which affect an individual and his/ her reactions to them. These reactions may occur immediately or after a time.

The process of learning and remembering a communication message depends on the nature of the acquired product and commitment of the consumer. In case of selectable products of high price, the process of active learning is occurring. Strong commitment of the consumer makes him/ her actively search for information and process it selectively. Advertisements placed in select media, providing the consumer with reasonable arguments for the promoted brand, are conducive for intentional memorising of the information. In case of frequently purchased articles of low price, the process of learning and memorising communication messages is rather passive. Advertising these products must be exceptionally attractive so as to attract attention of the consumer. Detailed argumentation is unnecessary in this case, and displaying the name of the brand and the related smart slogan will be sufficient. Advertisements should also cause pleasant associations with the brand in the consumer.

The relationship of the consumer to the product is shaped systematically throughout the process of making decisions by the consumer. It is illustrated in Figure 2.

In the first stage of the decision-making process, the objective of the promotional activities is to attract attention and cause interest in the product. These activities are to result in identification of the product by the consumer and his/ her becoming aware of its existence in the market. In the second stage of the decision-making process, free samples of the product are introduced. The objective is to encourage the consumer to test the product and get to know it. In this stage, slips allowing acquisition of a product at a very low price are used. In the next stage, the company affects the consumer with purchase of cost reduction tickets. The degree of this reduction is lower and lower, so that finally the consumer makes the decision to purchase the product without promotional support. In the process of affecting the consumer, he should better and better learn the features of the product.

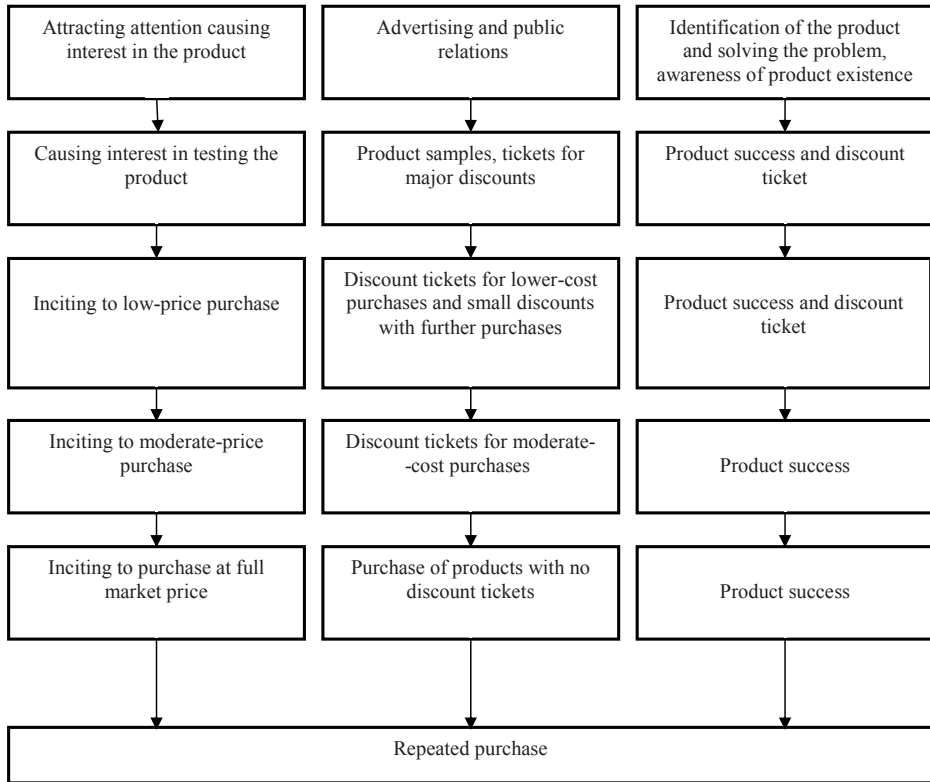


Figure 2. Staging intensity of promotional activities adjusted to the process of making decisions by the consumer

Source: (7, p. 263).

The product which gives the customer most satisfaction has chances to be bought again. According to the behaviourist theory of learning, satisfaction from the product is for the consumer a sort of reinforcement which stimulates repeated purchase. The opportunity to win a prize is also a new experience for the consumer, which is conducive for learning.

4.4. Attitude and communication process

The factors which affect the process of communication of the company with consumers include attitude. The attitudes of consumers result from their earlier experience, family traditions or cultural values, which create for the consumer the reference system in making market decisions. The consumer assuming a specific attitude releases him/ her from the necessity of reassessment of the product again and again and determines his/ her behaviour for a longer time.

Intending to effectively advertise the product, the essence is to learn the nature of consumer attitudes and possibilities of their changes. These possibilities depend on whether they express the basic values of the consumer or peripheral values. The attitudes which express fundamental values are very resistant to change. The attitudes of peripheral nature are relatively easy to change.

With promotion instruments, it is possible to affect change of both the cognitive element in the attitude and the emotional element or inclination to a specific purchase.

Change in the cognitive structure of the attitude may be achieved with promotion measures which perform information functions, mostly advertising. In this case, press advertisements are especially useful and enable delivery to the consumer relatively largest resources of information on the given product, service, and consequences for the consumer.

The effect of the attitude on the emotional element consists in adopting such a concept of advertising which stimulates the feelings of consumers, thus creating pressure leading to change in the attitude towards the given product.

Change in the behavioral element of the attitude, i.e. inclination to specific behaviour patterns in the market, may be achieved with various measures of supplementary promotion: sales, demonstrations, free sample, discounts.

4.5. Personality and communication process

The information about features of personality of the prospective buyer is useful in preparation of the contents of communication messages. Typologies of personality differentiating consumers according to susceptibility to external stimuli are especially useful. They are used in creation of message content.

Breaking down consumers into reactive and reproductive types offers major possibility of using in advertising activities. The former feature high susceptibility to persuasion, are easily subjected to suggestions and opinions of other people. Communication message of persuasive nature should be thus addressed to this group of consumers. Reproductive types feature quite fixed patterns of behaviours and likings, are conservative and consistent in their behaviour and not easily succumb to suggestions. Therefore, communication messages based on objective features of the product will be more appropriate for them.

The typology of personality by David Riesman may also be useful in communication with consumers. He differentiated three groups of consumers:

- with orientation for tradition, strong personal binds with the past, these are individuals resistant to changes;
- with internal orientation, focused on the personal system of values;
- with external orientation, focused on other people, taking over their values, attitudes and behaviour patterns from others.

The nature of orientations in consumer's behaviour patterns determines the way of perception external stimuli by them, which affects communication with persons

of varied orientations. Thus, e.g. persons focused on the past may look out for such elements in communication messages. In turn, the internal orientation of consumers results in expectation of the relationship of the content of the communication message with the system of values accepted by them. The communication message to the persons focused on other people should be based on using familiar people, like actors, sport people, TV presenters, journalists, as well as common people, who confirm significant values of the advertised product in satisfying their needs.

M. D. Veron's differentiation of types of personality on the basis of the type of their perception also creates the possibility of application in advertising activities. These are the so-called perception (opposing) types, including: reacting to colour and shape, visual and tactile, analytical and synthetic, active and passive.

However, the possibilities of using personality variables in communication with consumers is limited. It results from the difficulty in selecting groups of consumers of similar personality.

4.6. Effect of lifestyle on building communication strategy

Knowledge of lifestyles is used very broadly in the communication process. It is applied mostly in the field of advertising. It helps in building new communication strategies and in selecting and using media in advertising campaigns.

The analysis of lifestyles in the target segments allows the companies to discover new concepts for advertising messages and to adjust the current visions of the system of social values embedded in the messages.

Each social group features different sensitivity to media, and recognising these sensitivity variations allows to assess the means of message and select these which best meet the expectations of the buyers. The selection of media done in this way which relate to consumer lifestyles facilitates adjusting them to various products and types of promotional actions.

The analyses of lifestyles allow better understanding of different groups of recipients, tracking their development and changes in market expectations. These analyses allow to discover new advertising ideas, update the old issues and select the appropriate media.

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Zachowania nabywców jako przesłanka tworzenia strategii komunikacji przedsiębiorstwa z rynkiem

Streszczenie: W gospodarce rynkowej w centrum zainteresowania znajduje się konsument. Od jego decyzji rynkowych zależy sukces przedsiębiorstwa produkującego i sprzedającego produkty. Wiedza o zachowaniu konsumenta oraz o czynnikach go kształtujących stanowi podstawę przy formułowaniu strategii marketingowej przedsiębiorstwa.

W artykule zwrócono uwagę na znaczenie posiadania informacji o zachowaniu konsumenta dla tworzenia strategii marketingowej przedsiębiorstwa. Wskazano w nim na rolę czynników społeczno-kulturowych w ustalaniu strategii promocji. Mają one bardzo duży wpływ na koncepcję przekazu, na dobór i rolę różnych rodzajów mediów w jej realizacji. W artykule omówiono w szczególności wpływ wykształcenia społeczeństwa na rodzaj i zakres stosowania reklamy. Wskazano na znaczenie koloru czy symbolu graficznego dla postrzegania przekazu i dla powodzenia kampanii reklamowej. Ważnymi czynnikami zachowań konsumpcyjnych, branżami pod uwagę w projektowaniu działań promocyjnych, zwłaszcza w dziedzinie reklamy, są oddziaływania grup odniesienia oraz liderów opinii. Artykuł zwraca uwagę, że istotne znaczenie dla polityki komunikacji ma ustalenie siły wpływu tych czynników na zakup produktu.

W artykule dokonano także charakterystyki czynników psychologicznych kształtujących zachowania konsumenta i ich wpływu na strategię komunikacji przedsiębiorstwa z rynkiem. Wskazano na przydatność informacji o motywacjach konsumentów w projektowaniu przez przedsiębiorstwa przekazu komunikacyjnego. Znajomość ich charakteru pozwala dobrać odpowiednie instrumenty pobudzające do zakupu produktu. Zwrócono także uwagę na mechanizmy postrzegania przez konsumentów przekazu reklamowego oraz na cechy, jakie powinien on mieć, aby przyciągał uwagę konsumentów. W artykule omówiono wpływ uczenia się na zachowanie konsumenta i rolę tego czynnika w procesie komunikacji. Poruszono także rolę postaw i osobowości w kształtowaniu zachowań konsumentów oraz przydatność informacji o postawach i osobowościach potencjalnych nabywców w przygotowaniu treści przekazów komunikacyjnych. Wskazano również na przydatność informacji o stylach życia ludności w budowaniu strategii komunikacji, a w szczególności w projektowaniu przekazów reklamowych.

Słowa kluczowe: konsument, komunikacja, reklama, rynek, strategia, czynniki społeczno-kulturowe, czynniki wewnętrzne, zachowanie konsumenta

VASILY RUDNITSKIY, EWA ZYCH*

Organisation and regulation of audit activities in Ukraine

Key words: audit, external audit, audit standards, organisation, regulation, audit activities

Summary: The paper discusses problems of organisation and regulation of auditing in the world, and solutions to the questions of organisation and regulation of audit activities in Ukraine. In addition, it deals with current problems in functioning of external audit.

1. Introduction

Economic development of most countries in the world is based on economic conditions of the market, in which the establishment and operation of the system protecting owners' interests as well as information on the activities of economic entities, available to external users, is of great importance. Auditing—whose importance grows each year—plays a major role in protecting interests of the owners.

Problems of organisation of audit activities in Ukraine were studied by the scientists: V. Bondar, F. Butynets, S. Rollins, N. Dorosh, A. Zagorodnyy, S. Zubilevich, A. Kuzminskiy, A. Petric, N. Petrenko, V. Rudnitskiy, O. Redko, B. Usach, V. Shevchuk and others.

Various countries around the world implemented their own systems of organisation and regulation of audit activities, but their professional management and principles of management are similar in most of the countries with market economies. However, the specifics of the organisation of auditing in different countries is manifested in different ways depending on the degree of government regulation and monitoring of the performance of the subject.

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2. Models of organisation and regulation of auditing

Depending on the model of organisation of auditing selected by a given country, it creates an independent professional organisation, government regulation and management of auditing and public organisations. The fundamental principle in forming an appropriate model based on the priorities of the state or professional organisation is conducting organisational activities of auditing, issuing permits for those activities, regulation of activity of the audit, conducting monitoring of the operations, and adoption of measures regarding professional liability. Organisation of auditing provides solutions to such urgent tasks as determining the status of an auditor in relationships between business entities, financial institutions, government, setting out the rights and responsibilities of the auditor's relationships with customers, creating a system of laws and regulations in an audit environment.

Each country has different solutions to the above-mentioned tasks, so the legal status of the auditor and his role in the society is manifested in unequal measure, and depends on the model of organisation and regulation of auditing.

Evaluation of global approaches of an organisation and regulation of audit activities lets us determine the existence of two fundamental concepts of audit regulations—the public and the professional ones.

In France, Germany and Poland there is a state concept, which provides audit focused primarily on the needs of public authorities, as the main customers of auditing services. Thus, auditing and related services in these countries are rigidly regulated by the state. In addition, in most of European countries specific requirements for vocational education and work experience that is a basis for possible attestation for obtaining qualifications of the auditor are subject to regulation by the state.

In the countries with professional concept of regulation of auditing, particularly in the USA, the UK, the main users of auditors' reports are investors, lenders, banks, insurance companies, stock exchanges. Organisation, regulation and supervision of auditors are carried out according to the concept of professional organisations.

The basic principle of auditing depends on the level of economic development of a given country. If we estimate the degree of government regulation and control over the functioning of the subjects of audit activity as high, medium and low respectively, then we can define three models of organisation and regulation of auditing: a rigid, mixed and soft one. In the countries with higher economic development level there is usually the soft model of auditing. Countries that are at an early stage of market relations adopt rigid and mixed models.

In Figure 1 we see the three models of organisation and regulation of auditing, depending on the degree of government's control over auditing in a country.

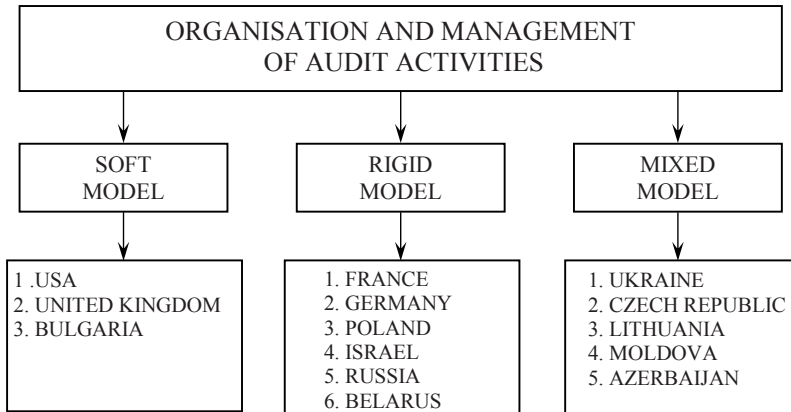


Figure 1. The types of models of organisation and regulation of audit activities

Source: authors' own study.

3. Features of an organisation and regulation of audit activities in Ukraine

Ukraine is a representative of the mixed model of organisation and regulation of audit activities (Figure 2).

The mixed model means that regulation of audit activities in Ukraine is carried out both by the authorities of the country, and independent professional organisations. The Supreme Council of Ukraine and the Government of Ukraine shall be the legal regulation of audit activities by the approval of the Basic Law of Ukraine “On Auditor’s Activity” (Supreme Council of Ukraine, 1993) and several other legal acts.

Apart from the state independent professional body which carries out the organisational and methodological management audit activities in Ukraine, there is the Audit Chamber of Ukraine (ACU). This body is developing guidelines regarding the audit as well as approving the national standards, rules, regulations, and instructions on auditing.

According to Article 12 of the Law of Ukraine “On Auditing” the ACU provides:

- certification of persons who have an intention to engage in audit activity;
- developing and adopting national standards for the audit;
- approving the training of auditors;
- maintaining a register of auditors;
- supervising the work of auditors (audit firms);
- implementing measures to ensure independence of auditors in conducting their activities and oversight over the quality of audit services.

Each year the ACU receives progress reports from audit companies, provides analysis and reports a compilation of information on audit activities in Ukraine to the Council of Ministers.

The ACU functions as an independent body, as it is a legal entity and has an appropriate accounting and reporting. It is working according to the rules of partnership and its delegates are the auditors of Ukraine as well as the representatives of public authorities. The total number of the ACU members are 20 persons. The public authorities are represented by a delegate of Ministry of Finance, Ministry of Justice, Ministry of Economy, State Tax Administration, State Committee for Securities and Stock Market, State Committee for Regulation of Financial Services Markets, Accounting Chamber and Main Audit Office of Ukraine.

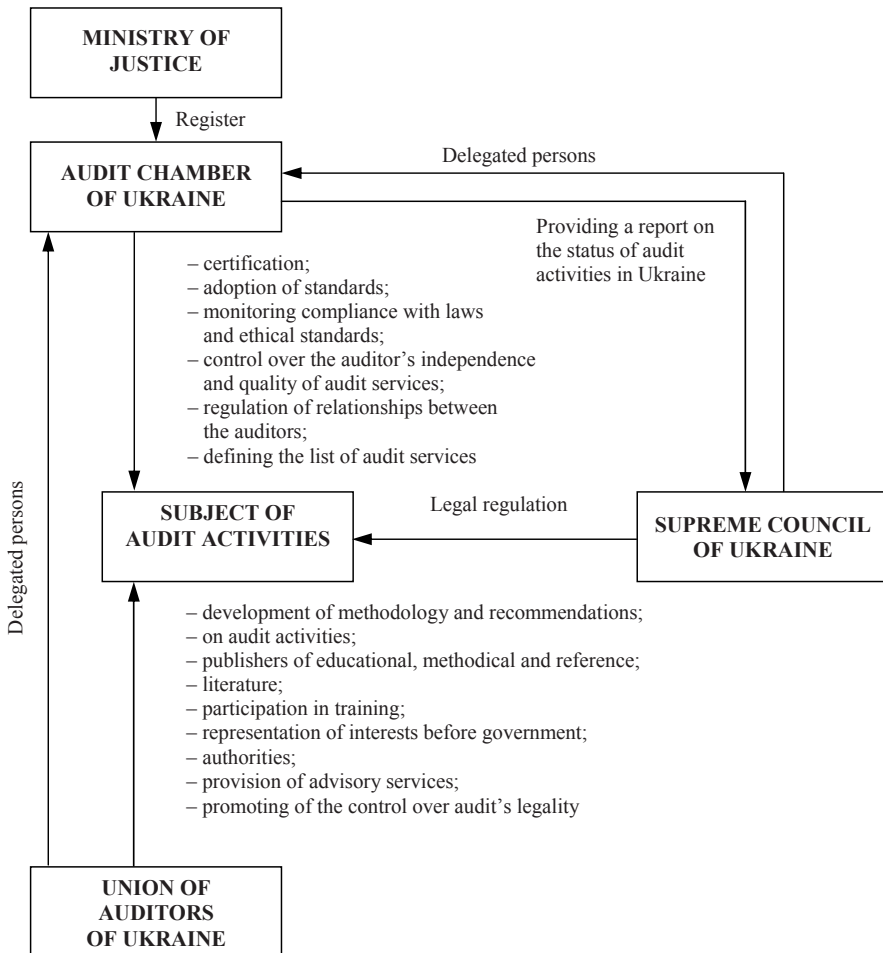


Figure 2. Regulatory framework of auditing activities in Ukraine

Source: authors' own study.

The ACU consists of 10 qualified auditors with experience in auditing at least 5 years, as well as representatives of universities and scientific organisations. The Chamber may establish regional branches on the territory of Ukraine. The term of office of a ACU member is 5 years. The same person cannot be delegated in the ACU for more than two consecutive terms. The members—except the chairman of this body—shall perform their duties on a voluntary basis.

The sources of funding of the ACU are the fees for issuing certificates to persons entitled to take action to control, charges for inclusion in the Register of Auditors, the voluntary contributions of the professional organisations of Ukraine and other sources.

In addition to the ACU, in Ukraine there is a professional public organisation called the Union of Auditors, which focuses on the principles of practising auditors on a voluntary basis, develops draft regulations, provides guidance on the implementation of the audit and other services related to audits.

4. Current problems in the functioning of external audit in Ukraine

External audit has been one of the most important types of auditing in Ukraine for over 17 years. However, its development is closely dependent on the growth in economy, i.e. the number of enterprises that need confirmation of their financial statements.

In recent years, audit has been faced with new tasks consisting in improving the quality of audit services in accordance with the principles and guidelines of the International Standards on Auditing (ISA) and the ethics of the auditor. This is due primarily to great scandals in the activities of some international accounting firms.

Development of audit in Ukraine and improvement of its quality, in our view, depends on a number of challenges: improvement of the information base audit, providing of control in accordance with the ISA, ethical principles of conduct by the auditor referred to in the Code of Ethics for Professional Accountants (auditors).

Provision of information in the audit process includes a diverse set of legislative and legal acts regulating control activities in general, and the audit process in particular.

The audit process is based largely on the ISA. It should be noted that decision on refusal of national standards of the audit (NSA) for the ACU and its transition to the ISA was a right solution. The NSA was imperfect and incomplete compared to the ISA. Comments on the use of international standards, which are prepared by the ACU, should be clear, professional, unbiased, and the terms and phrases used in them should be understandable for the public.

The subject of auditing is economic activity of enterprises, with special regard to financial statements and notes thereto. Therefore, financial statements of an enterprise pro-

vide the most information gathered in an audit process. It is obvious that the sources of auditing are also other main documents, accounting registers, etc. (4, p. 288).

Nowadays, organisation and procedure of accounting and financial reporting are regulated by the law “On Accounting and Financial Reporting in Ukraine”, established by the Supreme Council of Ukraine in 1999, and national regulations (standards) of accounting (RSA). However, the existing RSA in certain areas do not meet the IAS and the European Union Tacis Project “Accounting Education Programme in Ukraine” of 2004. At the same time, in accordance with the Council of Ministers of Ukraine document “On approval of measures on realisation of priority directions of development of corporate governance in joint stock companies”, no. 25 of 18 January 2003, all public companies active in years 2004–2005 were to be included in the EU Tacis Project.

Thus, enterprises in Ukraine can be divided into three groups:

- 1) small businesses that keep records and prepare financial statements according to a simplified scheme;
- 2) companies that keep records and prepare financial statements in accordance with the clause of the RSA;
- 3) joint-stock companies that prepare their financial statements under International Financial Reporting Standards (IFRS).

Thus, audit information base as well as the results of inspection procedure will depend on the standards of accounting represented by the management of a company.

The auditor should take into account that between the ISA and the RSA there are some differences, and with regard to this, certain individual standards do not match. For example, very often the RSA will not be as detailed as the related ISA. Such differences result from definite restrictions of the RSA if compared to the ISA. Firstly, such restrictions are to be noticed concerning the absence of alternative approaches in the RSA, as well as lack of specific requirements for public information.

An important issue of the audit practice in Ukraine is that the auditors should pay more attention to the acknowledgment of headings entitled “Balance” and “Report on financial results”. At the same time, the “Statement of Cash Flows”, “Statement of Changes in Equity” and “Notes to Financial Statements” are often left without proper attention of the auditor, while they contain interesting information for different groups of users.

