COUNSELLING FOR SELF-EMPLOYMENT: THE APPLICATION OF DECISION SUPPORT SYSTEM

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Abstract. The article considers the provision of decision support opportunities for unemployed people who are seeking for self-employment and opening a new business. The purpose of this paper is to consider the application of decision support system (DSS) for e-counselling of the unemployed, specially focusing on self-employment solutions. The development of DSS is tackling main social challenges of the long-term unemployed: it conveys an experience from previous employment; provides new business opportunities, which are highly related to person's hobbies; and it connects people by developing complementary groups of same interests and same positive attitudes towards entrepreneurship.
From a technical perspective we suggest that it is advisable to place a workflow engine at the core of the Internet based e-decision making system. This will let us generate and manage personalized and adaptable individual recommendation access. The access flow algorithm of DSS consists of three interconnected blocs: the first bloc is constructed for the self- containment as process logic and analysis of consumer objectives; the second one analyses person's ability for entrepreneurship, it also evaluates individual's overall motivation to start his own business; and the third bloc provides with potential complementary business partners or business start-up.

Keywords: self-employment, unemployment, decision support system, recession.

JEL Classification: C63,C69, E0, E24, J4.

ĮSIDARBINIMO PROBLEMOS SPRENDIMAS: SPRENDIMŲ PARAMOS SISTEMOS TAIKYMAS

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Santrauka. Per paskutinius keletą metų ekonomikos recesija turėjo įtakos struktūriniams darbo rinkos pokyčiams. Šie pokyčiai dažniausiai susiję su darbo jėgos paklausos sumažėjimu tiek tam tikrose ekonomikos šakose, tiek tarp tam tikrų profesijų. Ilgalaikis nedarbas tapo viena iš opiausių visuomenės problemų, skatinanti priimti neatidėliotinus strateginius sprendimus.

Straipsnyje nagrinėjamos sprendimų paramos sistemos (SPS) taikymo galimybės asmenims, ieškantiems darbo ir norintiems pradėti savo verslą. Šio straipsnio tikslas – išnagrinėti elektroninės SPS vaidmenį įsidarbinimo problemoms spręsti. SPS įdiegimas leistų kaupti informaciją apie profesinę žmogaus patirtį, suteiktų informacijos apie naujas veiklas, susijusias su asmens pomėgiais, sudarytų galimybes formuoti asmenų grupes pagal tam tikrus požymius, tokius kaip interesai, požiūris į verslininkystę. Techniniu aspektu sprendimų paramos sistemos algoritmą sudaro trys sujungti blokai: pirmasis skirtas savo tikslų analizei, antrasis įvertina asmens verslumą, motyvaciją įsidarbinti ar pradėti savo verslą, trečiasis suteikia papildomos informacijos apie potencialius verslo partnerius ir apie verslo pradžią.

Reikšminiai žodžiai: įsidarbinimas, nedarbas, sprendimų paramos sistema, recesija.

1. Introduction

Economic downturn in many European countries has affected the structural changes in labour markets during the last few years. These changes are mainly based on the decline of the demand for some economic activities, as well as professions. Indeed, it has been suggested that individuals with longer unemployment spells are less likely to be employed (Aaronson *et al.* 2010).

Long-term unemployed professionals find themselves in the situation when strategic decision needs to be made. There is not only a need to choose a new way for professional life, but also there is a necessity to integrate them into labour market again. Moreover, the self-employed have to reclaim the experience form previous professional practice. Such complex decisions need advanced counselling. As Rodríguez-Planas suggests, the counselling for self-employment assists in developing and implementing a business plan, it includes some form of financial support (Rodríguez-Planas 2010) and assists in developing a network of business partners. The counselling for self-employment uses a variety of fragmented data about legal and financial environment; business-starters support activities, etc.; which needs the complex of IT management approaches. Thus, the interest in DSS for making decisions regarding counselling of the professionally unemployed is immediate and obvious.