5. Conclusions

It is important that the auditor drew attention not so much to the form of a report as to its content. Also, the presence of subjective factor in interpretation of this or another report indicator should be noted. It basically depends on qualifications of the auditor and his/ her practical experience.

A significant problem of audit activity in Ukraine is that often the subject of auditing are not the shareholders (owners), but executive directors (managers). Such a practice is incompliant with ethical principles—the principle of independence in particular. In this case, the auditor agrees the audit contract terms with the manager and thus to some extent becomes dependent on him.

Quality and effectiveness of audit largely depend on the standards used by a business entity for preparation of financial statements. At the same time, the use of the ISA in audit practice takes into account modern experience of foreign countries.

However, in recent years there has been a tendency in Ukraine towards a rigid model of organisation and regulation of auditing and simultaneously reducing the role of the Union of Auditors, an independent professional organisation. In addition, the number of members of the Audit Chamber of Ukraine delegated by government agencies was increased.

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Организация и регулирование аудиторской деятельности в Украине

Аннотация: В статье рассматриваются проблемы организации и регулирования аудиторской деятельности в мире. Раскрыты вопросы особенностей организации и регулирования аудиторской деятельности в Украине. Кроме того, затронуты современные проблемы функционирования внешнего аудита.

Ключевые слова: аудит, внешний аудит, стандарты аудита, организация, регулирование, аудиторская деятельность

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Innovativeness in food industry in the European Union and Poland

Key words: innovativeness, innovations, food industry, agricultural business, economic and financial results, Sokołów S.A. company

Summary: The paper presents major issues related to innovativeness of the Polish food industry on the background of the entire industry and the European Union. The EU framework programme for the benefit of competitiveness, and the adjusted Lisbon Strategy formulate the strategic objective of stimulating innovativeness in the European Economic Area (EEA).

After discussion of theoretical issues related to innovativeness and innovations, the level of innovativeness of the Polish industry has been analysed. On the basis of presented measures, the author finds low level of innovativeness of the industry, apparent especially in comparison with many other countries. The situation is similar in the food industry, even though its major restructuring and modernisation occurred in the system transformation period. It is confirmed with the analysis of changes in this branch of industry in 1990s and later.

In the light of *Rzeczpospolita* daily paper List 2000 ranking and comparisons of innovativeness in the enterprises of our food industry in the years 2006 and 2009, unfavourable trends in this field are apparent. However, the world-scale financial crisis and recession in business in the years 2008–2009 had effect on this situation. It is also worth noting that Poland evaded these threats after joining the EU and one of the reasons was that it became a major exporter of agricultural products and food in Europe and in the world.

1. Introduction

As the modern economy is created based on knowledge, innovativeness, entrepreneurship and competitiveness of companies play an important role in this respect. The European Union actively supports activities in this field within the adopted strategy and policy of economic growth and development. In conclusion of the European

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Council peak in Brussels in 2004 it was assumed that “competitiveness, innovativeness and propagation of the culture of entrepreneurship are the decisive conditions necessary for the growth of the economy at large, and is specifically important for the sector of small and medium-size companies (1).

The EU framework programme for competitiveness and innovativeness (CIP) sets the objective of integrating innovativeness and improvement in effectiveness of companies, growth and compatibility of scientific research, directed at modernising economy, taking into account the requirements of solid and sustained use of resources.

In the new approach to the Lisbon Strategy, the European Committee in the message of February 2005 stated that there is a need for stimulating innovativeness, especially in ecology, supporting education, new technologies, sustained use of resources and innovative potential of companies in this respect, as well as better cooperation of countries in the European Economic Area (1).

A major part in these enterprises falls on industry, including agricultural and food, focused in the broadest dimension in the sector of small and medium-size companies (2). The food industry gathers over 30 industries of production, such as meat, dairy, fruit and vegetables, distilling, etc. Thus, it plays a significant and important role in the national economy, including food economy, as well as in a broadly understood agricultural business (3).

The objective of this paper is to present major issues related to innovativeness of the food industry in Poland on the background of the European Union.

2. Innovatics, innovativeness, innovations, innovative strategy and policy

Innovatics is young scientific field which may and should affect innovative processes, bringing about benefits to the economy and to the community. Innovative solutions may result from own research and development activities of the company, cooperation with others, or from purchase of knowledge and ideas in the form of patents, software, know-how, as well as services of technical, technological, organisational, and marketing nature. In a different approach, the tangible one, it may be based on the use of machines and devices of enhanced parameters or on spreading new goods and services, improved in terms of use, quality and function. Innovativeness means implementation of novelties, i.e. a new or improved solution in reference to the process, organisation, product, service or marketing. Thus comes isolation of process and product innovations in technological innovations, and organisational, marketing and institutional innovativeness (4).

Innovativeness means also the skills, motivation and attitudes of commercial entities for scientific, research, technical, organisational, financial and commercial activities—aimed at development and implementation or improvement of methods, prod-

ucts, services—dedicated for the market or for another application in commercial practice (5).

The problem of innovativeness and innovations in economy and its entities is reflected in the theory of economics and management, among others with the work of Joseph Schumpeter, Peter Drucker, Michael Porter, Everett Rogers and others.

Schumpeter formulated the innovative process as a creative action which consists in creation, designing and executing the innovation. This process includes: research, implementation, diffusions of innovativeness, which means their dissemination (6).

Drucker considers innovations to be the basic driving power of entrepreneurship, which needs knowledge, ingenuity and predispositions of the persons who are distinguished in it (7).

Porter, in turn, believes that the condition for gaining competitive edge is achieving innovative capacity which contributes to increased effectiveness of company activities (8).

Everett Rogers defines innovation as a diffusion process through which it is delivered via specific channels of the social system (9).

In the European Union programmes and practice programming, innovativeness is also a means and a method which determines supplementary financing of development projects (10). It is commonly assumed that the basic source of innovativeness comes from investment expenditures, especially for the so-called advanced technologies, fixed assets, research and development (R&D), as well as increase in qualifications and knowledge of employees. Innovative objectives and processes are to ensure optimum effects for the companies in their executed business activities (2).

“Innovative management” is closely related to this issue, reacting to market challenges, cooperation of partners (clusters), and the network in information technology constitutes the basis for building management structures (11).

Another important issue is still development of strategy and adopting a specific innovative policy in both micro- (company level) and macroeconomic aspects, e.g. the European Union (12). The innovative strategy of companies shall be considered an ingredient of strategy in companies. In a broader approach, strategy constitutes the necessary item of creating the information society and comprehensive development based on knowledge (13).

The innovative policy in the EU countries results directly from the premises of the renewed Lisbon Strategy. Its objective is enhancing dynamics in the growth and development, increasing competitiveness with various financial instruments (EU funds), etc. It is reflected in programme solutions, such as the CIP programme mentioned earlier (the Framework Programme for Competition and Innovativeness, Innovative Economy Operational Programme 2007–2013), as well as in institutional solutions, such as the Council for Competition, the European Committee.

In the structure of the Polish economy based on knowledge, the strategic objective has been assumed—creating conditions for increasing competitiveness, entrepreneurship and innovativeness, written into the National Strategic Frames of References for

the years 2007–2013. In the Development Strategy of the Country in the same years, the growth and innovativeness of economy written in the Regional Operational Programmes based on regional Innovative Strategies were considered the priority.

Sectoral Operational Programme Improvement of the Competitiveness of Enterprises (SOP ICE, PL abbr.: SPOWKP) for the years 2004–2006 is currently continued for the years 2007–2013 in Operational Programme Innovative Economy.

The detailed objectives are entered here as follows:

- increasing innovativeness of enterprises;
- increase in competitiveness of the Polish science;
- increasing the role of science in economic growth;
- increasing the share of innovativeness of products of the Polish economy in the international market.

3. The level of innovativeness in the Polish industry under the conditions of European integration

Poland is one of these EU countries which invest into modern technology to a low degree only.

In 2006, only 0.57% of GDP was allocated on the works in the scope of new technologies and products, while this index was 3.87% in Sweden and the average of 1.87% in the EU. Expenditures of companies for R&D in the same 2006 year were, respectively (in m Euro): United Kingdom 15.9, Sweden 5.9, Germany 2.9, Poland 0.04. Only 3% of our export was in high-tech products, with 29% in Ireland and 18% in Germany (14). In terms of innovativeness, the EU lags behind the United States and Japan. Expenditures for R&D in these countries currently are 2.6% and 3.4%, while the average EU value is less than 2% of GDP. The necessity of increasing the share of this index to at least 3% is assumed to ensure innovative jump in the EU (15).

The generally low level of innovativeness of the Polish economy is confirmed with the “General index of innovativeness” prepared for the European Committee. It listed (2009) 0.317 for Poland, with the average EU index at 0.478, 0.636 for Sweden, 0.596 for Germany, 0.575 for the United Kingdom, 0.516 for Belgium, 0.501 for France, 0.481 for Estonia, and 0.479 for Cyprus (16).

The share of innovative companies in the total number of industrial companies is the measure used to determine the level of innovativeness in the industry. Eurostat in the EU and GUS in Poland determine within a pre-set period of 3 years how many companies introduced into the market at least one technical innovation, that is a new or improved technological process or a new product. The results of this research by GUS on a large sample of ca 15,000 companies in the years 2002–2008 are given in Table 1.

Table 1

The percentage share of innovative companies in the Polish industry in the years 2002–2008

| Description | 2002–2004 | 2004–2006 | 2006–2008 |
|---|-----------|-----------|-----------|
| The total % of innovative companies | 25.9 | 23.2 | 21.3 |
| % of companies in the section “Industrial processing” | 25.6 | 23.1 | 21.2 |
| Including: the total number of companies: | | | |
| – small (10–49 employees) | 17.7 | 13.9 | 14.6 |
| – medium-size (50–249 employees) | 41.3 | 37.4 | 32.7 |
| – large (250 and more employees) | 67.5 | 65.5 | 60.7 |

Source: (17).

For the next three research periods, Table 1 presents a declining trend of the share of innovative companies in the Polish industry. This decrease applies to all the groups: small, medium-size and large companies.

Another measure to determine the share of the industry in the development of innovative activities is the innovativeness intensity coefficient which reflects the relation of expenditures for innovative activities in the industry to the value of industry production sold (Table 2).

Table 2

Intensity and cost intensity of innovativeness in the Polish industry in the years 2000–2008

| Year | Expenditures for innovative activities in the industry (PLN m) | Expenditures for innovations in % of the value of | |
|------|--|---|-----------------------------|
| | | production sold in the industry | added gross in the industry |
| 2000 | 12,235 | 2.50 | 7.71 |
| 2004 | 15,417 | 2.27 | 7.44 |
| 2005 | 14,670 | 2.10 | 6.85 |
| 2006 | 16,558 | 2.11 | 7.20 |
| 2007 | 20,223 | 2.29 | 8.03 |
| 2008 | 24,271 | 2.60 | 8.92 |

Source: (18).

It follows from the calculations in Table 2 that the charges on our industry with expenditures for innovative activities are low as they were only 2.5 to 2.6% of the value of production sold in the years 2000–2008.

This index for added gross production of the Polish industry was at the level 7.71–8.92% in the same years and was lowest in 2005 at 6.86%.

The situation was similar in the same years, expressed with the index of participation of the value of goods production sold on account of implementation of technical innovations and their introduction into the market within the last 3 years to the total value of production sold in the given year.

The production renewal level throughout the Polish industry has been low, with the declining trend from 20.9% in 2004 to 15.8% in 2008. And a similar direction of changes to an even higher degree comes for the “industrial processing” section, with decrease from 23.8% to 18% (18).

It follows from the findings of Mikołajewicz (17) that in the 5-year period of Polish membership in the EU:

- the number of research units dropped by 20, from 300 to 269;
- the number of employed in these units dropped by 12.5%;
- the share of budget funds in the R&D expenditures decreased from 61.7% to 56.1%;
- the share of the state budget in financing innovative activities in the industry dropped to a very low level at ca 6.5%.

The GUS research shows that only 19% of the companies introducing innovations in the industry in the years 2006–2008 considered innovative activities as favourable for them due to cooperation with the science. The view is common that high intensity of innovativeness depends on progress in science. Analysis of structural transformations in our industry indicates unfavourable changes from the point of view of innovative processes throughout the period of economic transformation (18).

4. The food industry in the EU and in Poland

This industry plays a major role in the EU countries as the total value of its production is larger than compared with the USA, Canada or Australia. It employs ca 13.5% of employees in total and generates ca 2% GDP in the European Union. It also constitutes an important element of trade exchange in the world, remaining the largest exporter and importer of food and maintaining positive result in this trading, e.g. 3.7 m Euro in 2008 (19).

The food industry in Poland is one of the fastest developing areas of economy. Its share in the sales volume of the entire industry is almost 24% and is 9% higher than in 15 EU countries where its average is 15%. A higher share is only in 2 countries, i.e. Denmark with 28% and Greece with 27%. The generated gross added value (including the tobacco and beverage industries) is ca 6 B ZUS, that is over 4% of the value in the whole economy. The food industry employs ca 430,000 people, i.e. almost 5% of the total number of employees in the economy, and about 20% in the industry in total.

The value of the food market in our country is assessed at over 100 B PLN (without tobacco and beverages), that is ca 49 B Euro, with the value of production in this industry in the UE at ca 626 B Euro. Employment in the EU in this industry is 28 million people. Added value in the UE is ca 145 B Euro (with 11 B Euro in Poland). The number of companies (without microcompanies): 27,000, including 93% small business units (20).

Before Poland joining the EU, the food industry faced a major progress, and the result is that its larger part is one of the most modern branches in Europe. It was confirmed with the dynamically increasing export of our agricultural and food articles to countries in the European Union and other. In the years 1994–1997, the food industry was increasing production by ca 10% per year, at the same time maintaining high investment rate (with international investments). After 2000, the level of investing in general expenditures was lowered. However, no decrease in production and consumption of food was recorded in 2001. In absolute numbers against 2001 it is ca 30%. Beginning with 2000, the food industry has been recording gradual improvement in financial results.

Proceeds and profitability of the food industry companies according to the *Rzeczpospolita* daily paper ranking List 2000 are given in Table 3.

Table 3

Proceeds and profitability of companies in the food industry, agriculture and forestry
in the years 2005–2006

| Description | Total | Industry | |
|------------------------|---------------|---------------|--------------------------|
| | | Food industry | Agriculture and forestry |
| 1. Number of companies | 2000 | 202 | 4 |
| Proceeds in PLN thou. | 1,186,673,237 | 70,846,178 | 5,332,965 |
| Share in List 2000 | 100.0 | 5.97 | 0.45 |
| 2. Analysed companies | 1337 | 141 | 4 |
| Proceeds in PLN thou. | 831,327,156 | 50,767,863 | 5,332,965 |
| Dynamics 06/05 in % | 113.3 | 106.3 | 105.6 |
| 3. Net profitability | | | |
| 2006 in % | 5.0 | 4.8 | 4.4 |
| 2005 in % | 4.9 | 4.6 | 4.6 |
| Change in points | 0.1 | 0.2 | -0.2 |
| 4. Investment rate | | | |
| 2006 in % | 0.2 | 5.3 | 9.3 |
| 2005 in % | 7.1 | 5.7 | 10.4 |
| Change in points | -0.9 | -0.4 | -1.1 |

Source: (21).

5. Innovativeness in the Polish food industry

The possibilities of development of agricultural and food processing in Poland at present depend mostly on higher innovativeness with high segmentation markets (ecological food, diet food, semi-finished products for catering and restaurants) and changes in consumer preferences (22).

The interest of companies in innovativeness is the main measure of entrepreneurship and increase in competitiveness of companies.

Significant growth of innovative activities in the Polish food industry comes for the 1990s, when the process of adjusting companies to requirements of the market economy was started. Intense activities were undertaken to improve quality of goods, safety of work and protection of the natural environment. The result of these transformations was a fast rate of increase in investment expenditures in the years 1992–1997 for innovative activities. In recent years, the transformation was focused mostly on machines, technical equipment and means of transport. The value of these investment expenditures in the years 1997–2000 exceeded the amount of 800 m PLN, that is ca 60% expenses for innovations in total. Expenditures for R&D were low and amounted to as little as 30 m PLN, with even smaller amounts allocated for purchase of technologies and training events related to innovative activities (20).

The renewal index in production of food articles and beverages in percentage of the total production sold was 12.5% in 2004, and was systematically dropping down to the level of 8.4% in 2008 (18).

Innovativeness mostly refers to the technological point and process and in a lesser degree to company management, which means certification and quality, logistics, distribution, marketing, company image and brand. The need of innovativeness usually results from the general needs of the market and developing knowledge and application of IT sciences.

In the ranking by *Rzeczpospolita* in 2006, 12 out of 100 best innovative companies were in the agricultural and food sector and in the agricultural business, including 6 companies in the food industry (23).

In the next, seventh ranking of innovative companies, only 2 out of the selected 60 companies represent the agricultural business, i.e. Małopolska Hodowla Roślin sp. z o.o., Krakow (ranked 8) and Sokołów S.A., the meat industry (ranked 52).

The tables below present the economic and financial results of Sokołów S.A., the food industry company distinguished in the *Rzeczpospolita* ranking List 2000 (Table 4 and Table 5).

Table 4

General economic and financial characteristics
of Sokołów S.A. (the food industry) in the years 2008–2009

| Description | Sokołów S.A. Capital Group | Sokołów S.A. |
|-------------------------------------|-------------------------------|--------------|
| | 2008 | 2009 |
| 1. Proceeds from sales (PLN thou.) | 2,179,339 | 2,106,028 |
| 2. Dynamics of proceeds = 100; 2007 | 18.2 | 14.4 |
| 3. Operational result (PLN thou.) | 80,188 | 81,870 |
| 4. Net result (PLN thou.) | 47,091 | 62,586 |
| 5. Depreciation (PLN thou.) | 59,961 | 51,954 |
| 6. Assets (PLN thou.) | 874,551 | 1,033,237 |
| 7. Equity (PLN thou.) | 447,177 | 636,191 |
| 8. Investments (PLN thou.) | 69,548 | 63,891 |
| 9. Employment (PLN thou.) | 5569 | 4957 |
| 10. ROE (%) | 10.5 | 9.8 |
| 11. Rank in List 2000 | 153 | 127 |

Source: (21).

Due to the crisis situation in the years 2008–2009, the proceeds were lower, however their dynamics against 2007 dropped from 18.2% to 14.4% in the years 2008–2009. The operational result in these years increased by 2%, and net result increased by 33%. The assets increased by 18%, and equity by 42%. The investment expenditures decreased by 8%, and employment by 11%.

ROE, the return on equity as a ratio of the net result to the equity of the company at the end of the accounting year decreased from 10.5% to 9.8% in the years 2008–2009.

According to the adopted methodology for determination of ranking of innovative companies, the general index was used with the maximum value of 6 points. Up to 3 points were assigned for R&D activities, the ratio of employees in R&D against all the employees, and the ratio of R&D work completed in the unit to the total proceeds. For every positive answer to five questions about quality, the total of one point could be gained (24).

Table 5 presents the obtained results of innovative activities in 2009 in Sokołów S.A. in Sokołów Podlaski.

Table 5

Economic and financial results of Sokołów S.A.
in the ranking list of the best innovative companies in 2009

| Description | Sokołów S.A. 2009 |
|---|-------------------|
| 1. Score | 0.2585 |
| 2. Proceeds from sales (PLN thou.) | 2,106,028 |
| 3. Expenditures for R&D (PLN thou.) | 2429 |
| 4. R&D expenditures to proceeds | 0.1 |
| 5. Employment in total | 4957 |
| 6. Employment in R&D | 27 |
| 7. Employment in R&D to employment in total | 0.5 |
| 8. Rank in the list of 60 best innovative companies | 52 |

Source: (20).

In the scoring system, the difference between Sokołów S.A. and the first best company, Comarch S.A. Kraków (services and trade) is 41513 points, and between it and the last 60 company (Holding Węglowy S.A. Katowice) it is 0.2179. The result was thus 0.2585 points and 52 rank in the list of innovative companies.

The company allocated almost 2.5 m PLN for research and development in 2009, with relatively low employment in R&D, i.e. 27 persons, which gives 0.5 person to the total employment.

6. Conclusion

The generally low level of innovativeness in the Polish industry is apparent, including the food industry. There are many reasons for this, especially insufficient financial means and lack of capital, specifically in the sector of small and medium-size companies whose number in the analysed industry is very large. However, a major restructuring continued throughout the transformation period in the food industry, with beneficial effects in economy and finances of these companies. They result, among others, from the opening high export possibilities, along with Poland gaining the full membership in the European Union. Due to the crisis situation in the years 2008–2009, the situation of food companies worsened, including the area of innovativeness, which is confirmed with unfavourable rankings in the 2000 *Rzeczpospolita* List. In 2009, only one company was included in this ranking: Sokołów S.A., ranked 52 among the 60 selected companies.

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Innowacyjność w przemyśle spożywczym Unii Europejskiej i Polski

Streszczenie: W opracowaniu przedstawiono ważniejsze kwestie związane z innowacyjnością polskiego przemysłu spożywczego na tle całego przemysłu oraz Unii Europejskiej: Program ramowy UE na rzecz konkurencyjności oraz skorygowana Strategia Lizbońska, za cel strategiczny stawiają stymulowanie innowacji w Europejskim Obszarze Gospodarczym (EOG).

W kolejności tematycznej i merytorycznej artykułu – po omówieniu kwestii teoretycznych związanych z innowatyką i innowacjami – przeanalizowano poziom innowacyjności polskiego przemysłu. Na podstawie omówionych mierników w konkluzji autor stwierdza niski poziom innowacyjności przemysłu, zwłaszcza widoczny w kontekście porównań z wieloma innymi krajami. Podobnie sytuacja przedstawia się w przemyśle spożywczym, chociaż należy zauważyć, że w okresie transformacji systemowej dokonała się tutaj istotna jego restrukturyzacja i modernizacja. Potwierdza to przeprowadzona analiza zmian w tej gałęzi przemysłu w latach 90. i później.

W świetle badań rankingowych „Rzeczpospolitej” – Lista 2000 – i porównań innowacyjności w przedsiębiorstwach naszego przemysłu spożywczego w latach 2006 i 2009 zauważa się niekorzystne tendencje zachodzące w tej dziedzinie. Należy však mieć na uwadze wpływ na tę sytuację pojawienia się kryzysu finansowego w skali światowej, jak również recesji gospodarczej w latach 2008–2009. Równocześnie warto w tym miejscu stwierdzić, że po wejściu do UE Polska z tych zagrożeń wyszła obronną ręką, między innymi dlatego, że stała się liczącym się eksporterem artykułów rolnych i żywności w Europie i w świecie.

Słowa kluczowe: innowacyjność, innowacje, przemysł spożywczy, agrobiznes, wyniki ekonomiczno-finansowe, ranking, firma Sokołów S.A.

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Methods of aggregate assessment in project decisions

Key words: aggregate assessment, analysis of preferences, ranking method, scoring method, quotient standardisation method

Summary: The paper discusses the following: the preliminary notes, the analysis of preferences as a universal concept of aggregate assessment, the ranking method, the score method, the quotient standardisation method.

The preliminary notes give an interpretation of aggregate assessment. It consists in general assessment of the value of an object by combining individual assessment criteria into one entirety. Aggregate assessment has broad applications, in reference to both projects and processes, phenomena, and all types of objects. It is used in diagnostic research and in making decisions (related to, e.g., the selection of the optimum project variant).

Then, the analysis of preferences as a universal concept of aggregate assessment is provided. Analysis of preferences in common understanding is a research approach which consists in qualifying objects according to a specific scale, which is expressed in hierarchy of importance of the objects. This part of the text presents also the research process cycle. Its main components are: the object, a set of objects or a system, the values characteristic for the object, assessment criteria, aspects of preferences, the procedure of calculation of the weighted value of the object.

Then the ranking method is discussed which is used for qualification of projects (project variants) in the scale of natural numbers. The research workflow in the ranking method is as follows: 1) defining the ranking range, 2) collecting the data for ranking, 3) preferential organising (calculating total ranks, calculating averaged ranks, determining the position of the project in the ranking).

Then the score method is discussed along with its special form of the score aggregation. Qualification is done here, unlike in ranking, in the scale of real or integral numbers. The research proceedings in the score aggregation method follows the following steps: determining the universal formula for the weighted value, score standardisation for selection criteria, aggregate assessment (calculation of the IPP_i index), categorisation of the IPP_i index.

The basic text is concluded with the quotient standardisation method discussed. This method is the aggregate approach of the index-based assessment of projects. The essence of quotient standardisation is in unifying values of individual selection criteria by referring them to predefined

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master values. The central step in this method is calculation of the indexes Z_i and Z_i^* . They constitute the simple or weighted arithmetic mean of the aggregate assessment of the project. The project with the highest index is the optimum solution.

1. Preliminary notes

Aggregate assessment is a general assessment of the values of a certain object which consists in combining individual assessment criteria into one unity.¹ This value may be positive or negative and refers to various types of aspects, e.g. utilitarian, technical, economic, social, depending on what is the objective and the subject matter of the research.

The attitude represented by aggregate assessment is a multicriteria qualification of the given object, which means that it is subject to assessment with a larger number of criteria (at least two). This method of assessment is justified with the fact that multicriteria qualification is more complete than monocriteria assessment, thus giving a more comprehensive image of the actual condition or of the proposed solution.

The characteristic discriminant of aggregate assessment is the principle of merging individual criteria to get answer to the question about *general value of the object*. Perception of the object in one dimension, that is with only one criterion, gives a very limited view on its actual value. For example, limitation only to assessment of economic effectiveness of the investment or operational programme, bypassing the market and utilitarian aspects or technical functionality, will be basically different from the required scope of diagnostic research or from the competent selection of the project variant.

This paper presents in more detail the basic methods of aggregate assessment, namely: ranking, scoring, quotient standardisation. Moreover, attention has been paid to the problem of weighing assessment criteria, running the ranking and categorisation of projects.

It has to be noted that the presented methods of aggregate assessment have bidirectional references:

- one applies to comparative analysis in diagnostic research;
- the other is related to selection of the rational (optimum) project.

Comparative analysis in diagnostic research is aimed at assessment of the actual condition of the given object, which may be a company, an executed strategy, or any process or subsystem. Diagnostics may be expanded with assessment of external factors which constitute the surroundings of the studied object.

Comparative analysis focused on selection of the rational (optimum) variant applies to assessment of the projects of the proposed improvements which have been

¹ The term “object” is treated here very broadly, including all types of things, processes, phenomena. It includes both existing and planned systems.

developed in reference to the shortcomings disclosed during diagnosis of the object. In this case, designing is based on the principle of “improving or perfecting the system.”

Apart from the comparisons made on the set of proposed improvements, the analysis may be referred to another case which is a set of base projects, thus being new (original) solutions, developed on the principle of “creating from the scratch.”

In the above directions of studies, the multi-criteria approach is recommended, that is both in diagnostics and in solving the project tasks. This approach has a definite substantial advantage over single-criterion approaches, thus the stipulation of binding individual assessment criteria in a complementary system. It is a problem of *type and quantity selection of assessment criteria*, which is one of the basic issues in the process of making project decisions.

2. Analysis of preferences as a universal concept of aggregate assessment

2.1. Framework approach to analysis of preferences

Analysis of preferences in common understanding is a research approach which consists in qualifying objects according to a specific scale, which is expressed in hierarchy of importance of the objects. This hierarchy is represented in the ordered (decreasing or increasing) preferential series. The need of qualifying objects is a natural necessity in measuring their share and significance in a specific community or system (economic, social, technical). The method of this measuring and its practical objectivisation constitute the essence of the presented concept.

Analysis of preferences as a management tool is a research approach used in diagnostics and designing technical, economic and organisational systems.² The general objective of this approach is multi-criteria aggregate assessment directed to both analytical and comparative studies, as well as to selection of variant solutions.

The basic methods of analysis of preferences in project management are ranking and scoring.³

The ranking method is a procedure which consists in determining validity of a specific object in the given set for predefined aspects of preferences. Ranking is used for putting objects into series so that comparative and diagnostic studies could be run with a view on various premises and points of view. This method is also used

² Apart from technical, economic and organisational applications, analysis of preferences is used in the marketing assessment of products, in sociological research and public opinion polls, in general statistics, didactics, sport.

³ The auxiliary methods, mostly used for identification and diagnostics, are questionnaire studies, interviews, check lists.

in determining the order of priority, e.g. quality of organisational solutions, validity (significance) of production and market tasks, urgency of investment enterprises.

The scoring method in general consists in assessment of objects with points (in any scale of real numbers). Directing studies in this method applies to the following areas:

- comparative assessment;
- verifying assessment;
- varianting.

In the comparative opinion, scoring means qualification of validity of individual objects (systems, parameters, assessment criteria, etc.) in the context of the relationships between them. This type of assessment is also used in analysis of the effect of specific factors, for example, on effectiveness of an organisation and functioning of a company, an institution, a macroeconomic system, etc.

The verifying assessment performs a different role. It is a test which is used to prove to what degree the agreed requirements are respected by the given system. The verifying assessment answers to the questions whether the system is well organised (or improperly organised and to what degree), how it is functioning, what is its effectiveness (e.g. high, average, low).

Scoring in varianting has yet another meaning. In this case, the verifying assessment is run as well, yet not in the diagnostic nature but directed to selection of the rational (optimum) project solution. Assessment covers specific variants in the range specified by a set of selection criteria. Variants are subject to selection for their utilitarian suitability (functionality), project risk, and the scale of economic benefits.

It has to be noted that analysis of preferences is used along with standard research methods, e.g. with the index method for assessment of financial standing of a company, the discriminative analysis and the statistical standardisation methods.

2.2. The research process cycle

The main components of the cycle in the research process on analysis of preferences are:

1. The object;
2. The set of objects or the system;
3. The characteristic values of the object;
4. The assessment criteria;
5. The aspects of preferences;
6. The procedure of calculation of the weighted value of the object.

The object

The notion of the object has universal nature. It is regarded as the subject of research, e.g. a thing, a factor, a feature, a structure, a system, an element. In the commercial area, the object is the enterprise (the company), the organisation, the area of

activities, the management process, the product, the quality feature of the product and of the service, the type of resource. Specific external or internal effects and project solutions may also be the object. The term of the object thus extends to the “actual condition” and to all types of projects and models.

The set of objects or the system

The analysis of preferences is based on classification (typology) of any type of objects which may create a distributive or collective set. In the first case, the point is about classes or type groups of objects, in the second about constituent parts of the organised entities. Industry-specific groups of companies, classifiers of all types of resources, stock exchange quotes of companies, currency exchange rates, commercial sectors, segments of the market, classes of products, etc., may be examples of distributive sets. The following may be listed as examples of collective sets: organisational units of a company, stage of the production process, functions of technical systems, a system of functional features of the product, organisation of country administration.

Knowledge of the structure of the objects is the condition necessary for conducting analysis of preferences, as it presents a conglomerate of components which are the subject matter of scheduling. This conglomerate, after turning into a set or a system constitutes the proper subject of study in comparative analysis as well as in diagnostics and procedures concerning selection of the rational variant of the project.

Characteristic values of the object

These are the features specific to a given object. They may be features of quantity or quality (specified quantitatively or in the nominal scale). The characteristic values assume the form of parameters and empirical or theoretical functions. They may have a descriptive or axiological form. In this last case, they are regarded as resulting values corresponding with the applied assessment criteria.

Assessment criteria

Assessment criteria are measures used to run diagnostic studies or performing the role of testers in project work in reference to selection of the rational (optimum) solution. In both cases, assessment is done but focused on separate areas of application. Assessment criteria are used in diagnosis for determination of the actual condition, while in project work they decide which variant is best. Assessment criteria are features or parameters of axiological (evaluative) nature.

Organising aspects

Organising aspects perform the function systematising various objects. These aspects may be divided into: classification and preferential. *Classification aspects* are the features of division of any community into classes or type groups, or into constituent parts in case of systems. *Aspects of preferences* are points of view, views accord-

ing to which importance of objects is specified by hierarching them by assignment of ranks or points. Ranks and points are used to relativisation and scheduling of objects (in the sense of relationships of majority, minority or equivalence). Any determinants which are material or intangible values are assumed as aspects of preferences. These may be the objectives or the situations or circumstances according to which significance (meaning) of objects or assessment criteria is analysed.

Procedure of calculation of the weighted value of the object

This procedure is a research procedure which consists in quality analyses of the objects, e.g. in terms of their allocated use or functionality. The stages of this procedure are as follows:

1. Development of the template for assessment of the object;
2. Selection of aspects of preferences;
3. Determination of weights of assessment criteria;
4. Conducting verifying assessment and the final qualification of the object.

The diagram for this procedure is presented in Figure 1.

Development of the template of object assessment is one of the most important activities in the procedure. The assessment template is the summary of criteria assessment which make up a certain aggregate which constitutes a multi-criteria evaluative system. Assessment templates may be of standard or stipulation nature.

Standard templates are expressed with values (features, parameters) given in advance which are regarded as optimum (theoretically or practically), or they are determined obligatorily as preset (planned) values. They are by definition regarded as extreme values whose exceeding or not achieving is a shortcoming. Standard templates are also called *nominants*.

Stipulative masters assume two forms:

- one comes as *stimulants*, that is the features for which the increasing trend is desired;
- the other comes as *destimulants*, that is the features for which the decreasing trend is desired.

The difference between standard templates (*nominants*) and stipulation templates (*stimulants* and *destimulants*) lies in the fact that the deviation up or down for standard templates is assessed negatively, while in case of stipulation templates every situation of increase in the value of the stimulant is regarded positively and, similarly, every case of decrease in the value of the destimulant is assessed positive.

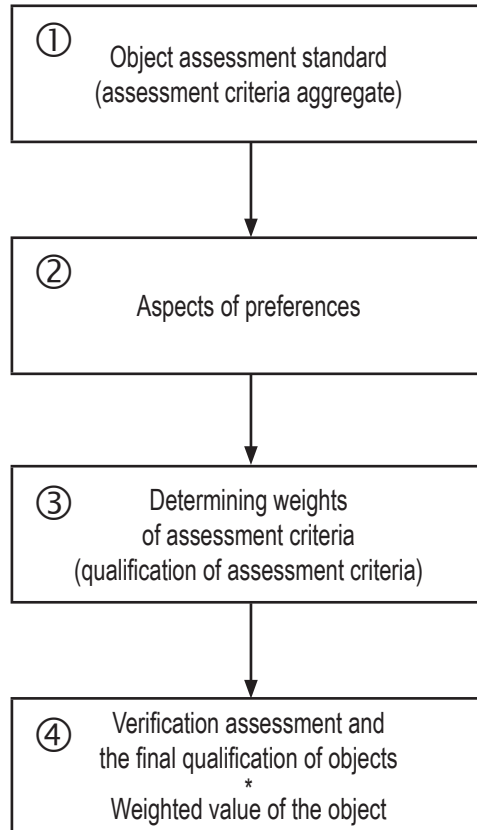


Figure 1. Procedure of calculation of the weighted value of the object

Source: author's own study.

Another step is the *selection of aspects of preferences*. In this case they perform a special role, as they are used for rational and objective determination of assessment criteria weights. Aspects of preferences qualify assessment criteria in the dimensions of purposefulness: economic, organisational, technical, social, etc. These aspects are selected in correspondence with the scope and substantial sense of the conducted research.

After the selection of preferential aspect, *assessment criteria weights* are determined. Weights express importance, significance, validity of a factor (these are measures used in a special way, as they are referred to the assessment criteria which constitute the original basis of assessment). This step in the procedure is the basic factor which determines weighted assessment of the objects, because it can only be done by determining preferences for individual assessment criteria.

The presented procedure is completed with the stage of *verifying assessment and the final qualification of the object*. The verifying assessment means measuring the degree of meeting the specific requirements, e.g. the degree of meeting the standards, functionality, the level of quality, and the final qualification of the object is its weighted value. The following formula expresses it:

$$V_{ij} = w_j \cdot q_{ij}, \quad (1)$$

where:

V_{ij} —weighted value of the i object due to the j assessment criterion

w_j —weight of the j assessment criterion

q_{ij} —the verifying assessment referred to the i object due to the j assessment criterion

$i = 1 \dots m$ —the objects

$j = 1 \dots n$ —the assessment criteria.

The aggregate weighted value A_i is calculated from the formula:

$$A_i = \sum_{j=1}^n V_{ij}. \quad (2)$$

The weighted average A_i^* may also be calculated:

$$A_i^* = \frac{1}{W} \left(\sum_{j=1}^n w_j \cdot q_{ij} \right), \quad (3)$$

where:

W —the sum of weights w_j .

It has to be noted that the verifying assessment q_{ij} is a standardised value.⁴

2.3. Verifying assessment in diagnostics and designing

As it was stated earlier, the verifying assessment is to indicate whether the given object observes the assumed requirements. It is thus used, e.g., for determination of results of company on the basis of specific measuring scale, which is to allow at the same time interpretation of successes or failures of the studied business unit. Interpretation of the results in the verifying assessment is done in the context of their trends, with a view on the adopted assessment criterion. The reason is that different assessments will be applied for decreasing trend in the indexes of sale profitability than for decreasing trends for energy consumption index. In the former case, the decreasing trend of the index will have negative significance, in the latter—positive. Interpretation of the results and their trends is the basic issue, which allows the proper verify-

⁴The essence of standardisation is presented in section 5.

ing assessment, especially in the situation of applying a multi-criteria model in which individual criteria are of the stimulant, destimulant or nominant nature.

The “verifying assessment” term will be understood as the result of the comparison of the original condition with the master, that is a standard or stipulative condition. Thus, verifying assessment is at the same time *standardised* (unified) *measure* referred to diagnostic variables, assessment criteria, parameters, features. With standardisation, the values originally different may be compared and algebraical operations may be done with them.

In case of the project, verifying assessments will be expressed, for example, with functionality, accuracy, importance, level of quality, thus in general referring to effectiveness. Verifying assessment is thus a special type of measurement in which a certain value with positive or negative sense (usually the verifying assessment is subject to categorisation) is subjected to the characteristic value.

Verifying assessment may be expressed in the scoring or index methods. The *scoring* form of assessment is proper for using the range scale (in the predefined range of the multi-grade assessment). The *index* form is the expression of using the quotient scale.

In both approach, reference of the actual condition to the template is done. In diagnostics, it may be a “result-planned” comparison or assessment of meeting some function by the given system. The level of compliance between the measured characteristic values and the standard condition is determined on the basis of the score (in the agreed scale) or with the effectiveness index. Both the scoring and the index verifying assessment are traditional measures for task completion or functionality (and other similar forms of performance), that is achieving a pre-defined result intended as the objective. The power of the measuring scale in which the specific assessment criterion can be expressed decides whether the scoring or index assessment should be applied.

As it was stated earlier, verifying assessment is defined by the *original condition–standard relation*, and the standard is understood as the standard or stipulative condition. Interpretation of this relation, however, is different in diagnostics than in designing, which should be explained with different objectives in these research directions.

For diagnostics, the original condition means the actual (real) condition of the object which is subject to verifying assessment, and the standard is the reference. In diagnostic research, the standard may come, for example, in the form of the planned or pre-set value, and it may also be an empirical value or the perfect structure.

In designing, it is assumed that the above relation is a comparative system which is to be used as the base for making decisions in selection of the rational (optimal) project. In this case, the original condition is represented by a set of projects or project variants from which the best solution has to be selected. The question may be asked whether referring individual projects to the standard is thus necessary. Finding the best solution in the given choice space does not mean that it meets the expectations

of the company management, of the investor or of another user. Therefore, the action should be taken into consideration in the decision procedure, which is verifying assessment, which will confirm whether the individual projects are eligible for the further stages, e.g. of the tender proceedings. This verification is to give answer to the question whether the proposed solutions meet the conditions of acceptability. The list of specific conditions of acceptability forms the standard in the designing process, which is thus the measure of the requirements which must be met by the designer and by the contractor. It has to be added that perfect standards may be designed, that is theoretical models which form references of higher level for the set of projects—apart from the acceptability standard. In this last case, the standard may be understood as the perfect option, perfection model. The prototypes standing out in terms of excellence may be treated in a similar way. This type of reference allows categorisation of the selected project, thus marking its level of quality.

3. Ranking method

The ranking method is used for qualification of projects (project variants) in the scale of values of natural numbers, from the best project to the worst (or the other way round). This method enables comparing heteronymous values, that is non-additive values of features which may be summed up when converted into ranks.

In diagnostic research and in selection of the rational variant, the additive, multi-criteria assessment of projects is based on the assumption of equivalence of significance of features which have been adopted for the analysis. Thus, the features with the assigned value sense are treated as criteria of selection, without differentiating their validity.

In ranking, the importance of the projects in a given set is determined according to adopted criteria of selection. Preferences for individual projects are specified in sequential ordering, and significance of the projects in the assumed set is expressed with the ranking number. *Ranking number* (rank) is an ordinal number which means the degree of validity of the project. It has to be stated here that there is no universal interpretation rule related to increase or decrease of the ranking number. In some cases, its increase may mean a higher rank of the object, in other the situation will be reversed and increase of the ranking number may express decrease in validity. The following are examples of the convention which consist in that the higher the rank (degree, category), the higher the digit which stands for it: grading groups (categories), medical specialisations, degrees of difficulty of work. The reverse convention may be used to qualify the capacity of the system to thwart threats, product qualities, levels of quality.

The research workflow in the project ranking method is as follows:

1. Defining the ranking range.
2. Collecting the data for ranking.

3. Preferential sequencing:
 - calculation of total ranks;
 - calculation of averaged ranks;
 - determining the item in the project.

Defining the ranking range

Ranking projects conducted on the basis of one criterion is a single-criterion ranking. If there are more criteria, we refer to it as multi-criteria ranking. In the latter case, ranking assumes the aggregate form in two variations:

- ranking with the basic ranking potential;
- ranking with high ranking potential.

Ranking potential is the number of selection criteria which are used for ranking. For example, the basic potential may have 2–10 criteria, while high potential may have more than 10 of them. Please note that there are no unanimous indications to define the ranking range at the basic or high levels. The practical needs and experience of the researcher will decide what ranking potential should be assumed.

Collecting data for ranking

The elementary data are necessary for ranking at this stage, namely: a set of projects and their characteristic values. The latter are the result values which correspond with the applied selection criteria.

The basic problem in the ranking method is the choice of selection criteria and the result values interpreted accordingly. The choice of selection criteria and ranking in itself require substantial knowledge of a specific empirical area, which constitutes the subject matter of specialised expert opinions. Interpretation of the result values is mostly related to determination of preferences which are assigned to them, as well as changes (increase, decrease) in these values.

The following solutions may be used in building the table of characteristic values:

1. The choice of selection criteria may be limited only to stimulants or destimulants.
2. If the summary of selection criteria includes both stimulants and destimulants, their ranking should be done in the reverse ways: for stimulants from the highest value to the lowest, for destimulants from the lowest value to the highest.
3. If nominants are included in the set of selection criteria, their ranking should be referred to the absolute difference Δ_{ij} between the nominant and the actual result value for individual projects:

$$\Delta_{ij} = \text{nom} |x_{0j} - x_{ij}| \quad (4)$$

where:

x_{0j} —the value of the nominant
 x_{ij} —the actual result value.

Preferential sequencing

Calculating of the total ranks (sums of ranks) and the averaged ranks is done according to the formulae:

$$R_i = \sum_{j=1}^n R_{ij}, \tag{5}$$

$$\bar{R}_i = \frac{R_i}{n}, \tag{6}$$

where:

R_i —the total rank (the rank aggregate) for the i project, where $i = 1 \dots m$

R_{ij} —the rank assigned to the i project due to the j criterion of selection, where $j = 1 \dots n$

\bar{R}_i —the average rank of the i project

n —the ranking potential (the number of selection criteria).

The ranking results are given in Table 1.

Individual and total ranks

Table 1

| Projects | Selection criteria (j) | | | | | R_i (sum of ranks) |
|----------------|----------------------------|-------|-------|-------|-------|-------------------------|
| | x_1 | x_2 | x_3 | x_4 | x_5 | |
| P ₁ | 1 | 1 | 1 | 2 | 2 | 7 |
| P ₂ | 3 | 4 | 4 | 4 | 4 | 19 |
| P ₃ | 6 | 5 | 5 | 3 | 3 | 22 |
| P ₄ | 4 | 3 | 3 | 5 | 5 | 10 |
| P ₅ | 2 | 2 | 2 | 1 | 1 | 8 |
| P ₆ | 5 | 6 | 6 | 6 | 6 | 29 |

Source: author’s own study.

The shortcoming of the ranking method is that it uses sequential scale, while strong scales (range and quotient types) may only be used in reference to quantitative characteristic values. In case of average ranks, the measurement has quasi-distance nature because it does not apply to natural or index distance, and only to the ranking distance (sequential).

Determining position of the project is the stage finishing the basic ranking process. It is, however, always relative for the given sets and it is a procedure resulting in the ranking of projects with the assumed assessment criteria (Table 2).

Moreover, determination of the position, that is the place of the project in the ranking, is done in the way reverse to that used in determination of ranks. The higher the ranking number, the higher the general level of the project. The position means the successive place in the ranking list (from the best to the worst), and the number 1 means the best position, 2 is a lower position, etc.

Table 2

Average ranks, project positions, ranking

| Projects | R_i (average rank) | Position | Ranking |
|----------|-------------------------|----------|----------|
| P_1 | 1.4 | 6 | 1. P_6 |
| P_2 | 3.8 | 4 | 2. P_3 |
| P_3 | 4.4 | 2 | 3. P_4 |
| P_4 | 4.0 | 3 | 4. P_2 |
| P_5 | 1.6 | 5 | 5. P_5 |
| P_6 | 5.8 | 1 | 6. P_1 |

Source: author's own study.