The application of DSS can reduce the risk in strategic decision making by optimizing the choice options. Majority of studies on DSS focus on the issues of construction and other industries (Zavadskas *et al.* 2010), business decision by employing additionally multi-criteria evaluation technique (Ginevičius *et al.* 2008; Ginevičius, Krivka 2009). At the same time the application of DSS is of high importance in the situation when individuals have only limited amount of experience in decision- making.

Regardless of the governmental program to decrease long-term unemployment, only brief career counselling is designed for professionally unemployed people by the labour market training authority. However, the proposed retraining courses do not guarantee employment. Alongside all these obstacles, there is a strong impact of global economic crisis on the access to employment. The number of the long-term professionally unemployed is growing constantly. According to the data of Eurostat, one in three unemployed persons in the EU has been jobless for over a year (Hijman 2010).

One possible solution to described situation is to encourage the long-term professionally unemployed for self-employment. The application of decision support system allows us to connect the professionally unemployed to a network and to provide them with comprehensive information and decision support. Two main stimuli encouraged us in development of decision support system guidance for the long-term professionally unemployed: the need to analyze systematically the alternative solutions in counselling, and to benefit from the favourable support conditions in the business-starters environment. Big variety of governmental initiatives can be identified as support conditions (see for example Enterprise Europe network). However, utilization of these conditions in the career counselling needs to be measured and the decision support system suites for this purpose.

2. From unemployment to self-employment

In recent years, there has been an extensive growth in the empirical research on effectiveness of entrepreneurship, business start-up, and self-employment activities (see in *Entrepreneurship Theory and Practice* Special Issue: Theory of the Family Enterprise; or *Journal of Organizational Behavior* Special Issue: New Directions for Boundaryless Careers 2010). Although, the research focus of these studies is considerably different, there is a common perspective on a positive effect of self-employment. Economists agree that when people can't find the jobs, self-employment would be the way of solving this kind of the problem. According to the studies, 63% of Americans and 49% of Germans wish to be self-employed, yet the actual number of self-employed only lays at around 15% (Blanchflower 2000). Moreover, self-employment rates have been falling in most OECD countries (OECD 2010).

Large-scale unemployment involves tremendous waste, which are analyzed and interpreted in a variety of ways by economists (Grüner 2006; Šileika, Andriušaitienė 2006). Empirical evidence appears to be consistent with the notion that unemployment is in practice more of a burden than a blessing (Christiano *et al.* 2010). The current economic climate makes many people wary of spending money. Gruber

(1997) found that households suffer roughly a 10 percent drop in consumption when they lose their job. Also, there is substantial literature, which purports to find evidence that insurance against labour market outcomes is imperfect. Christiano (2010) in the studies has predicted that high unemployment in recessions reflects the pro-cyclicality of effort in job search. There is some evidence that supports this point of view. The Bureau of Labor Statistics (2009) constructed a measure of the number of "discouraged workers". These are people who are available to work and have looked for work in the past 12 months, but are not currently looking because they believe no jobs are available. The number of discouraged workers jumped by 70 percent in 2009 (Christiano *et al.* 2010). To the extent that workers share the sentiments of discouraged workers more generally, a jump in the number of discouraged workers could be a signal of a general decline in job search intensity in recessions.

Self-employment theories are classified into several groups, such as economic and sociological-psychological as well as the "push" and "pull" theories (Startienė *et al.* 2010). Economic theories of self-employment interpret financial motives of the person to pursue own business, while sociological-psychological ones determine non-financial objectives of self-employment such as psychological comfort at work, implementation of goals that make an individual decide to become a self-employed person. The group of "push" self-employment theories treats self-employment as an alternative to avoid unemployment, psychological discomfort, while the group of "pull" self-employment theories describes self-employment as the desire to earn the income by realizing own ideas (Startienė *et al.* 2010).