Ranking

Ranking may also be used in diagnostic studies, for example in comparative analysis of companies, products (of the same type), employees, managerial personnel. Ranking is used as an auxiliary tool in gradation of development barriers, too, in setting hierarchy for factors of threat or for the factors which are determinants positively affecting functioning of a system, etc. In this case, ranks are weights for particular factors and these are, on the principle of analogy, equivalents of assessment criteria. Diagnostic analysis is then used to give an answer to the question about the rank (importance) of the effect of a given factor on the studied system, and this effect is estimated with a view of the adopted aspects of preferences.

4. Scoring method

4.1. General characteristics of the scoring method

The scoring method is the method of qualifying projects in the conventional numerical scale with a specific system of assessment. The values of the features (parameters) of the projects or results (obtained or prospective)⁵ form the basis of assessment.

In the scoring method (unlike in ranking), qualification is done in the scale of real or integral numbers. The scales may be built in three areas:

⁵ Point (in scoring) is a conventional unit in calculation of results in diagnostic studies and in designing.

- as single-pole positive scales (with or without zero);
- as single-pole negative scales (with or without zero);
- as two-pole scales (positive-negative with or without zero).

Single-pole scales are used for assessment of results for features interpreted as positive or negative.⁶ These scales are thus applied in assessment of alternative features or phenomena. Two-pole scales are used for combined assessment which takes into account both positive and pejorative features. Interpretation of differences between positive and negative assessments is then an important issue.

Two-pole scales may assume symmetric or asymmetric form. The symmetric scale is used most often when there is no need for radical juxtaposing of positive and negative features. The asymmetric scale with positive extreme value, more distant than the negative extreme value (e.g. 5, 4, 3, 2, 1, 0, -1, -2, -3), occurs when the system of qualifications emphasising positive assessment degrees is used, otherwise more strict qualification is applied (with or without a critical point), emphasising negative assessment degrees.

The system for assessing projects performs the basic role in the scoring method. This system constitutes regulations for assigning scores on the basis of preferential system for assessment criteria and with calculation techniques of the verifying assessment. Assessing system should have its own methods, as freedom in scoring is common in practice, and it makes this very important tool of quality multi-criteria assessment imperfect.

4.2. Analytical proceedings in the score aggregation method

The proceedings in the score aggregation method is formed of the following steps:

1. Determination of the universal formula for weighted value.
2. Score standardisation of selection criteria.
3. Determination of weights of selection criteria.
4. Aggregate assessment (calculating the index for project variants IPP_i).
5. Categorisation of the index IPP_i .

The analytical approach to the scoring aggregation method is presented below.

1. The universal formula for weighted value:

$$V_{ij} = w_j \cdot q_{ij} \quad (7)$$

where:

The markings as in Formula (1).

2(A). Expanded score standardisation of selection criteria

⁶ Negative assessment may be expressed in positive or negative scales. For reasons of interpretation, in this case it is better to use the negative scale, e.g. in counting penalty points.

2.1. The verifying score assessment:

| Positive qualification (assessment degrees) | Score (positive scale) |
|--|---------------------------|
| I. Distinguishing factor | 6 |
| II. High usability factor | 5 |
| III. Good condition | 4 |
| IV. Average condition | 3 |
| V. Satisfactory condition (admissible) | 1–2 |

| Negative qualification (assessment degrees) | Score (negative scale) |
|--|---------------------------|
| I. Labile condition | (1–2) |
| II. Limited possibilities condition | (3–6) |
| III. Critical condition | (7–8) |

2.2. Interpretation of assessment degrees:

→ presentation of their interpretation as meeting specific requirements, appropriate for the assumed ranges in the qualification scale.

2.3. Essence of verifying assessment:

→ finding equivalence between the characteristic condition for individual project variants and a specified assessment degree (in line with the interpretation of individual assessment degrees).

2(B). Reduced score standardisation of selection criteria (low resolution)**■ The verifying score assessment:**

| Positive qualification (assessment degrees) | Score (positive scale) |
|--|---------------------------|
| I. Very good condition (distinguishing) | 6 |
| II. Good condition | 4 |
| III. Satisfactory condition (admissible) | 3 |

| Negative qualification (assessment degrees) | Score (zero and negative scale) |
|--|------------------------------------|
| I. Neutral condition | 0 |
| II. Unsatisfactory condition | (1–2) |

3. Weights of selection criteria:

4—criteria absolutely necessary (dominant)

2—criteria required (basic)

1—criteria useful (good).

4. Aggregate assessment (the scoring index of project variants IPP_i)

$$IPP_i = \sum_{j=1}^n w_j \cdot q_{ij}, \quad (8)$$

where:

Markings as above.

5. Categorisation of the index IPP_i

Category S (distinguishing)—the value of the index IPP_i above 80% of the maximum value

Category A (leading)—the value of the index IPP_i within 61–80% of the maximum value

Category B (average)—the value of the index IPP_i within 40–60% of the maximum value

Category C (low usability)—the value of the index IPP_i below 40% of the maximum value.

The calculated index IPP_i expresses the total scoring value for individual projects (project variants). The project with the highest score is the optimum solution (with the assumption that it meets the threshold conditions).

The last step is categorisation of the index IPP_i the essence of which is quality qualification of individual projects. Categorisation is thus an additional assessment of projects referred to the maximum score value achievable for the index IPP_i .

5. Quotient standardisation method

The standardisation method is the aggregate approach to index assessment of projects. The essence of quotient standardisation is in unification of the values of individual selection criteria by referring them to the pre-set standard values. Standard values of selection criteria are in the range from 0 to 1: the closer they are to one, the higher is the verifying assessment of the project. The opposite is true, too: the closer they are to zero, the lower is the verifying assessment.

The quotient standardisation method is used in the following steps:

1. Determination of the universal formula for weighted value.
2. Quotient standardisation of selection criteria.
3. Determination of weights of selection criteria.
4. Aggregate assessment (calculating the indexes Z_i and Z_i^*).
5. Categorisation of the indexes Z_i and Z_i^* .

The analytical formalisation of the quotient standardisation method is presented below.

1. The universal formula for weighted value:

$$V_{ij} = w_j \cdot q_{ij}, \quad (9)$$

where:

The markings as in Formula (1).

2. Quotient standardisation of selection criteria:

$$z_{ij} = \frac{x_{ij}}{\max_i \{x_{ij}\}} \text{ for } j \in S \quad (\text{stimulants}) \quad (10)$$

$$z_{ij} = \frac{\min_i \{x_{ij}\}}{x_{ij}} \text{ for } j \in D \quad (\text{destimulants}), \quad (11)$$

where:

x_{ij} —the value of the j selection criterion for the i variant

z_{ij} —the standard value of the j selection criterion for the i variant.

$$z_{ij} = \frac{x_{ij}}{x_{nom}}, \text{ when } x_{ij} \leq x_{nom}, \quad (12)$$

$$z_{ij} = \frac{x_{nom}}{x_{ij}}, \text{ when } x_{ij} > x_{nom}, \quad (13)$$

where:

x_{nom} —the nominant value

x_{ij} —the actual condition referred to the appropriate type of nominant.

3. Weights of selection criteria:

4—Criteria absolutely necessary (dominant)

2—Criteria required (basic)

1—Criteria useful (good).

4. Aggregate assessment:

$$Z_i = \frac{1}{n} \sum_{j=1}^n z_{ij}, \quad (14)$$

$$Z_i^* = \frac{1}{W} \left(\sum_{j=1}^n w_j \cdot z_{ij} \right) \quad (15)$$

where:

$$W = \sum_{j=1}^n w_j \quad (16)$$

5. Categorisation of the indexes Z_i and Z_i^* .

0.96–1.00 the distinguishing level (taxation 6.0)

0.81–0.95 the high usability level (taxation 5.0)

0.61–0.80 the average level (taxation 4.0)

0.51–0.60 the satisfactory level (taxation 3.0)

$0 \leq Z_i \leq 0,50$ }
 $0 \leq Z_i^* \leq 0,50$ } the unsatisfactory level (taxation 2.0).

The indexes Z_i and Z_i^* constitute simple arithmetic average or weighted arithmetic average of the aggregate assessment of the projects. The project with the highest index is the optimum solution (with the assumption that it meets the threshold conditions).

Just like in the score aggregation method, the last step of the procedure is categorisation of the indexes Z_i and Z_i^* . It will show in which range of the general (total) assessment the assessed project (project variant) is located. It has to be remembered that the best project does not need to be the distinguishing solution or high usability solution.

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Metody oceny agregatywnej w podejmowaniu decyzji projektowych

Streszczenie: W artykule wyróżniono następujące punkty: uwagi wstępne, analiza preferencji jako uniwersalna koncepcja oceny agregatywnej, metoda rangowania, metoda punktacji, metoda normalizacji ilorazowej.

W uwagach wstępnych podana została interpretacja oceny agregatywnej: polega ona na syntetycznym oszacowaniu wartości jakiegoś obiektu, poprzez połączenie w jedną całość pojedynczych kryteriów oceny. Ocena agregatowa ma szerokie zastosowanie, zarówno w odniesieniu do projektów, jak i do procesów, zjawisk, wszelkiego rodzaju rzeczy. Wykorzystuje się ją w badaniach diagnostycznych i w podejmowaniu decyzji (np. w związku z wyborem optymalnego wariantu projektowego).

Kolejny punkt artykułu to analiza preferencji jako uniwersalna koncepcja oceny agregatywnej. Ogólnie pojmowana analiza preferencji jest podejściem badawczym polegającym na kwalifikowaniu obiektów w określonej skali, czego wyrazem jest hierarchia ważności obiektów. W tym fragmencie tekstu przedstawiono również cykl procesu badawczego. Jego główne składowe to: obiekt, zbiór obiektów lub system, wielkości charakterystyczne obiektu, kryteria oceny, aspekty preferencyjne, procedura obliczania wartości ważonej obiektu.

W następnym punkcie tekstu omówiono metodę rangowania. Służy ona kwalifikacji projektów (wariantów projektowych) na skali wartości liczb naturalnych. Tok postępowania badawczego w metodzie rangowania przebiega następująco: 1) określenie zakresu rangowania, 2) zestawienie danych do rangowania, 3) porządkowanie preferencyjne (obliczenie rang sumarycznych, obliczenie rang uśrednionych, ustalenie pozycji projektu w rankingu).

Dalszy punkt został poświęcony metodzie punktacji i jej szczególnej formie, mianowicie agregacji punktowej. Tu kwalifikację przeprowadza się – w odróżnieniu od rangowania – na skali wartości liczb rzeczywistych lub całkowitych. Postępowanie badawcze w metodzie agregacji punktowej wyrażają następujące kroki: ustalenie uniwersalnej formuły wartości ważonej, normalizacja punktowa kryteriów wyboru, przeprowadzenie oceny agregatywnej (obliczenie indeksu IPP_i), kategoryzacji indeksu IPP_i .

Tekst zasadniczy zamyka punkt dotyczący metody normalizacji ilorazowej. Metoda ta jest agregatowym ujęciem oceny wskaźnikowej projektów. Istota normalizacji ilorazowej sprowadza się do ujednoczenia wartości poszczególnych kryteriów wyboru poprzez odniesienie ich do ustalonych wartości wzorcowych. Centralnym krokiem tej metody jest obliczenie wskaźników Z_i i Z_i^* . Stanowią one średnią arytmetyczną prostą lub ważoną oceny agregatowej projektu. Projekt o najwyższym wskaźniku jest rozwiązaniem optymalnym.

Słowa kluczowe: ocena agregatowa, analiza preferencji, metoda rangowania, metoda punktacji, metoda normalizacji ilorazowej

JOLANTA STANIENDA*

Determinants of development of business activity zones

Key words: regional economic growth, development of entrepreneurship, region competitiveness, business activity areas

S u m m a r y: The region with resources located in it and production factors may stimulate innovativeness and competitiveness in companies and at the same time may enhance competitiveness of local economy by creating surroundings which is more attractive for investors. Each region features different material and financial resources, labour resources, etc., which create conditions that affect development processes in companies. Therefore, taking into consideration regional and local factors that affect creation and development of entrepreneurship seems to be justified. This situation may be called increasing competitiveness between regions about Union funds, investors, etc. Establishing business activity zones (PL abbr. SAG) is one of the examples of such activities.

The objective of this paper is presentation of business activity zones as factors of regional economic development, deciding to a high degree about increasing competitiveness of the region and creating new work places. It also indicates benefits related to functioning of the zones, both for the region and for the companies operating in them. The thesis of the paper has been formulated as: expansion of a business activity zone contributes to increasing region competitiveness and increasing the number of companies located in the zone, which ultimately means creating new work places. More on general nature, special attention has been paid to the business activity zone in Tarnów.

1. Business activity zone purpose

Business activity zones (PL abbr. SAG) are the areas that are isolated and prepared for investing, and which meet the demands of prospective investors, most often created by local governments (business activity zones are established and function

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on the basis of the act on Special Economic Zones, the Ordinance of the Council of Ministers on establishing individual zones, as well as the regulations of the zones and their development plans with the act of 20 October 1994 on special economic zones (1). This formal definition does not constitute premises for further analysis of the problem. Thus, finding something that would better reflect the essence and researching the issues valid for business activity zones would be interesting and useful. The SAG issues in a broader sense may include a range of properly composed elements which attract investors. Some of the more important of these elements are:

- attractive financial conditions (fiscal, aid, etc.);
- development (the infrastructure, the area);
- support with the supply of services (legal, design, transport, scientific, medical, etc.);
- the appropriate social and cultural dimension (atmosphere, ambitions, safety, historical heritage, etc.).

The zones are of key significance for increasing the level of commercial investments, significantly increase investment attractiveness of the region, incite entrepreneurship and create new work places. The communes, perceiving positive effects of operation of such zones, merge new areas, build technical infrastructure and change allocation of the areas in local masterplans. The result is the ever increasing number of business activity zones.

The objective of the zones is, first of all, attracting investors. For this purpose, local authorities prepare and monitor conditions for companies which would allow creation of new work places. Entrepreneurs may use these zones for beneficial investing with minimum or even null taxes and in the properly prepared area. The first (industrial) business activity zones were established in mid-1990s. They mostly covered undeveloped municipal areas. The zones differ in size, infrastructure and development methods. Business activity zones will be converted into Special Economic Zones in future. Their rules of functioning have caused certain reservations of the European Union since the very beginning, as they were perceived as threat to equal competition (2). On 30 December 2008, new ordinances became effective on the conditions of managing business activities in the areas of special economic zones and extending the period of functioning of the zones until the end of 2020 (the ordinances previously in force stated that the zones would cease functioning in 2016 or 2017, depending on the zone) (3).

2. Conditions created by Special Economic Zones

Special Economic Zones (PL abbr. SSE) were established in Poland in 1994. Their original purpose was to create better conditions for entrepreneurs, at the same time directing stream of investors' money to the regions which needed such investments. The principles and procedure for establishing SSEs are regulated in the act on spe-

cial economic zones (1). The main objective of establishing a zone, according to the act, is to quicken economic development of the part of the country's territory by developing specific areas of business activities, expanding new technical and process solutions, increasing export, increasing competitiveness of the produced goods and of the services provided, managing the existing industrial property and commercial infrastructure, creating new work places and managing unused natural resources with ecological balance principles observed (4, p. 149). The zones, as an instrument of regional development, were established in the areas most deprived economically and facing structural unemployment as a result of collapse of entire branches of industry (5). There are 14 SSEs in Poland, established by the Council of Ministers on the motion of the minister competent for the issues of economy. SSEs in Poland may only be managed by a joint stock company or a limited liability company in which the State Treasury or the voivodeship local government has majority of votes (5). The zone may be established only on the land which is the property of the managing unit, of the State Treasury or of the commune(s), of the municipal union or on the land which is in perpetual usufruct of the managing entity (5).

When Poland was negotiating joining the European Union, the latter was very reluctant about SSEs, because their functioning alone was perceived as disruption to the rules of free competition. Thus, changes were made in functioning of special economic zones which consists in changing the maximum allowed tax exemptions. According to regulations prior to 2001, entrepreneurs investing in SSEs could count on complete exemption from income tax throughout the first 10 years of activity. This was to be 50% at a later time (1). After the changes made as of 1 January 2001, tax exemptions were equivalent to 50% of the investment expenses of large companies and 65% of small companies. The negotiations were successful in the regulation small businesses could maintain their privileges by the end of 2011, and medium-size businesses up to 2010. Large businesses turned to functioning on the principles compliant with those of the EU starting with the day of accession.

The rules and conditions for investing in the SSE premises and the benefits from conducting business activities there are specified in *the act of 20 October 1994 on special economic zones* and executive acts (the Act of 2 October 2003 on changing the act on special economic zones and other acts, Dz. U. 2003, no. 188, Item 1840; the Act of 30 May 2008 on changing the act on special economic zones, Dz. U. 2008, no. 118, Item 746; the Ordinance of the Council of Ministers of 10 December 2008 on the criteria whose meeting enables some land to be managed as a special economic zone, Dz. U. 2008, no. 224, Item 1477; the Ordinance of the Council of Ministers of 26 January 2010 amending the criteria whose meeting enables some land to be managed as a special economic zone, Dz. U. 2010, no. 15, Item 79; the Ordinance of the Council of Ministers of 10 December 2008 on public aid granted to entrepreneurs managing business activities on the basis of a permit for managing business activities in the area of special economic zones, Dz. U. 2008, no. 232, Item 1548; the Ordinance of the Council of Ministers of 26 January 2010 amending the Ordinance on

public aid granted to entrepreneurs managing business activities on the basis of a permit for managing business activities in the area of special economic zones, Dz. U. 2010, no. 15, Item 78).

The entrepreneurs placing their investments in the SSE area may take advantage of public aid granted in the form of income tax exemptions on account of (3, § 3):

- the costs of the new investment or
- creating new work places.

The volume of that aid depends on the maximum aid set forth for the area where the investment is executed and the values of eligible costs. The maximum intensity of aid in case of the investments executed in the areas of the Lublin, Podkarpackie, Warmian-Masurian, Podlaskie, Opole, Świętokrzyskie, Lesser Poland, Lubusz, Łódź and Kuyavian-Pomeranian Voivodeships is 50%, with 40% in the other voivodeships. The city of Warsaw area is the exception, with the cost covered with the help being 30% (3).

The amount of aid depends also on the size of the company. The aid granted to small businesses is increased by 20%, and to medium-size businesses by 10%. This relief does not apply to entrepreneurs operating in the transport sector.

Considering the amount of aid granted on account of the costs of new investments, it is calculated as a product of maximum intensity of aid set forth for the given area and the costs of the eligible investments. The entrepreneur may take advantage of such form of aid on the conditions of:

- managing business activities for a period not shorter than 5 years;
- maintaining ownership of the items of property to which the investment expenses were related for a period of 5 years.

And these periods are subject to shortening to 3 years for small and medium-size companies. The costs of acquisition of fixed assets borne by large entrepreneurs are covered with the aid only in reference to new fixed assets (3).

Another type of public aid granted in the form of income tax exemptions for the entrepreneurs operating in SSEs is the amount of aid on account of creating new work places related to the given investment. It is calculated as product of maximum intensity of aid and two-year gross costs of labour of newly hired employees, increased by all the obligatory payments related to their employment. The entrepreneur who takes advantage of this aid is obliged to maintain the newly created work places for a period of 5 years (3 years in case of small and medium-size companies) (3). The permit for managing business activities in the SSE area is the basis for granting public aid. The permits are issued by the companies which manage the zones by way of the combined tender proceedings or negotiations. The principles and method of conducting tender proceedings and negotiations are set forth (separately for each zone) in the *ordinances of the Minister of Economy and Labour of 2004 on tender proceedings and negotiations and assessment criteria for the plans as regards the investments to be made by the entrepreneurs in the zone area.*

Of the benefits coming from existence of SSEs in the given region, one most important has to be stated, namely attracting domestic and international investments, which in turn means new work places and investment expenditures that stimulate economic growth as well as the local market. A major investment is an immense impulse which affects the nearest surroundings. Decision on placing a company in a given area is related to purchase of land and construction of full infrastructure. Start-up of the company often requires employment of a large number of employees and making contacts with regional subsuppliers as well as with the entities from a broadly understood service sector: banks, restaurants, laundries or construction companies (for example local catering companies benefit from building a canteen for employees of the company). General estimates assume that 100 new work places generated in a zone creates, depending on industry, from 50 to 100 new work places in the surroundings of the zone.

The zones established in *brownfield* areas, that is in the former industrial centres, are of special importance. In this case, restructuring of the property remaining after liquidated companies is an important issue, significantly contributing to improvement of the image of Polish cities.

Location of companies turns out always to be a very difficult problem. The investor follows his own criteria based on which he indicates the places where he envisages his own company. It means that not always the investor may be persuaded in the negotiations to build his company in a place where the level of unemployment is high. The major criteria of importance to the investors are most often:

- customer accessibility (this factor is immensely important for the investor);
- access time: roads, airports, railway lines;
- areas and their preparation and price;
- labour (including qualifications of prospective employees, their cost, as well as their availability);
- potential of co-operating companies.

The size of domestic market and its trade network are also important. Obligation of the country in which the investors execute their projects is also important. Larger investors receive additional benefits from the state, e.g. refunding of the costs of personnel training or participation in providing utilities for the area. Special economic zones as they are and in reference to the aid programme are practically in existence only in Poland and have become Polish unique feature. There are practically no such zones in the Western Europe (6). Serious competition comes from the Asiatic economic zones in Dubai, China or the UAE (6). All in all, provisions related to establishing and functioning of SSEs are definitely broad and complex. Considering profits from the activities of the zones, it seems that the regulations for the rules of establishing the zones and their functioning should be simplified, which would be more beneficial for the entities that setup the zones and for the national economy (7).

3. Expansion of the business activity zone in Tarnów

Activities have been undertaken in the city of Tarnów aimed at expansion of the existing business activity zone. Creating comfortable conditions for international investors results in ever increasing commitment of the external capital into financing of the companies. Additionally, the positive attitude of the residents to the international investors (who are perceived as creators of new places of work) is also a factor which gives good climate for the investors. Many international companies have started their activity in Tarnów prior to 2011: the British Invensis Brook Hansen Group, LENZE (drive units and industrial automatics systems), Shell, Aral Polska and BP Polska, the American Goodyear with the Logistics Centre, the Austrian LEIER (building ceramics), Ahold Polska (supermarkets), Beckers S.A. (industrial paints and enamels), Summit Packaging Polska S.A. (the global producer of aerosol valves), DHL EXPRESS Poland sp. z o.o., GPL Projekty sp. z o.o.

The Tarnów business activity zone was based on the areas which were the property of Zakłady Mechaniczne Tarnów S.A. (over 66 ha). The expansion of the “Mechaniczne” business activity zone is to increase the zone area to 103.95 ha, thus creating new areas available for investments.

Business activity zones in Małopolska and their planned target sizes are presented in Table 1.