Many researches on the dynamics of self-employment concentrated on the effects of external factors, such as tax environment (Kindsfateriene, Lukasevicius 2008), increased demand of enterprises for more flexible workforce (Mickaitis *et al.* 2009), as well as government support policy (Tamošiūnas, Lukošius 2009). According to Pejvak (2009), not much is known about what is going on in the "black box"; what internal, attitudinal factors determine an individual's decision whether to become self-employed. The applicability of the Theory of Planned Behavior (TPB) to self-employment was investigated with the aim to identify the internal drivers of individuals' decision to become self-employed (Pejvak *et al.* 2009). The results demonstrate that TPB is applicable to the context of self-employment and explains over 55% of individuals' intention to have their own business in the future. The results showed that the strongest determinant of individuals' intention to become self-employed is their attitude towards being self-employed. Also, it was revealed that perceived behavioural control impacted on the intention to become self-employed (Pejvak *et al.* 2009). Other group of scientists (Nziramasanga *et al.* 2009) in their studies formulated a model of the viability

of self-employment that incorporated the impact of cost perceptions at the time of entry. It was revealed that interest rates and macroeconomic stability were important for sustainability of self-employment.

Also, the literature analysis has described that some scholars use the terms of "self-employment" and "entrepreneurship" as synonyms (Akyol, Athreya 2009; Block, Sandner 2009; Bradley, Roberts 2004; Kan, Tsai 2006; Sennikova, Kurovs 2006; Tubergen 2005; Wagner 2006). But according to Krasniqi (2009), self-employment and entrepreneurship are not the same and can't be analyzed as synonymous. In his studies he discussed the question if self-employment rate may reflect the level of entrepreneurship and to what degree.

Long-term unemployed professionals find themselves in the situation when strategic decision needs to be made. There is not only a need to choose a new way for professional life, but also to integrate themselves again into the labour market and reclaim the experience from previous professional activity. Such a complex decision needs advanced IT methods to be involved. Thus, the interest in decision support system for decisions in counselling of the professionally unemployed is immediate and obvious.

The application of decision support system (DSS) can reduce the risk in strategic decision-making by optimizing the choice options. Majority of studies on DSS focuses on the issues of construction and other industries (Zavadskas *et al.* 2010), business decision by employing additionally multicriteria evaluation technique (Ginevičius, Krivka 2009; Ginevičius *et al.* 2008). At the same time the application of DSS is of high importance in the situation when individuals have only limited amount of experience in decision-making. Regardless of the governmental program to decrease long-term unemployment, only brief career counselling is designed for professionally unemployed people by the labour market training authority. Additionally, professionally unemployed can pursue the retraining course as it is available for all unemployed in Lithuania. These measures are not nearly enough. The proposed retraining courses do not guarantee employment. Alongside all these obstacles, there is a strong impact of global economic crisis on the access to employment. According to Lithuanian labour exchange, the number of long-term professionally unemployed is growing constantly.

One possible solution to the described situation is to encourage the long-term professionally unemployed for self-employment. The application of decision support system allows us to connect the professionally unemployed to a network and to provide them with comprehensive information and decision support. Two main stimuli encouraged the development of decision support system guidance for the long-term professionally unemployed: the need to analyze systematically the alternative solutions in counselling,

and to benefit from the favourable support conditions in the business-starters environment. A wide variety of governmental initiatives can be identified as support conditions (see for example Enterprise Europe network). However, utilization of these conditions in the career counselling needs to be expedient and the decision support system suites for this purpose.

3. The application of decision support system to self-employment counselling

The application of DSS is increasing in solving the issues of social security or people well- being (Ranerup 2008). The majority of these applications provide the support for policy decision- makers; while the exploitation of DSS in decision- making for personal goals is not a common case. Individuals are taking only few strategic decisions through their life; and choosing a new profession is a major decision, which will deeply affect person's life and well- being (Cheney *et al.* 2008). Professionally unemployed find themselves in the situation when such a decision needs to be made. In the middle of the career near to 3% of economically active population becomes professionally unemployed and face the risk of in-work poverty (Trinczek 2007). More specifically, professionals cannot find jobs in their area of expertise. To find an alternative activity and to start a self-employment is one of the common solutions in a recovery after long-term professional unemployment. Beside the competence of entrepreneurship, the knowledge of specific business field is needed. The business start-up can be seen as a decision process. Therefore, consistent approach is needed and DSS is one of the best solutions for this purpose.

The application of DSS provides professionally unemployed with a powerful tool for self-evaluation and individualized decision-making. Additionally, DSS provides the possibility to utilize the databases in systematic and highly targeted way by unlocking new opportunities for people. Two main stimuli encouraged us to develop the decision support system guidance for professionally unemployed: the need to expand the impact of professional counselling on the activities related to the integration of the long-term professionally unemployed back into economic activity, and to benefit from the favourable support conditions in the business-starters environment. A wide variety of governmental initiatives can be identified as support conditions (see for example a governmental initiative at local level - Business Gateway Lithuania, or at EU level - Enterprise Europe Network).

The first step is to create the architecture of DSS for counselling the long-term professional unemployment. The architecture allows us: (1) to systematically integrate all existing information that is already collected through the last years; (2) to add new information by even four groups of system stakeholders: system administrator, system developers, system experts and consumers; (3) to create Internet delivery infrastructure.

4. The architecture of career counselling decision support system

Application of DSS in the counselling for self-employment can be interpreted as a flow of subsequent reclaim of experience that leads the individual person to a level of knowledge and competency in modified activities. DSS helps in solving such a challenging question as how to resettle previous professional experience in the new economic activity. Moreover, it is capable to provide the unemployed with decisions based on up-to- date information on labour and business market that is changing constantly. The brainstorming on challenging ideas that we presented above and potential of contemporary IT provided us with new possibilities (Fig. 1):

1. Possibility to get in touch with decision support system server in remote mode.
2. The databases constantly are up to date with new and actual information.
3. The users can connect at any time to the databases and receive expertise support for their decision.
4. There is a possibility of multi-user connection at the same time.

All these possibilities ensure the simplicity of providing individualized decisions, which includes the analysis of current situation in constantly changing economic conditions. All system is designed to give the individual recommendation how to start a new business or how to find the partners for new business.

DSS in accordance with input data (hobbies, activities, individual experiences, competency) culls necessary steps such as multilayer tests. DSS proceeds in this manner when consumer is registered and tested; it is integrated with the system's database.

From a technical perspective we suggest that it is advisable to place a workflow engine at the core of the Internet based e-decision making system (Izquierdo, Deschoolmeester 2008). This will allow to generate or manage personalized and adaptable individual recommendation access flows. The process of culling of an individualized recommendation grants the consumer access to subsequent databases of related resources or services. The structure of DSS is comparatively simple and is self-controlled in the process of logic analysis. Figure 1 outlines DSS functions and subsystems.

The functions and subsystems reside on a networked multi-server infrastructure with strong Internet connectivity and a number of databases (Jakeman, Letcher 2003). The Internet portal system provides different types of users: it is segmented according to user's type and customized services. The databases are designed to collect data about a number of processes and entities:
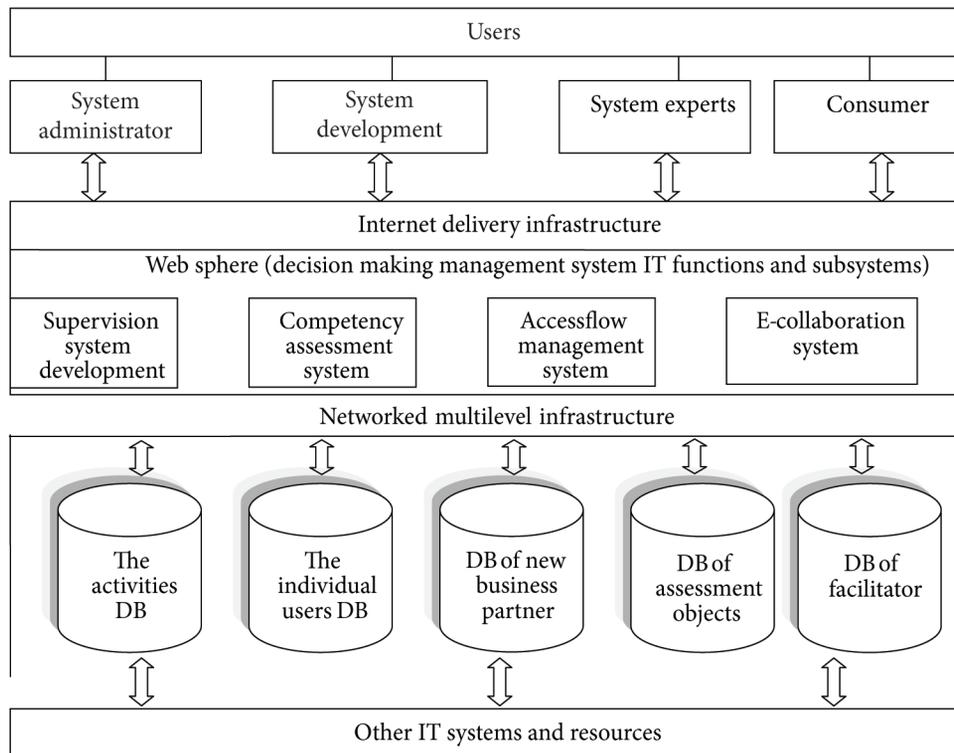
Fig. 1. The management of functions and subsystems information of the decision support system