Business activity zones in Małopolska in 2011

Table 1

| Business Activity Zones | Target zone area (ha) |
|---|-----------------------|
| Zielony Park Przemysłowy “Kryształowy” in Tarnów | 357.0 |
| Wojnicki Zielony Park Przemysłowy | 153.0 |
| Strefa Aktywności Gospodarczej in Limanowa | 13.7 |
| Chrzanowsko-Trzebiński Park Przemysłowy | 55.5 |
| Miejska Strefa Aktywności Gospodarczej “Nowe Dwory” in Oświęcim | 45.0 |
| Myślenicka Strefa Inwestycyjna in Jawornik | 90.0 |
| Bocheńska Strefa Aktywności Gospodarczej | 51.4 |
| Strefa Przemysłowa “Zielonych Dobrezyc” | 51.0 |
| Miejska Strefa Aktywności Gospodarczej in Chełmek | 27.0 |
| Niedomicka Strefa Inwestycyjna | 500.0 |
| Wielicka Strefa Aktywności Gospodarczej | 216.0 |
| Strefa Aktywności Gospodarczej Bukowno | 10.0 |
| Strefa Aktywności Gospodarczej Dąbrowa Tarnowska-Żabno | No data available |
| Koszycka Strefa Gospodarcza | 18.0 |
| Strefa Aktywności Gospodarczej in Sucha Beskidzka | 9.0 |
| Strefa Aktywności Gospodarczej Małopolski Zachodniej in Zator | No data available |
| Strefa Aktywności Gospodarczej Książ Wielki | No data available |
| Strefa Aktywności Gospodarczej in Wolbrom | No data available |
| Strefa Aktywności Gospodarczej in Trzciana | No data available |

| | |
|---|-------------------|
| Nowobrzezki Obszar Gospodarczy | 38.0 |
| Strefa Aktywności Gospodarczej in Andrychów | 140.0 |
| Strefa Aktywności Gospodarczej in Niszowa | No data available |
| Gorlicka Strefa Aktywności Gospodarczej | No data available |
| Strefa Aktywności Gospodarczej in Szczurowa | No data available |

Source: author's own study on the basis of (8).

The data provided in Table 1 show that there are 24 SAGs in Małopolska, of which the Tarnów zone is one of the larger ones in terms of area of operation.

The SAG in Tarnów expansion project is executed in the partnership system. The applicant is the Commune of the City of Tarnów, and the Partner is Tarnów Industrial Cluster S.A. Tarnowski Zarząd Dróg Miejskich is the entity managing the new road infrastructure.

The objective of the operation of the “Mechaniczna” business activity zone is to increase investment attractiveness and encourage business activity in Tarnów with location of new business entities. It may all lead to social and commercial enlivening of Tarnów and the entire Tarnów subregion.

The business activity zone is expected to create attractive areas for managing business operations and investing, characterised with comfortable location and ready, modern infrastructure and low costs of using the auxiliary property, as well as professional auxiliary services.

Investment attractiveness means a set of benefits resulting from the location and adjustment of the area which leads to maximisation of profits and minimisation of investment risk due to reduction in investment expenditures and current costs of operation (resulting from high degree of area readiness).

The “Mechaniczna” SAG expansion includes providing comprehensive utilities for the zone: building a public road along with related infrastructure within the zone and existing internal roads, building a section of water pipeline network to provide water for the zone, building a collecting pipe for rain waters for the entire SAG along with the water pre-treatment infrastructure and their pumping in case of floods, building pedestrian lines. The road line concept includes also location of electrical, gas, telephone and central heating networks. This scope of work constitutes Stage 1 of adopted investment plan.

All the intended works contribute to merging and expanding the existing “Mechaniczna” SAG, where over 30 entities are already active. They will significantly help improving investment attractiveness of these industrial areas by facilitating access to them.

The expansion of the “Mechaniczna” SAG will enable acquisition of external investors, meeting their needs and creating conditions for further new business entities locating their offices in the area of Tarnów and, indirectly, in the Counties: Tarnów, Dąbrowa, Brzesko and Bochnia, within the so-called “A4 motorway investment cor-

ridor". The result will be economic growth and creating new places of work as well as increasing living standard for the residents of the Tarnów subregion.

The partial use of the existing and repaired infrastructure of the Mechanical Plant, of the Industrial Park and the infrastructure of the companies operating within SAG, along with the utilities network provided in the expanded part of the zone will secure for the investors conditions required by them for managing business activities.

The following are the factors in favour of establishing SAG in Tarnów:

1. Creating attractive areas for investments, fitted with necessary technical infrastructure provided in a comprehensive package.
2. Cleaning up and providing additional utilities for investment areas pursuant to provisions in planning and strategic documents and in line with the EU standards and requirements.
3. Development of the areas close to the East–West international transport route, E4.
4. Development and opening up of the merged areas allocated for industry where region lacks them.
5. Enhancing competitiveness of Tarnów against other cities in the voivodeship and in the neighbouring voivodeships.

The literature on regional development issues has no clear demarcation for objectives, products, results and interactions in the methods of analysing effects of zone operation. Assuming the Waldemar Siemiński's concept, results of execution of general objectives at the highest level are defined as a long-term result, called impact. In the middle level, results are the result of executed operational objectives. At the lowest level, products (specific goods and services) are the result of execution of detailed objectives. The differentiation between products, results and impacts has the key function in the method of analysing the effects of operation of a given system or implementation of the project (9). Based on this concept, expansion of SAG may be expected to lead to economic and social effects for the Tarnów region. These include:

- increase in employment (new work places, reduction of unemployment);
- economic growth (business enlivening and increase in production).

Encouraging to developing new forms of commercial activities in SAG in Tarnów, which will generate new work places, causes business and social revival in the region. The necessity of preparation of new investment areas and appropriate infrastructure stimulates economic development of local government.

Investors located in SAG will generate demand for various types of goods and services, which will contribute to establishing more companies in the surroundings of the zone. Moreover, people employed in the companies operating in the zone will drive consumer demand (with their increasing income), and the need to meet it will also affect development of business activity in the region. These phenomena are named resource and income multiplier effects in literature, which means feedback-type phenomena that consist in development of many varied companies as a result of

additional consumer and procurement demand resulting from starting or expanding a company. The strategic element determining development of commune economy and local companies as a result of SAG functioning is skilful *use of the potential of native companies*, both small and large. They may provide services and execute orders for the companies located in SAG.

The expansion of SAG in the city of Tarnów will also lead to the reduction in unemployment and increase in vocational activity in the region by way of creating new, permanent work places. It may also limit emigration of the population, due to opportunities of earning money and staying in the city. As a consequence, it may increase the feeling of safety in residents and their awareness that authorities and organisations offer help in development.

New work places form, in turn, higher competition in the market of companies, also in acquiring employees, which gives opportunities for higher earnings. New, large companies offer possibility of work on the spot, in the city, for young people and these with more experience, instead of escaping abroad in search of decent wages. Higher earnings mean higher income for local business, shops, service companies and the city itself. They also give opportunities for establishing new, native companies, which are always created around the zone. The business zone means a larger city budget, which brings higher funds for new pedestrian pavements, roads, sports fields, bicycle routes, etc.

Data in Table 2 are the measurable result of expansion of the “Mechaniczna” SAG. They show that the main indicator of the result of expansion of the zone is an increase in the number of companies located in the area.

Table 2

Planned effects of expansion of the business activity zone in Tarnów in the years 2012–2017

| Year | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|--|------|------|------|------|------|------|
| Index | | | | | | |
| Number of companies located in the business activity zone, including the zone of technological nature park | 31 | 33 | 35 | 37 | 39 | 40 |

Source: Prepared on the basis of (10).

The number of companies in 2017 is expected to increase by 9 (against 2012). As a consequence, it may help in increasing the number of work places in the Tarnów region. They will arise from investments of new entrepreneurs who will start their business activities in the expanded areas of the Business “Mechaniczna” Activity Zone in Tarnów. Estimating the exact number of work places created in further years in the SAG area is very difficult, though. This is mostly due to difficulties in estimating which entities and in which industries will be interested in undertaking activities in this area. The number of work places will also depend on the amount of invest-

ment of new entrepreneur and its distribution over time. Thus, the assumption has been made that the number of work places will increase annually by ca 10% against the base year. With the assumption that 371 persons (as of 30 April 2009) were employed in the SAG area in the base year (2010), it will mean 37 work places established every new year.

4. Final notes

The business activity zones are certainly of key significance for increasing the level of commercial investments, thus contributing to the investment attractiveness of the region, inciting entrepreneurship and creating new work places. The basic encouraging factor is offering for demanding entities—such conditions which will allow fast location of the investment with simultaneous reduction in the costs of access to external infrastructure. Therefore, it is necessary to undertake activities which will allow comprehensive preparation of adequately large areas (over 2 ha) for the investments, with the planned use as places for creating business activity zones, including technological park zones.

The most important factor deciding about development of the SAG in Tarnów is having something that could be offered for the investor to attract him—like facilitation and help in arranging the issues related to undertaking business operations, allowances in fees and taxes, attractive prices for land lease and purchase, and regulations related to public aid.

SAG may be the good way for commercial revival in the given area, yet the zone has to be developed with a good idea behind it. Preparation of the land and waiting that somebody may undertake investments alone does not make much sense. Apart from this, the information about SAG in Tarnów must be properly delivered to prospective investors, not only in Poland, but also in the EU and in the world. The existence of the required infrastructure, including good quality of roads and motorways, seems to be the main factor to decide about interest of investors in the Tarnów zone. The proper qualifications of labour to be employed in SAG shall also be taken care of. Cooperation with local authorities, the proper climate, friendly conditions for investing and managing activities within SAG are also important. In this respect, the thinking of local authorities changes for better.

The analysis of the SAG expansion in Tarnów provided in the paper allows also more general conclusions, related to the assessment of functioning of the zone. It is an important item which shows whether the given project resulted in expected outcome and was successful. There is no such system of assessment of business activity zone functioning. This item should be the subject matter for further studies.

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Determinanty rozwoju stref aktywności gospodarczej

Streszczenie: Region i znajdujące się w nim zasoby oraz czynniki wytwórcze mogą stymulować innowacyjność i konkurencyjność przedsiębiorstw, a jednocześnie podnosić konkurencyjność lokalnej gospodarki, tworząc otoczenie bardziej atrakcyjne dla inwestorów. Każdy region charakteryzuje się odmiennymi zasobami rzeczowymi, finansowymi, zasobami pracy itd., które kreują warunki wpływające na procesy rozwojowe przedsiębiorstw. Dlatego też uwzględnienie czynników regionalnych i lokalnych wpływających na tworzenie i rozwój przedsiębiorczości wydaje się uzasadnione. Można mówić o nasilającej się konkurencyjności między regionami o środki unijne, inwestorów itd. Jednym z przykładów takiej aktywności jest tworzenie stref aktywności gospodarczej (SAG).

Celem artykułu jest przedstawienie SAG jako czynników regionalnych rozwoju gospodarczego, w dużej mierze decydujących o podniesieniu konkurencyjności regionu oraz o powstawaniu nowych miejsc pracy, a ponadto wskazanie korzyści związanych z funkcjonowaniem stref zarówno dla regionu, jak i dla działających w nim przedsiębiorstw. Teza artykułu zakłada, że rozbudowa strefy aktywności gospodarczej oddziałuje na podniesienie konkurencyjności regionu oraz na zwiększenie liczby przedsiębiorstw zlokalizowanych na terenie strefy, w konsekwencji zaś na utworzenie nowych miejsc pracy. Poszerzając kwestie ogólnej natury, szczególną uwagę zwrócono na strefę aktywności gospodarczej w Tarnowie.

Słowa kluczowe: regionalny rozwój gospodarczy, rozwój przedsiębiorczości, konkurencyjność regionu, obszary aktywności gospodarczej

ANNA WOJTOWICZ*

Study in pro-innovative organisational culture of the company

Key words: company culture, diagnosis, innovativeness, effectiveness

S u m m a r y: The key issue which decides about survival and success in the global market, under the conditions of the economy based on knowledge, is the capacity of the company to system-based creating and implementing innovation.

In the business practice, innovations are a significant factor to support execution of the development strategy of companies, but also of the whole economy, by enabling renewal of industrial structures or contributing to development of new sectors in business activities. Due to the increasing of these phenomena of conversion in the scope of cultural patterns according to new requirements of the global economy, they now become one of the basic problems which almost all companies all over the world face these days.

Company culture is understood as fixed patterns of thinking and behaviour of employees, developed by attitudes and behaviour of the management. It permeates the processes of both formulating the strategy and executing it. The company which understands its culture may use this knowledge as a source of strategic power.

The objective of the paper is to present the results of diagnosis of organisational culture in terms of its proinnovativeness. In the first stage of the study, on the basis of the obtained results of descriptive and questionnaire studies, the model of organisational culture in each of the companies was produced. The next stage of the study consisted in defining the culture required in the studied entities due to the strategy executed by them. First, the strategy of the studied companies was determined, and then the type of desired culture which enables proper execution of the strategy. The final stage of the study consisted in indication of directions and areas of changes in the current organisational culture.

The cultural models of the studied companies developed on the basis of the conducted study and presented in the paper show complexity and specific nature of the practised values and culture standards which may support or limit the capacity to manage innovative activities.

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1. Preliminary notes

Company culture is understood as fixed patterns of thinking and behaviour of employees, developed by attitudes and behaviour of the management. It permeates the processes of both formulating the strategy and executing it. The company which understands its culture may use this knowledge as a source of strategic power.

The basic condition of functioning of companies in the global market, under the conditions of increasing competition, the economy based on knowledge, is the capacity to system-based creating and implementing innovation (1, p. 20). In particular, innovations lead to:

- refreshing and expansion of the production and services assortment and the related markets;
- implementation of the new methods of production, procurement and distribution;
- introduction of changes in the methods of management, organisation of work, conditions of work and qualifications of labour.

In business practice, innovations are a significant factor to support execution of the development strategy of companies, but also of the whole economy, by enabling renewal of industrial structures or contributing to development of new sectors in business activities. Due to the increasing of these phenomena of conversion in the scope of cultural patterns according to new requirements of the global economy, they now become one of the basic problems which almost all companies all over the world face these days.

Flexibility, speed, effectiveness and responsibility of the company depend on skills, psychological assets and mentality of the employees. They need to want changes, not be afraid of innovation, not settle in the groove. Therefore, one of the tasks of the managing personnel is developing the appropriate (that is flexible, soft) organisational culture. This issues are difficult in terms of cognition, require cooperation of economists, sociologists and psychologists, there are no good methods of analysis of the culture, and the results of the analysis require professional interpretation, while the activities in this respect provide results with extended delay. For these reasons, company managements are not willing to deal with these issues. In this situation the strategies are developed which do not meet aspirations of owners, managers, or employees.

Multitude of the factors which shape organisational culture and multitude of cultures (subcultures) require from the researchers of this phenomenon precise determination of the subject matter of the study or, more generally, the “borderlines” of the study. The studies of organisational culture most often refer to cultural standards and values, that is the values which prevail in the organisation, and to their sources, and to their effect on the organisation. The cultural values and standards of the organisation may be classified into values and standards of strategic importance (e.g. car-

ing about people, competitiveness, quality, loyalty, focus on the market/ clients) and standards and values of operational importance (e.g. education, professional attitude, team work, the way of treating subordinates). In each case, they affect functioning of the organisation.

The research results presented in the paper refer to two purposefully selected business entities: an average-size private company and a large State Treasury company. A small number of studies entities is the consequence of the specific nature of the research process whose main objective was verification in practice of the diagnostic procedure of organisational culture of a company in the context of their executed strategy, proposed by the author of the paper (2). The objective of the study was to obtain possibly the most complete image of organisational culture of the studied company from both “quantity” (the questionnaire study) and quality points of view—the description of culture.

The model of diagnosing the organisational culture in the context of the strategy executed by a given organisation constitutes the basis of the solution for the presented problems. The model formulated is based in particular on the studies of literature of the subject matter and own views, as well as on the basis of earlier studies (Figure 1).

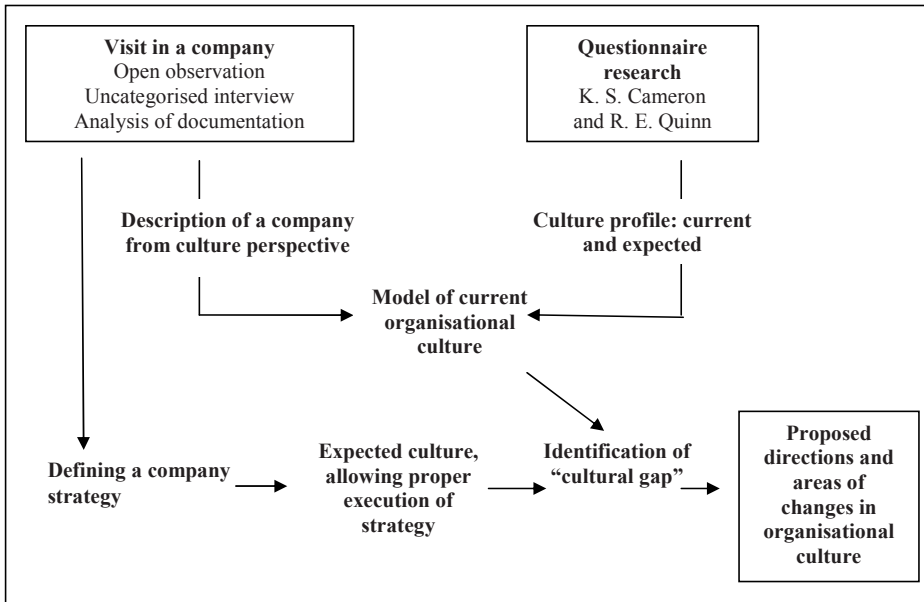


Figure 1. Research procedure

Source: author’s own study.

The diagnostic approach with elements of forecasting has been used in building the presented model (this applies to the concept of desired culture). In diagnosis of

organisational culture with its use, attention shall be paid to the following assumptions:

1. The possible comprehensive recognising of culture symptoms is the basic condition for the diagnosis.
2. The strategy of organisation is regarded as a determinant of organisational culture, therefore diagnosis may not be conducted if the strategy is not clearly defined in the selected organisation.

The study was conducted during the period from March 2009 to January 2010. The research process consisting in diagnosing organisational culture of the selected entities was initially executed along two lines:

1. Getting acquainted with situation in the entities studied. The following research techniques were used in the study: the visual inspection of the company, open observation, uncategorised interview and analysis of documentation. The identification of symptoms and of elements of organisational culture in the studied entities is the result of this procedure.

2. Questionnaire studies. The OCAI questionnaire (The Body Culture Assessment Instrument) was the tool used in the empirical study, based on the model of competing values, created by Kim S. Cameron and Robert E. Quinn (3). The conducted questionnaire study resulted in defining the profile of leading cultural values in the studied units.

On the basis of obtained results of descriptive and questionnaire studies, the model of organisational culture in each of the companies was produced.

The next stage of the study consisted in defining the culture required in the studied entities due to the strategy executed by them. First, the strategy of the companies (on the basis of analysis of documentation and talks with the management), and then the type of the desired culture (enabling proper execution of the strategy) were defined.

Just like with the organisational culture, the strategy of companies is dependent on the surroundings, and the degree of its variability and complexity. The surroundings may be characterised with the scale from the situation of certainty and stability to the situation of uncertainty and complexity. The above specific nature of the surroundings forms the basis for defining two extreme types of both strategy and organisational culture. Strategy is located in the area between perfect strategy and creative strategy (Table 1), whereas organisational culture may be focused on stabilisation and organisation or on innovativeness and flexibility, and on the surroundings (and the type of organisational culture results from the model of competing values).

Table 1

Features of perfect strategy and creative strategy

| Perfect strategy | Creative strategy |
|--|---|
| <ul style="list-style-type: none"> - focused on continuous improving of currently executed tasks, objectives, without analysing principles of such proceedings with a view on the needs in the organisation and in the surroundings - results in duplication of actions, procedures and results - proves well under satisfactorily stabilised conditions, under conditions of changing surroundings leads to "trained incapacity" | <ul style="list-style-type: none"> - proves well in turbulent surroundings - aims at finding new methods of satisfying the current needs - enables creativity and active reacting to new needs - allows designing of new methods of manufacturing of the goods that are already in production - aims at finding new markets or deeper penetration of the current markets |

Source: author's own study on the basis of (4, p. 53).

The above typology of strategies has been used as the basis to formulate the five basic dimensions used for its identification (Table 2).

Table 2

Classification of strategies

| Dimensions of strategy | Level of value of individual dimensions | | | | | Assessment of parameters of strategy |
|--------------------------------------|--|---------|---------|--|---------------------|--------------------------------------|
| | 1 | 2 | 3 | 4 | 5 | |
| | definitely perfect | perfect | neutral | creative | definitely creative | |
| 1. Expectations of clients | Full standardisation and repeatability of product or service | | | Continuous changes in product or service | | |
| 2. Adopted strategy of competition | Leader in cost | | | Leader in brand | | |
| 3. Subject matter of sale | Work of muscles, used means and objects of work | | | Work of mind, idea and concept as the result | | |
| 4. Reaction to a difficult situation | Attempted sale to client of what the company currently has | | | Attempted winning for client of what he/ she expects | | |
| 5. Attitude to client | Client is an intruder causing problems | | | Client is the actual employer of company employees | | |
| Average | | | | | | |

Source: (4, p. 54).

The level of creativity in strategy determined in this way constitutes the source of indications of changes in the area of organisational culture. It has to be assumed that

the higher the level of creativity in strategy, the higher flexibility and attitude to the surroundings should feature organisational culture.

The final stage of the study consisted in indication of directions and areas of changes in the current organisational culture of the companies, after a prior comparison of current culture as well as of desired culture.

The questionnaire study covered all the employees in the studied companies.

2. Identification of organisational culture—study results

2.1. Organisational culture in Bud-Sys sp. z o.o. Zakład Pracy Chronionej

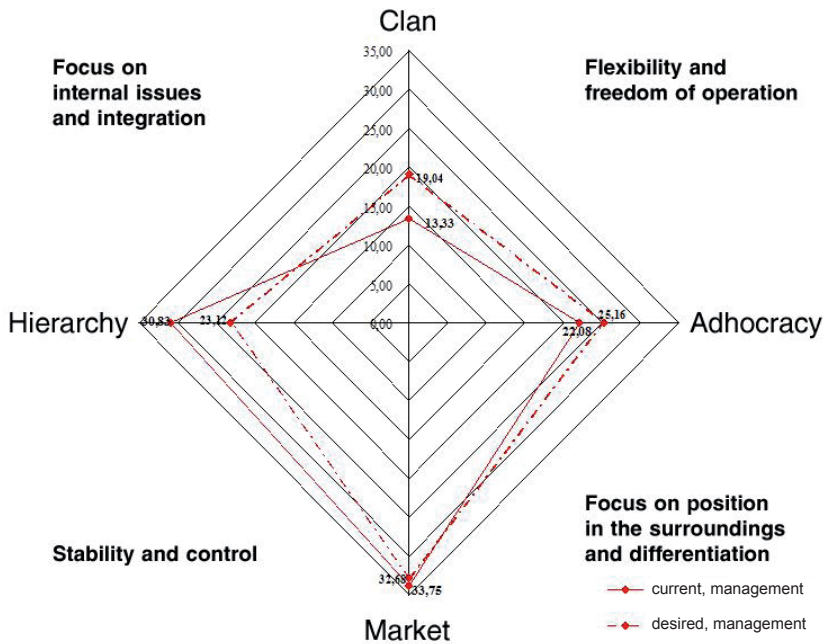


Figure 2. Organisational culture in Bud-Sys sp. z o.o.—present condition and desired condition according to the Board of Directors

Source: author’s own study.