– *Activities database*. This database integrates processes for the evaluation of consumer's readiness. It measures knowledge and competencies. Based on Izquierdo, Deschoolmeester (2008) approach, the knowledge and competencies are separated into standard role-based competencies and associated with knowledge requirements or patterns of behaviour.

– *Consumer database* consists of individual user's profiles, privileges, and data of the user's private information. In addition, the database contains personal curriculum, tests results, and individual recommendations.

– *Facilitator database*. This database contains data about user's searching history.

– *The assessment database*. Measurement objects are stored in this database. They also include their metadata. The objects or "unit of tests" are structured according to the implementation concept, and contain metadata (title, subtitle, creator, description, study-load), roles (system consumer, system expert), activities, objectives, prerequisites, content (activity, environment, announcement object, role information, etc.), method (activity structure, conditions). Based on Hora, Helton (2003) suggestion, the database is based on the squared differences of the consecutive ranks of the output variable. Therefore, this DSS generates levels of knowledge and competencies.

– *Business partners' databases*. Workflow system is built from multiple, separately developed components that have a link to consumer database. The system's individual recommendation is attributed to access the flow data.

According to Xiao *et al.* (2008), multiplex database system always gears up, so we must elaborate the system environment and structure. With regard to that issue, the important task is to create the *Administrator subsystem*, which leads to simplicity and integration of administration and author's subsystems to one application.

5. The individual recommendation access flow algorithm

The individual recommendation access flow algorithm schema of DSS is presented in blocs for test program of individual recommendation extraction (Fig. 2). It was expanded by deep analysis of gated results, and constructed to draw the individual recommendation for tested participant (Izquierdo, Deschoolmeester 2008; Butler *et al.* 1997; Jakeman, Letcher 2003). Figure 2 shows DSS access flow. Additionally, it matches the ideas that simulate the conditions of business starters' environment.