The analysis of Figures 2 and 3 suggests following conclusions: according to the employees, the hierarchical culture (37.58) and the market culture (29.32) are definitely dominant in the culture profile of the company in the present condition. This view is in line with the opinion of the Board of Directors that states that hierarchical

culture and the market culture have similar impact strength (30.83 and 33.75, respectively). The profile of desired situation, in the opinion of the Board of Directors and all the employees, show a similar change trend, namely the shift towards quarters of the culture of clan and adhocracy. It is interesting that the specification of intensity of the culture of adhocracy is similar (24.42 and 25.16), but the culture of clan shows significant differences (the employees 25.14 and the Board of Directors 19.04). It has to be stated here that according to the Board of Directors, the emphasis on the market culture should remain unchanged, but according to the employees, this type of cultural impact should be slightly weaker in the future, in favour of the culture of clan. Thus one could say that the culture change in the company should focus on increasing its flexibility and internal integration, with the current attitude to competition in the market maintained.

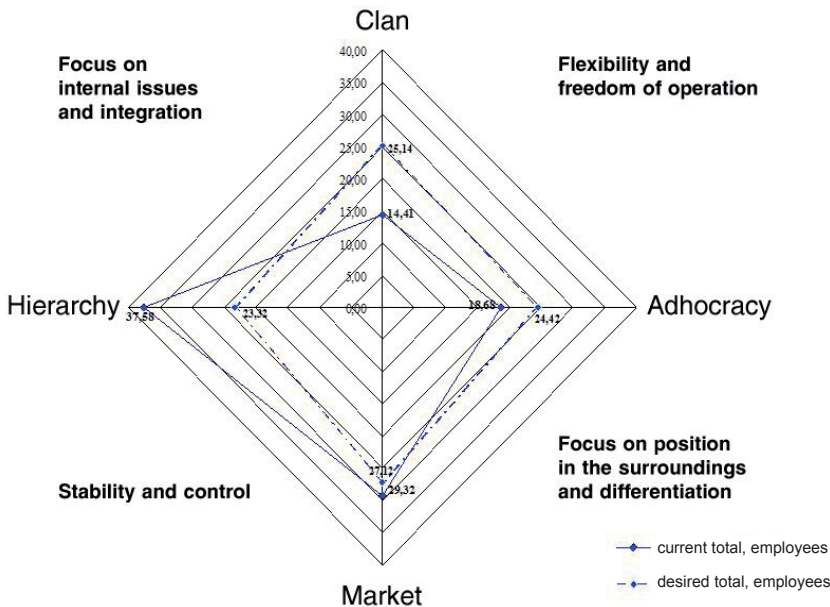


Figure 3. Organisational culture in Bud-Sys sp. z o.o.—present condition and desired condition according to all the employees

Source: author’s own study.

The strategy of the company, which constitutes the basis for assessment of adequacy of the organisational culture, is creative strategy (4.34). It means that its execution requires high flexibility in both the structure and the processes which are executed in the company (Table 3). However, it mostly requires flexibility, innovativeness and openness to changes from the employees and the management of the company.

Classification of strategy in Bud-Sys sp. z o.o.

Table 3

| Dimensions of strategy | Level of value of individual dimensions | | | | | Assessment of parameters of strategy (average from opinions of the respondents) |
|--------------------------------------|--|---------|---------|--|---------------------|---|
| | 1 | 2 | 3 | 4 | 5 | |
| | definitely perfect | perfect | neutral | creative | definitely creative | |
| 1. Expectations of clients | Full standardisation and repeatability of product or service | | | Continuous changes in product or service | | 4.4 |
| 2. Adopted strategy of competition | Leader in cost | | | Leader in brand | | 4.4 |
| 3. Subject matter of sale | Work of muscles, used means and objects of work | | | Work of mind, idea and concept as the result | | 3.9 |
| 4. Reaction to a difficult situation | Attempted sale to client of what the company currently has | | | Attempted winning for client of what he/ she expects | | 4.1 |
| 5. Attitude to client | Client is an intruder causing problems | | | Client is the actual employer of company employees | | 4.9 |
| Average | | | | | | 4.34 |

Source: author's own study.

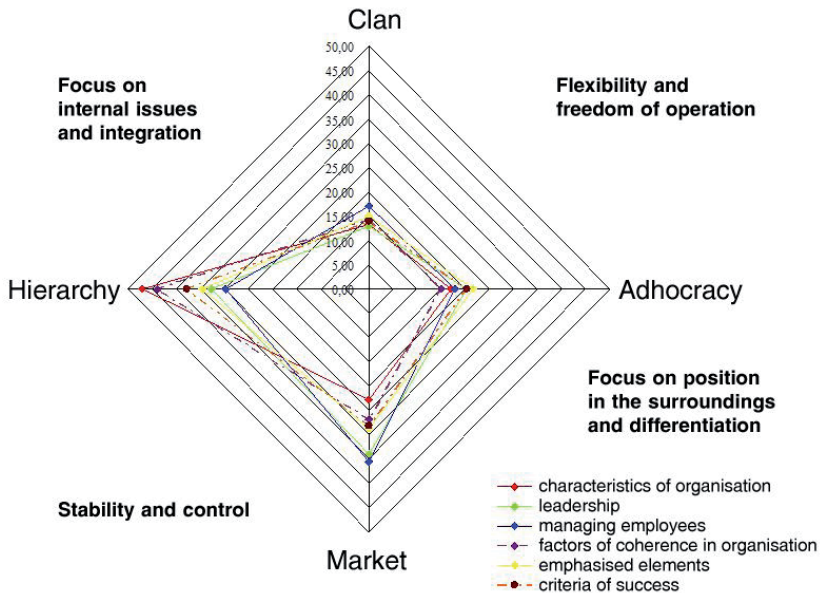


Figure 4. Profiles of organisational culture for individual questions—Bud-Sys sp. z o.o.

Source: author's own study.

To ensure effective execution of the strategy in future, the company needs significant changes in organisational culture. This process seems feasible, as the culture of the company is not too coherent (see Figure 3). The strongest differences are related to the issue of its image with respondents. What needs changes most is the perception of the organisation and factors which ensure its coherence and issues emphasised by it most. Defining criteria of success in the context of flexibility, openness to new phenomena and autonomy in operation should also be reconsidered.

The descriptive model of organisational culture

Current elements

ARCHITECTURE: internal and external. The head office of the company is located in a renovated 2-storey office building which is its property. Apart from office rooms, it holds a laboratory, a shop and a spare parts warehouse. The building is surrounded with a parking lot and a yard with garages, warehouses and production buildings. A basketball and volleyball playing areas are located nearby where the employees enjoy the annual President's Cup tournament. Individual rooms inside are built in the closed-space system with little open space, except for the secretary office located in the annex to the corridor. Apart from office rooms, a kitchen with the dining area was designed for the employees and the conference hall. The Server Room is an area accessible for the chosen few who have a special magnetic card (3 are in use) to enter it.

WORK STATIONS. Apart from the President of the Board of Directors, no one has individual office room. In most of the rooms, work stations are built as open-space units which allow free communication. Work stations in the Design Department are an exception. Designers work independently, and it is reflected in the organisation of their work places: each designer has a separate seat, in his/ her own separate box area, at his/ her own desk. All the work stations (not only those of designers and programmers) are fitted with modern computer hardware.

APPEARANCE OF EMPLOYEES. As regards the clothes, the employees are obliged to follow the office dress code: jackets and ties for men, and jackets or suits for women. The employees of the Warehouse, the Laboratory and the Production Department wear protective clothing.

ORGANISATIONAL CLIMATE. The company has a rule: "if something needs to be done, we work along until it is done." This rule applies to everybody, both the management and the employees. It is a common experience, then, that those who work on highly important tasks remain in their work places late into the night. The mood of competition can be felt among the employees, which is manifested with the so-called "wailing wall" of the IT employees. All the certificates won by individual employees of the department are placed on this wall. Who has the largest number of them is regarded best. Bud-Sys has several daughter companies in which directors perform functions of presidents, which is summarised in the statement: "Everyone here is president."

The company is a Supported Employment Enterprise, even though the disabled constitute only ca 10% of the total number of employees. Care about the employees and protection of their health manifests mostly with fitting the work places with modern, employee-friendly computer hardware (LCD screens, ergonomic keyboards and mouse sets and chairs), as well as with full meals reserved for all the employees in a nearby inn. The lunch break may be used from noon to 2 p.m. (30 minutes).

STRENGTHS AND WEAKNESSES. The company regards the following as its strengths: (+) a broad service offer, (+) the optimum time for execution of orders, (+) protection of the natural environment, (+) the guarantee and post-guarantee service, (+) experience and qualifications of the employees, (+) quality of services, (+) using the latest technologies. Weaknesses are: (–) weak flow of information between the departments, (–) lack of deeper integration of the employees, (–) weak image, (–) insufficient system of trainings.

Far-reaching (strategic) elements

VISION. We will be (we are) a modern company in which no one will design “on the board,” but on the computer, operating in the domestic and international markets, with the main office in Tarnów.

EXTERNAL IMAGE. The company is perceived as a modern, innovative technological company and tries to create this image in the external relations. It constitutes an attractive place of work for young people. The clients are surprised with the fact that “such a company” (meaning a modern one, using the latest technologies) comes from Tarnów, and more often locate it in Krakow (where a daughter company is located). Therefore, the Board of Directors decided to transfer the main office of the company to Krakow.

STRATEGIC VIGILANCE. The values and attitudes related to the culture of hierarchy are dominant in the organisational culture of the company: expanded inspection, authoritarian style, centralised decisions, emphasis on observing certain principles and procedures. Strategic vigilance is related to flexibility in activities, openness to changes and high qualifications.

Far-reaching elements—operational

INTERNAL IMAGE. The company is dominated by men, the descriptions of majority of qualification requirements for the key work places include as the preferred factor: male. Despite all efforts, the company may be called a “traditional organisation” which in its adjustment to the requirements of the information society has emphasised mostly development of the IT infrastructure without combining this process with simultaneous developing of its knowledge resources. Gaining knowledge is done in it by learning of individual employees in various types of training activities. Such knowledge has the nature of individual knowledge which is at present insuf-

ficient for the organisation to grow effectively. The company lacks modern management of human resources related to knowledge management. Efficient execution of the HR process is not enough for it to be a modern organisation.

COMMUNICATION. The company has appropriate technical means in the form of mobile and landline phones, a computer network with modern software used for internal and external communication. The selected information from the meetings, the minutes from the ZSZJiŚ¹ inspection by the highest management and the data related to employee issues are displayed in a common notice board and sent by e-mail.

QUALITY. Quality is perceived in the company as one of the key factors of success, which is confirmed with its obtaining the ISO 9001 and 14001 Certificates of Quality. The management of the company has defined and declared the Integrated Policy for Quality and Environment Management whose text is exhibited in general-access places for the purpose of making the personnel and clients visually acquainted with the objectives and obligations of the company. Based on its assumptions, the Integrated System of Quality and Environment Management was implemented which settles the course of all the processes in the company.

Assumptions—superior values

THE PHILOSOPHY OF THE COMPANY is in entirety based on the pro-quality approach. It is expressed mostly in excess formalisation of the activities by detailed descriptions of the operational procedures.

2.2. Organisational culture in REGION sp. z o.o.

The charts (Figures 5 and 6) with opinions of the management and all the employees of the Head Office in total show that the present cultural profile of the company is balanced. None of the four types of culture is clearly dominant (the differences between the values showing intensity of individual types of culture are in the scale of two units). The highest intensity is assigned to the culture of clan (management—24.53, employees—26.86) and the culture of hierarchy (26.17 and 24.51, respectively).

The profiles presenting desired culture are more varied. First of all, the shift towards the culture of adhocracy and clan is apparent. This trend is visible in the profile of the management and in the opinion of the employees. It is clear from the comparison of both profiles of the desired condition that in the opinion of the employees the most significant change should apply to making the company more flexible by weakening the focus on internal issues and stability and control, in favour of strengthening its focus on surroundings and flexibility and freedom of activity. It is interesting

¹ ZSZJiŚ—Integrated System of Quality and Environment Management (PL: Zintegrowany System Zarządzania Jakością i Środowiskiem).

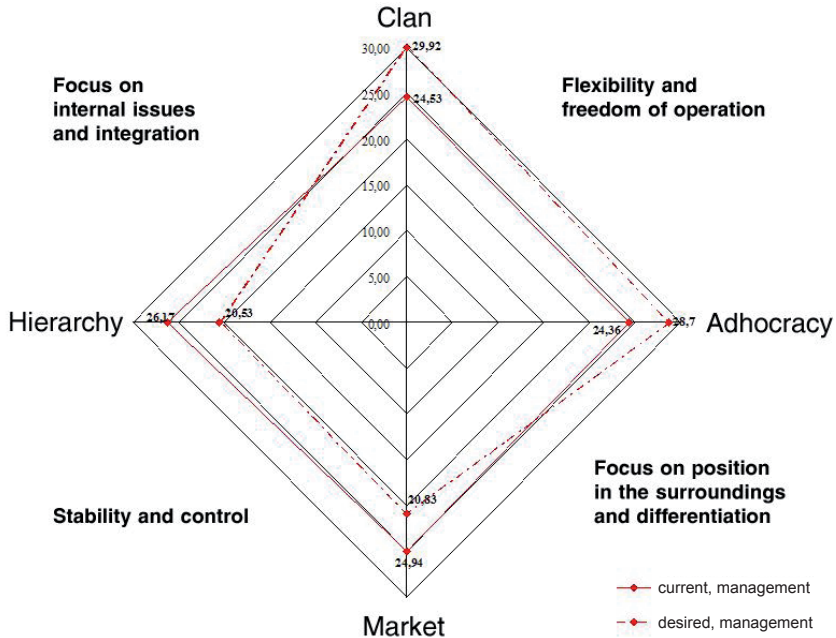


Figure 5. Organisational culture in Region sp. z o.o.—present condition and desired condition according to the Board of Directors

Source: author's own study.

that both the profiles of the desired situation and in particular the profiles of the current situation of the management and of the employees are similar. This proves first of all the openness and conscious course of the information policy in the company, within which significant issues are clearly and openly articulated.

It may be roughly stated that the change of organisational culture in the analysed company should mostly consist in strengthening the culture of adhocracy. Such a drawn direction of changes is compliant with the requirements of the strategy of operation agreed by the management of the company. This strategy may be called neutral and potentially creative. On the basis of the assessment of the management as regards particular dimensions of the strategy, the average assessment was 3.06 (Table 4).

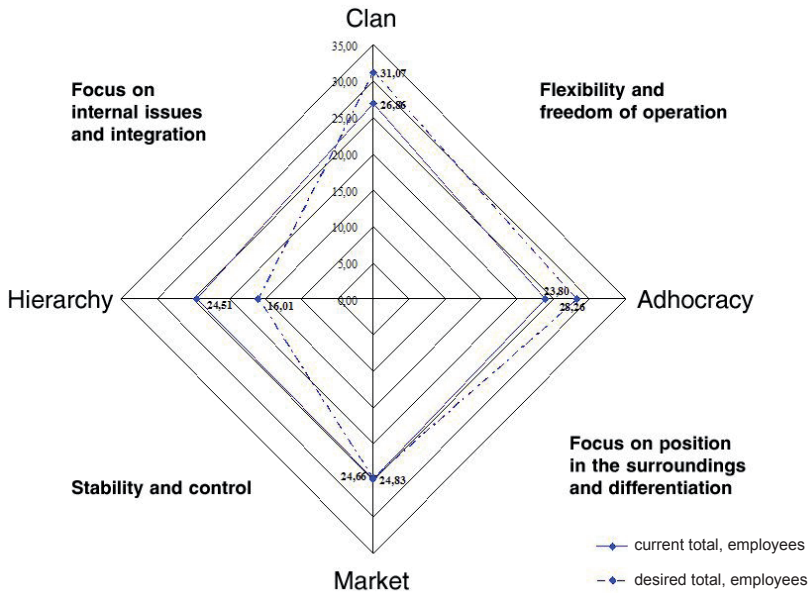


Figure 6. Organizational culture in Region sp. z o.o.—present condition and desired condition according to the employees

Source: author’s own study.

Table 4

Classification of strategy in Region sp. z o.o.

| Dimensions of strategy | Level of value of individual dimensions | | | | | Assessment of parameters of strategy (average from opinions of the respondents) |
|--------------------------------------|--|--------------|--------------|--|--------------------------|---|
| | 1 definitely perfect | 2 perfect | 3 neutral | 4 creative | 5 definitely creative | |
| 1. Expectations of clients | Full standardisation and repeatability of product or service | | | Continuous changes in product or service | | 2.0 |
| 2. Adopted strategy of competition | Leader in cost | | | Leader in brand | | 2.5 |
| 3. Subject matter of sale | Work of muscles, used means and objects of work | | | Work of mind, idea and concept as the result | | 3.8 |
| 4. Reaction to a difficult situation | Attempted sale to client of what the company currently has | | | Attempted winning for client of what he/ she expects | | 2.0 |
| 5. Attitude to client | Client is an intruder causing problems | | | Client is the actual employer of company employees | | 5.0 |
| Average | | | | | | 3.06 |

Source: author’s own study.

The strategy of this type features continuous improving of the currently executed tasks and objectives, but by taking into consideration the need in the organisation and outside of it.

To be able to specify the directions and scope of changes in the culture of the company more precisely, the coherence of its organisational culture should be assessed. The chart presenting cultural profiles in the aspect of individual questions of the questionnaire will be helpful in this respect (Figure 7). On the basis of the analysis of this chart, the culture of the company may be said to be coherent to a high degree. In planning the strategy of changes in the culture, changing the internal image of the organisation should be analysed, which may be related to possible redefining of the factors which ensure its cohesion (the highest intensity in the chart of the culture of hierarchy) and leadership and, possibly, a more liberal style of management should be applied. However, one has to remember that the analysed company is a state-owned unit operating in the sector strategic for the interests of the state and that it is under a strong influence of the operations of the entire political system. Therefore, the proposed directions of changes may be applicable.

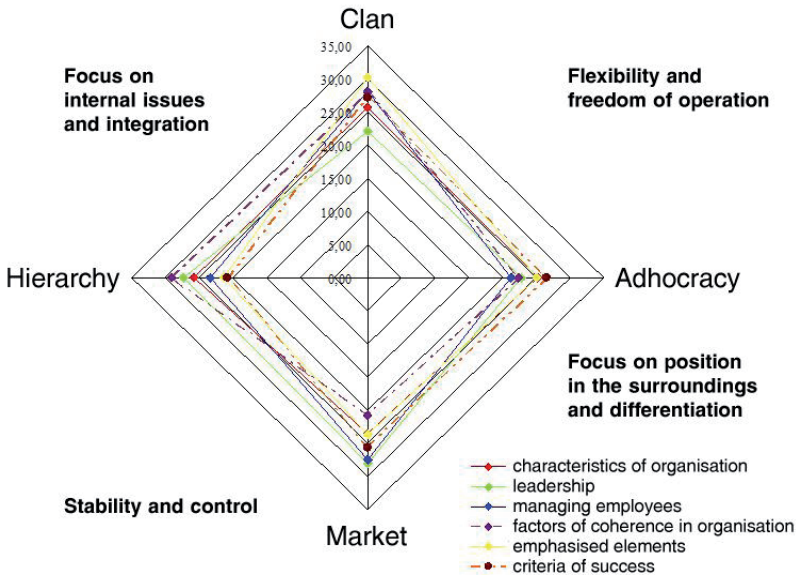


Figure 7. Profiles of organisational culture for individual questions—Region sp. z o.o.

Source: author's own study.

The descriptive model of the organisational culture Current elements

LOGO. The logo of the company is displayed in all the organisational documents, but in external relations the logo of the product offered by the company is more emphasised.

ARCHITECTURE: external and internal. The head office of the company is located in a renovated building which has gained modern looks from glazing of its mass. It gives the impression of clarity and openness to external world. Traditional style has been maintained inside the building: the walls and doors are not glazed, thus the impression of “openness” is not confirmed inside. Autonomous office rooms are reserved only for the highest management, while office managers share their space with the employees. The Client Service unit is located in the ground floor and is very well marked.

WORK STATIONS: organisation and equipment. All the work stations are fitted with computers, some employees additionally have company laptops. The stations are ergonomically organised, with the ergonomic desks and chairs for the employees, just like computer hardware (profiled keyboards and mouse units, large LCD screens). There are 3–4 work places in most of the rooms. The employees are not separated and can see each other and freely communicate. Each room is provided with the “kitchen corner” with a tea kettle.

ORGANISATIONAL CLIMATE. The company features peaceful atmosphere, people are kind to each other, although slightly reserved. Independent work is dominant, although team work is prized within the motivational system, and employees perform in teams the so-called bonus tasks, e.g. preparation and development of the annual report on the activities of the company.

STRENGTHS AND WEAKNESSES. The company lists its strengths: (+) a well developed high-capacity distribution network, (+) high accessibility to the field units which provide client support operations, (+) an experienced employee base, (+) good knowledge of the market—the needs of the clients and of the competition.

The company regards the following as its weaknesses: (–) the lack of integrated IT management systems or ISO 9000 and ISO 14000, (–) the habits taken over from the centralised system of management, adaptation barriers, (–) the lack of experience in offering and providing comprehensive customer support, (–) strong trade unions and their large number.

Far-reaching (strategic) elements

VISION. The company is planning to become a modern enterprise, efficiently meeting the needs of the clients, friendly for the surroundings and its employees.

EXTERNAL IMAGE. The company is perceived in the surroundings as one of the best employers in the area of Tarnów, providing not only good wages but also peaceful work (“a state-owned employer is a good, stable employer”). At the same time, the price of the product and services offered by the company causes reservations.

CONNECTIONS WITH THE ENVIRONMENT. The company, as a state-owned entity, is strongly related to the political system. Its operations are subject to close regulation on part of the state. In its closest surroundings, the company is a very ac-

tive participant in the public life, very often sponsoring various types of cultural, entertainment (concerts, performances) and scientific (conferences, symposia) events. It also supports with donations many cultural and social organisations, including hospitals, schools, and child care units.

Far-reaching elements—operational

INTERNAL IMAGE. The company is perceived by its employees as a good work of place. It is related to the HR policy. The competencies of employees form a very significant factor in the functioning of the company. The company has its own training centre and a professional library, continuously supplemented with new volumes related to the scope of its operations and in economy and law. Willingness to enhance qualifications by the employees is very welcome. If anyone intends to study, he/ she may receive up to 80% of supplementary financing on the condition that the average mark will be at 4.5 or more. The company itself sends the employees to postgraduate studies. A contract has been concluded in this respect with one of the Krakow facilities which organises such studies in line with the needs of the company.

INTERNAL COMMUNICATION. The communication system inside the company is very varied, from using notice boards inside the building and in its surroundings for this purpose to sending an e-mail to a private newspaper. The information provided in this way refers mostly to operations of the Board of Directors, situation in the company, external decisions of the centres of authority and daily issues in the employees' lives: trainings, cultural and entertainment events, retirements of the employees closely related to the company, achievements of the employees. Access to some information is regarded as a sort of privilege.

MANAGEMENT—EMPLOYEES RELATIONS. The management style preferred in the company is mostly based on the distance and emphasises differences between people. The persons at higher managerial posts are difficult to reach and aloof.

Assumptions—superior values

PHILOSOPHY OF THE COMPANY. As regards the superior values which the company observes in its operations, only guesses may be made. It is probable that its philosophy of operations consists in the belief of the best possible serving to the interests of the state and of the society. The impression may arise from the analysis of the activities of the company that its management would like to forestall any possible changes which may occur in its surroundings that may be at present called variable,² with the foreseeable changes. It may be proved by such activities as ordering expert opinions in the scope of strategic analysis and development of the strategy of company development from the employees of one of the Krakow university-level facilities; the implementation of the Strategic Results Card and preparation for the implementation of the modern system of employee assessment and the remuneration

² With the scale: fixed, variable, turbulent.

system. This allows the company to be called as one managed in a modern way and meeting the conditions of the information society organisation.

3. Final remarks

The above research results may be classified into two parts:

1. The results of the questionnaire study aimed at determining dominant types of culture and defining possible directions of changes in organisational culture.
2. The results of quality studies aimed at defining cultural context of activities undertaken by the studied entities; the result of these studies is systematisation of observations made in the form of descriptive model of organisational culture.

This approach has allowed quite a complete image of organisational culture of the studied entities, as both types of the studies supplement each other.

The cultural models of the studied companies prepared on the basis of the conducted studies and presented in the paper show complexity and the specific nature of values and cultural standards practised in each one of the analysed entities. They also allow capturing certain common elements, similar in both analysed studies:

- basing the communication process on modern technologies (mobile telephones, the Internet, the Intranet);
- in both, making operations more flexible with simultaneous maintaining of the position in the market is expected (by both the employees and the board of directors);
- care about the external and internal image;
- awareness of significance of knowledge in daily practice;
- increasing use of modern technologies in the basic activity;
- creative strategy.

These features allow the statement that the studied companies have big chances for transformation into innovative organisations capable of conducting innovative and creative activities, and not only of imitation.

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Badanie proinnowacyjnej kultury organizacyjnej przedsiębiorstwa

Streszczenie: Kluczową kwestią decydującą o przetrwaniu i sukcesie na globalnym rynku w warunkach gospodarki opartej na wiedzy jest zdolność przedsiębiorstwa do systemowego tworzenia i wdrażania innowacji.

W praktyce gospodarczej innowacje są istotnym czynnikiem wspierającym realizację strategii rozwojowej przedsiębiorstw, ale również całej gospodarki, poprzez umożliwienie odnawiania struktur przemysłowych, czy też przyczynianie się do powstawania nowych sektorów działalności gospodarczej. Wobec nasilania się tych zjawisk przekształcenia w zakresie wzorców kulturowych zgodnie z nowymi wymaganiami gospodarki globalnej stają się obecnie jednym z podstawowych problemów, przed jakimi stoją wszystkie niemal przedsiębiorstwa na całym świecie.

Kultura przedsiębiorstwa jest rozumiana jako utrwalone w nim wzory myślenia i postępowania pracowników, kształtowane przez postawy i zachowanie kierownictwa. Przenika ona zarówno proces formułowania strategii, jak i proces jej realizacji. Przedsiębiorstwo, które rozumie swą kulturę, może wykorzystać tę wiedzę jako źródło strategicznej siły.

Celem artykułu jest przedstawienie wyników diagnozy kultury organizacyjnej pod kątem jej proinnowacyjności. W pierwszym etapie, na podstawie uzyskanych wyników badań opisowych oraz ankietowych, stworzono model kultury organizacyjnej w każdej ze spółek. Kolejna faza polegała na zdefiniowaniu kultury pożądanej w badanych podmiotach, ze względu na realizowaną przez nie strategię. Najpierw określono strategię badanych przedsiębiorstw, a następnie typ kultury pożądanej – umożliwiający właściwą realizację strategii. Końcowy etap miał za zadanie wskazanie kierunków i obszarów zmian w obecnej kulturze organizacyjnej.

Opracowane na podstawie przeprowadzonych badań i przedstawione w artykule modele kulturowe analizowanych spółek ukazują złożoność i specyfikę praktykowanych wartości i norm kulturowych, mogących wspierać bądź też ograniczać zdolność do prowadzenia działalności innowacyjnej.

Słowa kluczowe: kultura przedsiębiorstwa, diagnoza, innowacyjność, efektywność

JACEK WOŁOSZYN, PAWEŁ WOŁOSZYN*

Digital exclusion in the information society and artificial intelligence techniques

Key words: information technology, disability, artificial neural networks

Summary: Along with development of the information society and spreading of computer technology, more and more areas of life of individuals are related to the access to IT services. Execution of daily needs of a modern citizen requires ever increasing use of advanced technical means, such as rich web applications, mobile devices, multimedia services, etc. Many of these activities go along with the need of their individual and autonomous execution, which results from the world of technology entering into highly private areas of life, such as correspondence, social relationships or personal finances. Autonomy of participation in such activities is nowadays more and more dependent on the ability of autonomous operation of computer equipment and the services offered with it.

Due to the civilisation changes that come along with introduction of IT technology in the communities, the term “performance” gains a new meaning and refers not only to the capacity of executing physical activities but also to participation in the information-related area of life. The loss of performance may cut a person off from access to this area, even if the lost capacities are not in themselves necessary for pursuit of similar objectives of the individual. It happens when technology that helps satisfy specific needs does not leave an alternative way of communication of a human being with a machine or does not present the potential of adaptation to specific conditions and limitations to which the user is subjected. Overcoming digital discrimination of the disabled requires application of techniques of artificial intelligence which imitate the redundant and creative human behaviour. In the example of artificial neural networks, analogies between methodological errors made during teaching and assessment of their operation and the problems of barriers of human–computer interfaces accessibility may be noticed.

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1. Introduction

It seems obvious that every human being should have the conditions to keep his/her personal, private area of life isolated from outsiders. Respecting independence of a human being as an autonomous individual and protection of individual areas of life and functioning against access of strangers is one of the foundations on which the mature society is based. On the other hand, not every human being has at his/her disposal the degree of performance necessary to maintain this private area of life. In case of people with diseases or disabled, a carer, therapist or physiotherapist often help in daily activities. Not always, however, is contact with another human being desired, especially if it is a long-term contact. Human being as an integral individuality has a strong need of independence and freedom with which he/she may be self-sufficient and capable of autonomous deciding about his/her functioning (1). This applies mostly to simple, daily activities and elementary living functions of the body. The capacity of free breathing, eating, moving or caring about hygiene and aesthetics are the examples of the key activities which determine such terms as freedom, human dignity or quality of life. The more priority a given function has in maintaining health and life, the stronger the need of its individual control.

The present day's trends in the information technology development make us more and more often use the computer as a tool for executing daily, simple activities. Shopping, reviewing the press, talking to friends or listening to music are just a few examples. Many a time these are also activities within the area of private, personal life which remains an individual area of functioning of each human being, isolated against access of other people with the barrier of personal secrecy. This includes private correspondence with the dear ones, managing home finances or seeking medical advice. All these activities may be done with the computer and this form of their execution indeed gains in popularity.

The summary of both problems, that is on the one hand the need to maintain independent control over private areas of daily life, and on the other hand the strengthening dependency of this specific area on the information technology, produces a specific perspective of the situation of people who suffer from less or more apparent limitation in performance: if the computer hardware helps in caring about oneself and one's participation in life, then it is not the general physical or intellectual performance but presence or lack of specialised possibilities of computer operation decide whether the given person is fully able and autonomous. This gives the technological (and not medical) criteria a significant role in determining personal competencies and prospective barriers which exclude him/her from social life.

2. Machine as support for autonomy

When the body is permanently damaged and its functions are affected, self-sufficiency may be lost. If the person cannot execute the activities which are the basis for healthy functioning, then he/ she starts being dependent on help from the surroundings. This kind of help is no longer a typical therapy or rehabilitation if the dysfunction is irreversible, and the objective of the interaction with the carer is not improvement in the condition but creating ground for further maintaining of life. Search of the demarcation line between freedom and responsibility, between the person of limited performance and his/ her carers is a difficult and controversial task of modern bioethics.

Thus, even if it may seem contrary to the ideals of altruism and human solidarity, the need to replace a human carer with a machine which performs his/ her role is clearly justified in many cases. A disabled person enjoying help of technical equipment in execution of activities which he/ she cannot do on his/ her own, feels more self-supported and independent than in presence of another person. A neutral and non-personal machine specifically allows maintaining privacy and intimacy at least in some areas of life, which in case of the disabled are the subject of excess exhibition, anyway. Moreover, technological progress makes more and more areas of life enjoy the support of computers. They may not only perform a role of a simple tool, but that of a more advanced system in assistance of the human being (2).

Reading books by the blind may be an example here. The works released in Braille are few, and the range of the titles limited to a fraction of literature legacy. One may ask a carer to read a book aloud, but it means inevitable disclosure of the contents of the text and prevents free moving around the text according to one's own likings. Using for the same purpose a computer, speech synthesis software or an electronic Braille reader allows independent reading of books, but also enables private correspondence or reading official letters.

The machine equivalent of the carer should, however, imitate a living person, replicating his/ her features in the best possible way, such as the capacity for learning, adaptation, expecting or reacting in non-typical situations (3). Only then can the machine be left alone with the disabled person without the necessity of operator's supervision, even if he/ she is hidden and remote. All tools of artificial intelligence come in handy here which provide the machine with less or more advanced equivalents of the features of the human mind (4).

Artificial neural networks constitute one good example of such tools, not only because they can be used in various systems of therapy support, rehabilitation or self-care of the disabled. Some properties of networks allow for finding interesting analogies between the way they function and the functioning of a human being in the context of lost abilities. These analogies do not mean that neural networks are the ideal ground for construction of human assistance systems, but they allow viewing the issue of disability in a slightly non-standard way.

3. Levels of performance and its lack

The complex problem of disability features several levels related to various standards which determine the expected (thus regarded as proper) ability and performance of a human being (5). What is a natural attribute of human functioning should be differentiated from additional roles assigned to the humans during cultural and civilisation development. The lower levels of references may be well grounded with the biological functions of the organism whose lack constitutes some sort of pathology. The higher levels gain stronger features of social convention and evoke pondering whether disability may at all be regarded as an objective phenomenon (Figure 1).

The lowest level in this hierarchy is hindering of the activities which results from damages to the tissue, the organ or the entire system. Loss of the functions of both hands after injury to the upper limbs may be an example here. Some functional disorders result from illness or trauma, other inevitably come with time passing as a result of ageing of the organism. Degenerations accumulating with time may deprive a person the capacity of executing precise hand movements almost to the same degree as amputation. However, disorder in itself does not have to imply disability in its full meaning.

Motor disability is a higher level of this context. If the activity covered with the disorder is crucial for the given aspect of human performance, its lack prevents achieving the objective for which it is used. For example, the lack of a fit hand impairs the writing ability with the standard computer keyboard. However, it is difficult to indicate an obvious example of such an objective which a person could not achieve after excluding the directly related activity. It is a natural consequence of redundancy which is common in biology, including the biology of human being.

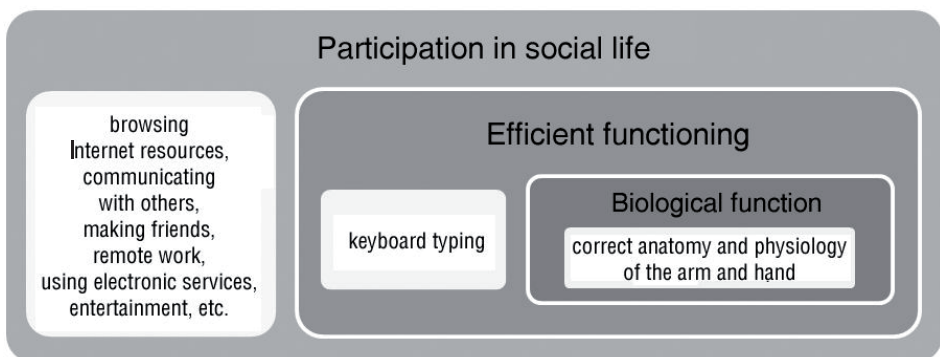


Figure 1. Levels of ability and the corresponding examples of activities

Source: authors' own study.

If the selected aspect of ability (for example movement, verbal communication or object manipulation) has some margin of redundancy, then the activities covered by this ability may be replaced with their equivalents. The human being may walk on hands, play instruments with feet or operate the keyboard with the mouth. Redundancy in biology, which consists in the lack of strict assignment of specific roles to individual structures and functions of the organism, means possibility of maintaining performance of the system even when some activities are impaired.

The highest level of disability considered in medicine is the barrier of participation in social and cultural life exceeding over the standard of biological life. This barrier arises when there are no alternatives to enable participation in the given activities with the abilities other than those which have sometimes been completely arbitrarily regarded by the humanity as necessary. The lack of capacity to use keyboard and computer mouse practically prevents taking advantage of the Internet resources (apart from a few cases of specially adjusted computer hardware) even if the same person can perfectly speak, move, hear or perceive images.

Further on in the same mood, there are other issues, less obvious and going beyond pure disability: if the given method of participation in the activities of the community is the only way to fulfil high aspirations of the individual, the barriers in this respect may completely deprive him/ her of the possibilities of satisfying the personal needs in education, professional career or interpersonal contacts. In reference to the earlier examples, one may hypothetically assume (although it is not far from reality, considering development of cyber-society) that using online community portals is the only way for making acquaintances, without any other, alternative, redundant way. If this is the case, the lack of access to online services condemns a person to loneliness whether the reason of disability are the limbs or a trifle lack of a computer connected to the network. Basically, it is a form of phenomenon called digital exclusion.

4. Artificial intelligence and creative redundancy

These considerations induce to think about the term “disability”, which in the above context becomes very relative. It seems natural that personal performance should be determined by the capacity to achieving the intended objective, and not by the method used (6). Leaving the possibility of free selection of activities and measures to be used is the condition of objectivism of the assessment. Otherwise, anyone who does not fit the highly specialised task where no margin of redundancy is left becomes disabled (7).

With a jump between the contexts, similar observations may be found to refer also to artificial intelligence tools. Various techniques of solving problems with “soft” calculation methods (using, among others, genetic algorithms, neural networks or fuzzy systems, to name just a few examples) are based on a similar assumption: achieving the satisfactory result is important, and not the method that leads to it. The point of

departure for seeking a solution is an undetermined system with adaptation freedom which gives it possibility of adjustment to the problem in a unique way. The way to go is learning process, especially learning without supervision, with clearly exploration nature.

Similarities in some behaviours in people and their biocybernetic models which may be referred to the disability context can be tracked with the example of neural networks regarded as a tool for solving problems. Just as the human body is not a specialised biomachine dedicated to executing specific activities, the artificial neural network does not constitute the data processing unit programmed for the needs of executing a specific task. Just on the contrary, in both cases these are highly complex structures with the potential for solving problems which is difficult to foresee. However, first free and neutral conditions for adaptation to the problem must be secured, free of initial preferences, bias and arbitrary choices, so that this potential could be manifested.

Unsupervised teaching of neural networks may be an example of such independent exploration of the problem area which is to go in the direction of finding the solution without indicating its details. Assessment of the results of teaching (similarly to the above quoted assessment of human performance) is based on checking the results, and not the method of achieving them. It would be difficult even to indicate specific roles and tasks set for particular neurones, because their functions are not determined prior to starting the teaching process, and remain undisclosed after its completion. It again reminds of the situation of a person who, facing the challenge for his/ her performance, will seek a solution with all the available resources of the body. Due to almost unlimited human creativity, one cannot definitely state what is the purpose of hand, foot, mouth, or tongue, as these organs do not have any unanimous role assigned by physiology. For example, categorising a person writing with his/ her mouth as disabled is more and more questionable.

5. Teaching as a generalisation process

Setting preliminary expectations for the network in training and adjusting the teaching data according to subjective criteria happen to be an error which deprives the network of the possibility of seeking generalisations and more universal solutions. The example of a similar situation in the context of human performance comes in the form of persuading left-handed children to learn writing with their right hands, that is forcing the solutions developed by one group of people as fitting to the needs of all others. As a rule, it brings about more damage than benefit.

Assessing wrongly trained neural network as incapable of executing the task set forth for it, one should also take into consideration this freedom of problem exploration. It may turn out that the problem in itself is incorrectly defined, and the biased sets of cases hide subjective preferences and hypotheses of the researcher. Another

analogy comes from a pre-school situation of teaching children the names of vegetables and fruit. Colour-blind children may be assessed as incapable of learning because the teacher prepared vegetables which differ only in colour.

Communication between a human being and the external world is a good example of skills acquired in the learning process. Immense plasticity and adjusting capacity of the human brain to very non-typical conditions of communication may be proven with the richness of forms and means used by the disabled to communicate with the surroundings. No activity of the body may be simply indicated which is subject to conscious control and which would not be used for making contact with the world in the situation where there are no other possibilities (8).

This reminds one of another feature considered in the context of neural networks, namely the capacity to generalise the learned models. The correctly trained network should solve the task also in the situations in which it has never been before. The more specialised network, the stronger its fitting with the selected set of cases, the more probable its reliability when circumstances change in which it is to be applied. The same applies to communication solutions, as well as many other areas of civilisation legacy, such as construction, transport or education, which the disabled have to face. Their difference from standard cases constitutes a similar challenge for the used solutions, like an unknown case of the input data for the trained neural network.

6. Final remarks

As regards the earlier described levels of performance or its lack, one may notice that barriers of free transfer between these levels—related to the lack of alternatives which would allow replacing one activity with another—are the consequence of excess fitting of the tools and resources to closely defined methods of their use. It manifests in the place where redundancy characteristic of biological organisms ends and appears specialisation which is typical of products of technology. For example, the problem of the person who lost a hand in an accident does not have to be in the lack of the limb, but in the necessity of using a keyboard fitted perfectly to the shape of the anatomically proper fingers.

It may be assumed that in case of communication of a person with a machine, the overtrained (to use the terminology of neural networks) interface constitutes the basic barrier for the disabled: it is not the human who cannot give instructions to the computer, but the machine itself does not cope with reading them. This presentation of the situation creates motivation to find more universal interfaces, otherwise, due to the information technology spreading in daily life of the people in highly developed countries, the escalating problems may be expected which lead to intensification of digital exclusion phenomenon.

During construction of the human–computer interface for a disabled user, the teaching capacity is in fact used on both sides of this bridge (9). Both the human and

the computer must adapt to ever changing communication conditions and learn new behaviour patterns or methods of expressing intentions. That is why seeking solutions based on neural networks, following some features of the human intellect, is also an activity aimed in a sense at making both sides of the dialogue of the human with the machine similar, because it is his alternative carer. The more tasks related to learning and getting to know its user the computer takes over, the easier will be for that person to make contact with it. In building the interface, one has to remember about maintaining the possibility of generalisation for a broader range of cases and conditions of application. Using the tools and techniques on the side of the computer which give the same possibility brings hope for creating a universal interface which could at the same time serve people with highly varied abilities and competencies.

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Problem wykluczenia cyfrowego w społeczeństwie informacyjnym a techniki sztucznej inteligencji

Streszczenie: W miarę rozwoju społeczeństwa informacyjnego i upowszechniania się technologii komputerowej coraz szerszy obszar życia jednostki zostaje powiązany z dostępem do

usług informatycznych. Realizacja codziennych potrzeb nowoczesnego obywatela wymaga w rosnącym stopniu wykorzystania zaawansowanych środków technicznych, takich jak bogate aplikacje internetowe, urządzenia mobilne, serwisy multimedialne itp. Wiele z tych aktywności idzie w parze z potrzebą samodzielnego i autonomicznego ich realizowania, co wynika z wkroczenia świata technologii do silnie prywatnych sfer życia, takich jak korespondencja, relacje społeczne czy osobiste finanse. Samodzielność partycypacji w tego rodzaju aktywnościach jest w obecnych czasach coraz silniej warunkowana zdolnością samodzielnej obsługi urządzeń komputerowych oraz oferowanych za ich pośrednictwem serwisów.

Wobec zmian cywilizacyjnych zachodzących wraz z informatyzacją społeczeństw pojęcie sprawności zyskuje nowe znaczenia, odnosząc się nie tylko do zdolności wykonywania czynności fizycznych, ale także do partycypacji w informacyjnej sferze życia. Utrata sprawności może odciąć człowieka od dostępu do owej sfery, nawet jeśli utracone zdolności nie są same w sobie niezbędne do realizacji podobnych celów jednostki. Dzieje się tak wówczas, gdy technologia pośrednicząca w zaspokajaniu określonych potrzeb nie pozostawia alternatywnej drogi komunikacji człowieka z maszyną ani nie wykazuje potencjału adaptacji do specyficznych uwarunkowań i ograniczeń, jakim podlega użytkownik. Pokonywanie cyfrowej dyskryminacji osób niepełnosprawnych wymaga zastosowania technik sztucznej inteligencji naśladujących nadmiarowy i kreatywny sposób postępowania człowieka. Na przykładzie sztucznych sieci neuronowych można dostrzec analogie między błędami metodycznymi popełnianymi przy uczeniu i ocenie ich działania a problemami barier dostępności interfejsów człowiek – komputer.

S ł o w a k l u c z o w e : technologia informacyjna, niepełnosprawność, sieci neuronowe

RENATA ŻABA-NIERODA*

Developing corporate image

Key words: identity, image, business model, strategy, corporation

S u m m a r y: Building image of a company accepted by the environment is a long and expensive process which requires time and consistence as well as work of many persons, but comparison of expenditures and benefits justifies undertaking such actions. The actual image of the corporation produced in the consciousness of the recipients highly deviates from the desired, perfect characteristics of corporate identity. The degree of consistence of image and identity depends on the effectiveness of the image communication process. Building the image of the company cannot be based on the image alone (logo, graphics, forms, lettering, colours, interior design style). Other factors have high or possibly the most important significance in the process of developing the positive image of the company. Supplementing the image of the company with communication and behaviour gives the possibility of producing the appropriate image in the client's reception, as the actual image is developed by the client only during direct confrontation with the product, the service or the employees of the company. Only these organisations may grow which will know the needs of the market and which can adjust their resources to them and leave the competition behind along the way.

Only positive image may be the source of competitive edge. Achieving competitive edge related to having positive image may be gained with: strengthening it (if its potential was not used so far) or building a new positive image from the scratch (if the previous did not bring about the planned results).

The financial consequence of active building of the company image may be in the form of adding value to it by the investors, which is expressed in creating positive goodwill. It constitutes, on the one hand, specific resources of the company (intangibles), and on the other hand it brings about new equity to the companies and business entities.

Success is achieved when the future is better planned, permanent strategic choices are made, and conducive circumstances help overcome competitors. However, it is related to the risk of failure.

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1. Preliminary notes

Any company which intends to have a strong market position must have individual identity which is distinct from that of the competitors. The identity of the company consists of its behaviour, image and communication. These elements shape the image of the company or its perception by clients, partners, investors.

The company which intends to take the proper position in the market needs individual, distinguishing identity. In this approach, identity may be defined as progressive and active management over all assets of the company, creating information about what the company is, how it changes and where it aims and what makes it stand apart from other companies of similar profile of activities. Identity is a modern and permanent element in building competitive edge in the market. Building positive image of the company cannot be based only on visualisation and unified logo, graphics, lettering, colour, interior design style. Other factors also have major, or possibly even greater importance in the process of developing the image of the company. Concentration only on the image of the company leads to the phenomenon of building the façade—however beautiful it be, there is nothing behind it. Supplementing the image of the company with communication and behaviour gives the possibility of producing the appropriate image in the client's reception, as the actual image is developed by the client only during direct confrontation with the product, the service or the employees of the company.

Building a commonly accepted image is a long and expensive process which requires consistency, but comparison of expenditures and effects justifies undertaking the actions. The actual image of the corporation or the image of it produced in the consciousness of the recipients deviate from the desired, perfect characteristics of corporate identity. The degree of consistence of image and identity depends on the effectiveness of the image communication process. In large and complex capital structures it is difficult to achieve.

Power capital groups are expanded structures which consists of many companies with the assigned roles within the activities of the entire corporation. There are various operational relationships between particular companies which make up the holding.

Developing competitive edge is a special benefit of the positive image of the company. This paper is an attempt at discussion of the relationships between the image of the company and developing its competitive edge. The directions in the theoretical analysis are illustrated with the example of the Tauron Company.

2. Essence, conditions and consequences of gaining competitive edge with business model

The main objective of any company is growth. It may refer to various areas of the activities of the company: procurement, production, investments, sales, finances, research, accounting. Gaining advantage over the competition is one of the methods to ensure such growth. Competitiveness is the skill of winning in the competitive fight: overcoming rivals, being better, achieving and/ or maintaining competitive edge, which applies also to the capacity of competing with competition and subsequent assessment of this competition. The commonly used “competitive edge” term is not clearly interpreted. Its multiple views refer to both the essence of competitive edge and its types, sources, and conditions of gaining and maintaining. Irrespective of differences in interpretation, one may assume that competitive advantage appears when the offer of the company is perceived by the clients as more attractive than that of the competitor (1, p. 9). The superiority of the company above its competition is the visible manifestation of this advantage.

The concept of description of the company’s activities with business models is a relatively new view on the company, and it changes in several aspects the current attitude to the problems of management, e.g. in the area of management strategies and methods. Traditional thinking about profitability of the company loses importance and gives way to the thinking which assumes competitive fight mostly in the area of innovation. Business models form the solution built on this way of thinking. Business models and their use are not regarded as another fashion but as a formula, a vehicle suitable for a business idea which often allows execution, implementation of modern management trends and concepts in a complex business reality (2, pp. 37–66).

This model is used by the companies which have strong advantages in the fight against the competition, most often of the market nature which distinguishes the company in the market. These may be: a strong brand in case of the model of profit from the brand. The business model used by the company may be based on the concept of value (3, p. 60) for the clients, for the company, and on its key resources or products. Image is one of the components of the business model, and brand plays a major role in this case. It is one of the basic key resources of the company, significant from the point of view of value. Thus business model consists of various elements and is a concept tool which combines a set of elements and relationships between them, the tool which presents the logics of activity of a given company. In a specific field, it includes the description of the value offered by the company to a group(s) of clients, along with the statement of the basic resources, processes (activities), as well as external relationships of this company, used for creation of value and ensuring competitiveness in the given field and allowing increasing its value (4, p. 57).

The business model for a power company is the connection of the competitive edge concept with a set of actions and resources necessary for its execution, allow-

ing the organisation to achieve profitability and its contribution to ensuring power security. Obtaining the competitive edge by the company and maintaining it, which is the condition for effective functioning in the market, is expressed in added value obtained by it which is higher than that of the competition, which in turn allows achieving profitability that is higher than the average (in the scale of the sector).

Companies are not operating individually. Contracts of cooperation have become the key factor for achieving success in changing markets. Few companies can create and deliver goods and services working alone, and even fewer handle the latest technologies:

- many skills and resources necessary for success of the company are located off its limits and beyond direct control of the board of directors in a higher degree than ever before;
- to fully use the opportunities, companies must be capable of establishing, developing and keeping a broad range of strategic alliances;
- the effect of synergy is the objective of any cooperation—jointly more can be gained than when acting alone, although the result of this cooperation may be varied.

The basic reasons for cooperation include: merging of forces—neutralisation of threat, supplementation of resources and skills, gaining knowledge and internationalisation, more effective research, stronger impact, higher probability of success, faster, better, cheaper development of products, services or markets, delivery of products or services, meeting external requirements, optimisation of costs. Business model as a general concept formulates the framework for the logic of managing business and such its features as innovativeness, competitiveness. Thus it includes the description of the value offered to the clients, the basic resources, activities and relationships with partners, which are used for creation of this value and ensuring competitiveness to the company.

To maintain a good position in the given sector for a long period of time and achieve better results, three basic competition strategies may be defined (5, p. 50): the leading position in terms of the total costs (cost leadership), differentiation (diversification), concentration (a larger scale of specialised activities).

Each of the presented strategies assumes a different method of achieving competitive edge. The characteristics of the basic competition strategy in the market indicates that the basic condition for effective action is emphasising this element or area in which the company will have advantage over the competition, as maintaining the leading position in all three areas is difficult and rather impossible.

Modern companies, to actively exist in the market, must build and create their competitive edge based on more and more original elements. The image of the company becomes important, right along with attractive price, the promise of high quality, reliability or specific method of distribution.

3. Building the image of the company in the competition and cooperation processes

The image of the company, or its imagined perception, has gained special importance. Every company needs individual identity distinguishing it from the competition and clear forms of communication. In this context, identity may be defined as progressive and active management over all assets of the company, creating information about what the company is, how it changes and where it aims and what makes it stand apart from other companies of similar profile of activities. The image of the company is a modern and—what is important—permanent element of building competitive edge in the market.

In practice, many types of images may be described in view of various criteria. Depending on the degree of its beneficial effect for the company, the image may be positive, negative or neutral. The client assesses quality of a product or service before their purchase on the basis of the image of the company.

Creating a positive image is one of the basic strategies aimed at building competitive edge. Creating a positive image is not easy, and often, when the deliberate policy of communication is missing, the negative image of the company may develop. Improper communication among the employees of the company may create a bad image of the employer, negative assessment of the management, effectiveness and quality of production and atmosphere at work. This affects the opinion of the clients about the company and its products, as well as the opinion of the suppliers about the image of the company. That is why planned and correct communication of the company is necessary, and it should create a good image of the company among all the social groups.

The company, while creating its image, is committed to a number of activities which make other companies perceive it as modern or enjoying traditions, producing goods of perfect quality, responsible, or as an important competitor in the market. Whether the company is well perceived in the market or not manifests in the consumers wanting to buy its goods at high prices or not, the prospective investors are willing to acquire shares of individual companies or not.

Until recently, reputation of a company and its image were a vague notion and were not within the direct interest of the most important management level in the company. The duties related to developing the image of the company were entrusted to the departments involved with public relations in the company or to the consultants hired in these companies. The awareness of the management level in the company is continuously increasing, and the factors related to developing the positive image of the company are more and more often listed among the elements which affect the market success, decisive for the significant competitive edge. The proper management of the image and reputation of the company is necessary, but the crucial element comes in the managers understanding significance and essence of such notions

as identity and communication of the company, as well as interdependencies between these elements.

The image and reputation of the company arise in the minds of those who are in any way related to the given organisation. The image is the view which begins to function in the consciousness of the person when he/ she hears the name of the company or sees its name or logo. The reputation of the company is in fact its assessment by the persons interested in it: clients, competitors, market partners. Thus it is necessary to create the proper image of the company with these entities in the market. It is nothing more than achieving the appropriate level of recognition among the target partners along with immediate identification of the industry and products of the company. Taking care about the proper reputation with the partners is also necessary. Very often identity is connected with the image of the company, which is a wrong approach. Identity is a set of features which the company wants to present to the environment, while image is their real projection in this environment (6, p. 9).

Positive image of the company may be developed with a coordinated campaign related to building the image of the company, including the formal system of communication taking into account its logo, mark name, advertising activities and public relations. The proper reputation of the company requires substantial identification which may be developed in continuous activities. The situation is possible in which the company has a perfect reputation but it has not achieved as positive image as the competition. Not only the perfect offer and perfect attitude to clients create the global image of the company. Some other activities also affect the image, such as good employees and strong investors.

The identity of the organisation creates the image of the company with the appropriate reputation. Communication is the element combining the identity of the company with its image and reputation. To achieve the intended objective, the company should apply various methods and channels of communication at the same time. This is the way to reach a broad group of the interested (7, p. 59).

Deliberate development of the image of the company brings about measurable benefits. A good, positive image and a clearly marked identity, appropriate for the target segment of the clients, help the company prosper well and easily enter the markets. It is so because in the market where competition offers goods of similar usable value, quality, price and appearance, the final decision of the buyer may be based on the impression caused by the company of better image and clearly marked identity. The image is never a static term. It is changing along with the changes in opinions and likings. It arises and grows independently of the willingness and will of the interested, because its creation requires continuous observation of the market and controlling whether the created image corresponds with the actual needs of the clients (8, p. 149).

4. Identity and image

It is interesting to find out what is identity and what is image. These terms are often wrongly considered equivalent. For this, it is important to differentiate their actual and desired conditions.

The actual identity is the way the managers see their brand, its features, the resulting benefits and the values which it represents. The desired identity is the condition which they would like to achieve. It includes all their plans, objectives and aspirations in reference to the brand. The image is a perception in the minds of the buyers. Companies strive to cause specific associations related to the brand (the desired image). However, they often deviate from the assumptions, to a higher or lower degree. The clients then perceive the offer in a different way than planned (the actual image). Identity is thus the beginning of the road, and image is its goal. The positive or negative effect of the actual identity on the desired identity, thus on further activities, depends on the effectiveness of the feedback. The information about the actual image of the brand developed its perception by the managers (9, p. 203).

If we assume that the chosen desired identity is under given conditions the most appropriate, then the skill of translating it into the corresponding actual image has major effect on the market success. Obviously, achieving the state of equality (the desired identity = the actual image) would be the perfect result. It is not always possible in reference to each of the current and prospective clients of the brand. Work on it should continue, though, and the means used for it is placement (8, p. 149).

Placement covers the activities related to development of the offer and image, leading to taking over a clear, significant place in the memory of the target recipients (10, p. 283). If identity is the strategy, image is the context of this strategy which exists in the surroundings of the brand, its reflection in the reality of the competitive environment, then placement is the tactics of achieving the condition of maximum closeness of the image with the identity (11, p. 181).

Placement is aimed at defining and promoting differences which will allow standing out in the crowd of competitors, persuading to purchase, leading to loyalty and evoking associations compliant with the adopted desired identity.

The company needs not only prepare a clear placement strategy but also effectively deliver information about it to the recipients. The point is not only about the promotion policy but about all the available marketing instruments. Product, price, distribution and promotion are all for the consumers the source of information about the brand. The buyers create its image on the basis of all the signals sent by it. Therefore marketing mix must be inherently consistent if it is to faithfully reflect the selected position. The brand must “speak” the same on all the fronts. The effect of synergy obtained with it multiplies the strength of the interaction.

The integrated marketing communication leads to generation of the desired image. This image is received by the minds of the recipients. If placement and marketing

mix have fulfilled their roles, the image is consistent with desired identity. The brand is presented as it was assumed. At this stage, many companies, especially those with less experience in marketing, end the process of building the brand and then it often turns out that the objective was not achieved. The image perceived by the buyer is not a simple reflection of wishes of the managers.

Uncoordinated actions of the owner of the brand are dangerous for the image. In effect, the brand, apart from the desired image, is also the source of a different one. The causes of this are not limited only to errors at the stage of defining the marketing mix, and may arise in the earlier stages as well:

1. Several alternative versions of the desired identity may be created in the company. It is dangerous when various departments/ persons work on the brand and their work is in no way coordinated. If this is the case, everyone has his/her own vision and will try to make it true. Further activities, as it goes, have to result in image schizophrenia.
2. One strategy of identity has been developed, but placement is conducted under the conditions as stated above. The result will be pursuit to achieve one image in various, often mutually exclusive ways.

Then the actual image will be created in the minds of the clients but it will be a product of many factors. If it is compliant with the desired identity, the brand is successful in this field. If not, correction has to be implemented. The source of knowledge in this case is the feedback in the form of marketing studies. The information obtained in this way affects the perception of the brand by its managers (the actual identity), which thus becomes the source for further actions. The whole process should be repeated until the maximum consistence is obtained between the desired identity and the actual image.

5. Corporate identity of Grupa Tauron

TAURON Polska Energia S.A. was established on 6 December 2006 due to the execution of the government electrical power engineering programme (12). This programme assumed establishing four large business entities which were to consolidate distributors and producers of energy. The objective of the consolidation was to create entities effectively competing with other European companies in the energy market. On 9 May 2007, the State Treasury contributed to Energetyka Południe S.A. the shares of Południowy Koncern Energetyczny S.A. of Katowice, Enion S.A. of Krakow, EnergiaPro Koncern Energetyczny S.A. of Wrocław and Elektrownia Stalowa Wola S.A. Other entities, apart from the listed four companies, are also included in the holding: in the scope of energy trading these are Enion Energia sp. z o.o., Pierwsza Kompania Handlowa Polska Energia sp. z o.o., and EnergiaPro Gigawat sp. z o.o.; in the scope of producing energy from renewable sources: Jeleniogórskie Elektrownie Wodne sp. z o.o. and Zespół Elektrowni Wodnych Rożnów sp. z o.o.; in the scope of

coal mining Południowy Koncern Węglowy S.A. Moreover, TAURON Polska Energia S.A. took control over Elektrociepłownia Tychy S.A. and Przedsiębiorstwo Energetyki Ciepłej Katowice S.A., and with the heat assets of PKE S.A., these companies are the base for building the Tauron Ciepło S.A. holding.

Tauron Polska Energia is one of the largest business entities in Poland and has the capital of 14 B PLN. The holding employs 28,000 persons and sells electricity for the value of over 9 B PLN. The corporate strategy was prepared for Grupa TAURON for the years 2008–2012 with the perspective up to 2020 developed in 2008.

When Tauron Polska Energia SA adopted a new logo and visual identification system, the process was initiated to clarify the corporate identity of Grupa Tauron. This process was the consequence of the implemented business strategy aimed at establishing a uniform operational holding. One of the assumptions of this model is consolidation of all the constituent elements of the holding, also in the dimension of the communicated corporate identity. Building the coherent identity within companies of the group will allow communication of legible and credible structure, thus affecting clarity of perception of the elements of the group which build its competencies and potential.

Strong corporate identity affects both internal and external processes in the holding. Within the group it deepens consolidation processes, building in the employees consciousness of belonging to one strong economic organism, and developing pride in the employee and affecting his/ her feeling of stability and safety. Externally, under conditions of market competition, it manifests the strategic position and helps build the planned image for both the entire holding and individual companies. In the future, it will be a clear confirmation of the potential of the group for prospective stockholders.

One of the factors which affect the decision about building uniform corporate identity for Grupa Tauron are the trends and directions assumed by competitive power holdings both in Poland and in other European countries. With the intention of effective maintenance of the market position, that is aiming at improving it in the future, it is necessary to manage communication and marketing activities which may meet the challenge of the actions by the competition.

Development of clear architecture of brands within the holding is the condition for implementation of uniform corporate identity of the group. It should be understood as a legible structure which indicates the place and role of each company within the holding organism. The best (fully executing the assumed consolidation objectives of the group) of the possible models which clarify the relationships between the companies in the capital group is the so-called monolithic model of corporate identity. It assumes full and unanimous identity of all the constituent elements of the holding at both lexical and visual levels. At the lexical level, that is the one related to the names of the companies, unification of the names is planned. The assumed naming strategy is the principle of building the names of the companies from two elements: the name of the brand “Tauron Polska Energia” and the competition determinant expressing the

role of the company in the chain of value of the group. At the visual level, the logo of the Tauron Polska Energia brand is the element which builds corporate identity.

The time scale for the implementation of the target model of brand architecture will depend on execution of consolidation activities of the companies in accordance with the implemented business strategy of the group. The monolithic model is regarded as a target which defines the direction of evolution of the current structure of brands, as well as determines the selection of an intermediate concept of implementation of the visual identity of the group within the companies.

The current architecture of the brands of the group which are not clearly related to the Tauron brand prevents the use of the communication synergy effect and excludes quick building of the uniform visual identity of the group.

During the work on the strategy, different possible concepts of implementation of visual identity at the level of companies were analysed. The adopted assessment criteria were helpful in assigning value and selecting the concept. First: the degree of coherence of the intermediate model with the assumed target model. Second: the scale of costs necessary for implementation of the intermediate model and then the target model. Third: the degree of legibility of changes at the visual level for both employees of the companies and their clients. The analysed concepts communicated in various degrees the uniform corporate identity as well as various forms of maintaining the current, often long-term tradition and organisational identity of individual companies. The analysed concepts were presented to the marketing services of the companies during the training in which the new business strategy of the group was presented, along with the strategy of the Tauron brand together with a new system of visual identification. The opinions and comments on the presented concepts expressed by the participants of the training were taken into account in the final selection.

The adopted concept of implementation of the new visual identity is based on the term of "foundation identity". The model of foundation identity in reference to the companies in Grupa Tauron may be understood as building corporate identity of the group on the foundation of the entire chain of values which constitutes the scope of competencies of the Tauron Polska Energia brand.

This model assumes the companies using at the visual level the main assumptions of the visual identification system of the Tauron Polska Energia brand and the logo of Grupa Tauron, along with simultaneous maintaining of the current names of the companies. The advantage of the adopted concept is the possibility of quick gaining the effects of communication synergy at the visual level and building the consciousness of belonging to one organism among the employees. According to the principle of building the Tauron brand on the foundation of constituent elements of the chain of values, using the logo of Grupa Tauron by entities beyond the chain of values (medical companies, holiday resorts, etc.) is excluded. Each of the companies in the group is not only an item in the structure of the holding but first of all the people who work there, even several dozen years. During the implementation of the new corpo-

rate identity, special attention should be paid to the process of informing the employees about the implemented projects. Apart from the actions planned at the corporate level, involving the marketing and public relations departments in each of the companies of the group in the information process is of special importance.

The technical condition of the implementation of the new corporate identity is harmonising the rules of visual communication for each of the companies and development of own systems of visual identification which take into account individual communication needs of the companies.

6. Final remarks

The image communication may be successful when the corporate identity is easily recognisable and stands apart at the background of the environment of the industry and when it has, if possible, characteristic and unique features. Achieving this objective becomes more and more difficult. This is caused by the dynamics of expansion of the power engineering corporations, mostly by way of acquisitions and mergers with the existing companies. Organisms of varied cultures and traditions are combined to create international structure of global nature. The Polish power engineering capital groups have come into existence relatively recently and are now only in the process of developing their corporate identity. The activities undertaken by Tauron should be included in purposeful actions of strategic nature. Tauron has applied the model of group identity which is the basis for specifying the architecture of the portfolio of brands of the given corporation: the monolithic model—a capital group uses one name and a uniform system of visual identification in all interactions with the environment.

The presented analysis indicates the necessity of continuous analysing (by managers) situations and placement of the companies managed by them. It is reflected in some images adopted by them, that is the assumptions which are identified and described with a specific model of proceedings resulting from the reaction of managers to what presents in itself the market, the clients and behaviour of the competition. No doubt, the business model constitutes an important (if not crucial) tool for the company and its employees to achieve market success.

All in all, one has to conclude that the positive image of the company may be used to gain competitive edge. A good image allows the company to reduce costs related to advertising, to facilitate making decisions for the clients as regards product purchase, to affect trust of the clients in the company and to create a group of loyal clients, to affect positive associations of clients and suppliers, to strengthen the placement of the company in the market with high entry barriers, to affect quality of service, to make differentiations of products and brands, to create identity and personality.

Only positive image may be the source of competitive edge. Achieving competitive edge related to having positive image may be gained with: strengthening it (if its

potential was not used so far) or building a new positive image from the scratch (if the previous did not bring about the planned results).

The financial consequence of active building of the company image may be in the form of adding value to it by the investors, which is expressed in creating positive goodwill. It constitutes, on the one hand, specific resources of the company (intangibles), and on the other hand it brings about new equity to the companies and business entities.

To sum it up, success is achieved when the future is better planned, permanent strategic choices are made, and conducive circumstances help overcome competitors. However, it is related to the risk of failure.

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Kształtowanie wizerunku korporacji

Streszczenie: Zbudowanie akceptowanego przez otoczenie wizerunku przedsiębiorstwa jest procesem długotrwałym i kosztownym, wymaga czasu i konsekwencji oraz pracy wielu osób, ale porównanie nakładów i korzyści uzasadnia podejmowanie takich działań. Rzeczywiste wyobrażenie o korporacji wytworzone w świadomości odbiorców znacznie odbiega od pożąda-

nych, idealnych cech tożsamości korporacyjnej. Stopień zbieżności wizerunku i tożsamości zależy od efektywności procesu komunikacji wizerunkowej. Budowanie wizerunku przedsiębiorstwa nie może opierać się tylko na obrazie firmy: logo, grafika, formularze, liternictwo, kolory, styl wyposażenia wnętrz. Pozostałe czynniki mają bardzo duże, a może najważniejsze znaczenie w procesie kształtowania pozytywnego wizerunku przedsiębiorstwa. Uzupełnienie obrazu firmy jej komunikacją i zachowaniem daje możliwość wytworzenia u klienta odpowiedniego wizerunku, gdyż rzeczywisty wizerunek kształtuje się dopiero w trakcie bezpośredniej konfrontacji z produktem czy usługą, z pracownikami firmy. Tylko te organizacje, które będą znały potrzeby rynku oraz potrafiły dostosować do nich swoje zasoby i pokonać przy tym konkurentów, mogą się rozwijać.

Źródłem przewagi konkurencyjnej może być tylko wizerunek pozytywny. Osiągnięcie przewagi konkurencyjnej związane z posiadaniem pozytywnego wizerunku można uzyskać poprzez: wzmacnianie go, jeżeli jego potencjał nie został jak dotąd wykorzystany, lub budowanie od początku nowego pozytywnego wizerunku, jeżeli poprzedni nie przyniósł zamierzonych efektów.

Finansowym skutkiem aktywnego budowania wizerunku przedsiębiorstwa bywa między innymi dowartościowanie go przez inwestorów, co ma swój wyraz w kreacji dodatniej wartości firmy. Stanowi ona z jednej strony swoisty zasób przedsiębiorstwa – wartości niematerialne i prawne, z drugiej zaś przysparza nowych kapitałów własnych spółek i pomiotów gospodarczych.

Sukces osiąga się wówczas, gdy lepiej przewiduje się przyszłość i dokonuje trwałych wyborów strategicznych, a dzięki sprzyjającym okolicznościom pokonuje się konkurentów. Wiąże się to jednak z ryzykiem poniesienia porażki.

S ł o w a k l u c z o w e : tożsamość, wizerunek, model biznesu, strategia, korporacja

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