Traditionally, tests are limited to the first 10 blocs (1–10 blocs). The 1-st bloc is constructed for self- containment as logic of processes and analysis of consumer objectives.
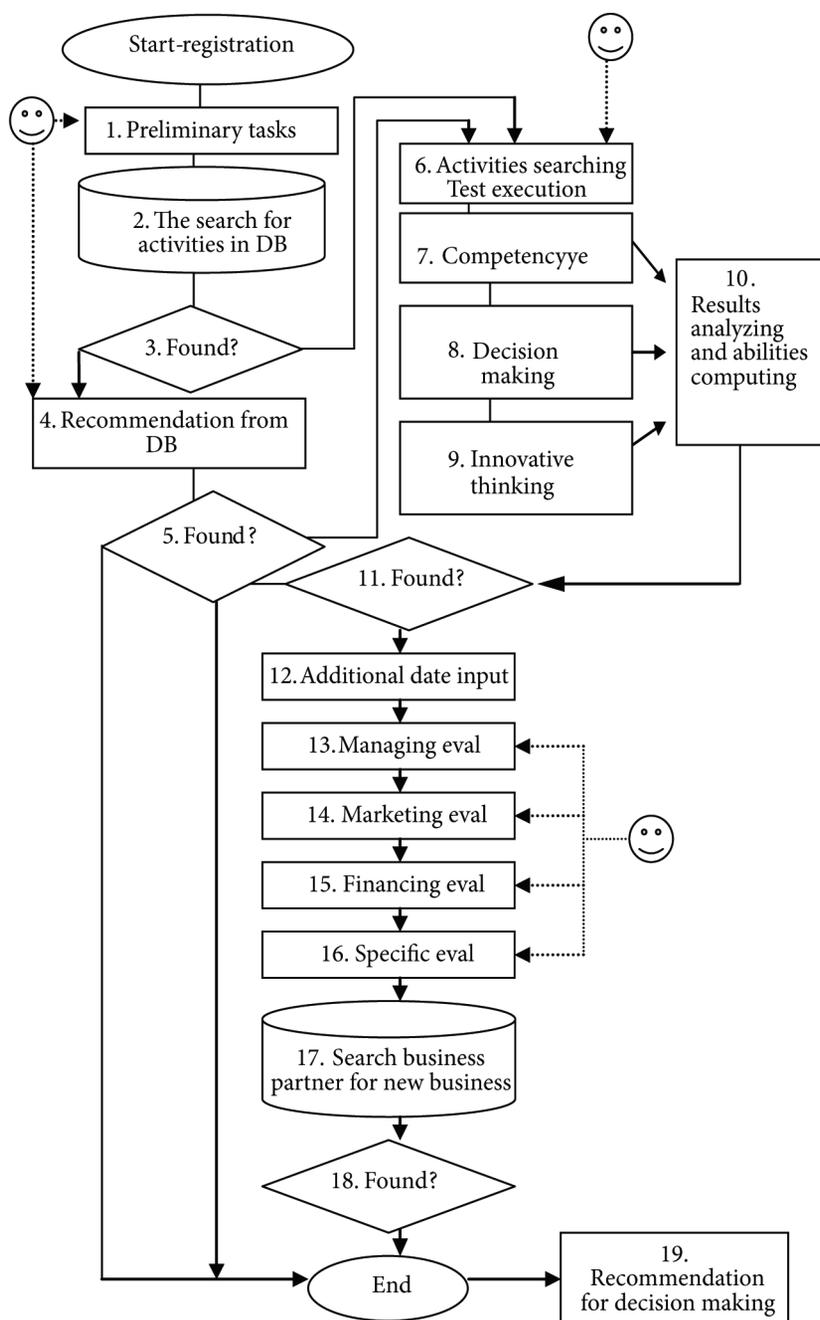
Fig. 2. The individual recommendation access flow in the decision support system

The 2nd bloc follows after preliminary tasks evaluation; its task is to search the possible behaviours for the tested person in the *activities database*. The consumers with clear cognition of their possibilities can get the help by 4th bloc. The recommendation from 2nd bloc can be chosen as a test result. Moreover, it is foreseen the possibility to retest the needs of user after another deeper analysis. The dialogues of the 1st section can not explicate the sphere of activities, the consumer can continue with activities searching (6 to 11 blocs). This additional possibility comes up through multilayer set up of the procedures. While the program is

testing the user by 7th, 8th, and 9th blocs, the 10th bloc is counting and analyzing the answers. Selected results are presented by 19th bloc.

The test not only informs participant about his scores of tested factors, but also provides a decision for future business start-up activities. In addition to usual tests, the proposed system overcomes the challenge of misinterpretation of the results. Test information is not easy to understand for user, and even it can lead to misunderstanding and mismanagement (Paul 2004). Therefore, this DSS was realized in multiplex intellectual task solving schema with the direct

work of user and test program. This function is marked as the dotted lines, including the 1st, 4th, 6th and blocs from 13th to 16th.

The professional counselling system is based on three interlinked parts. The first part measures and represents vocations and hobbies of individual person. Referring to the traditional professional counselling, the first step is to test persons' interests and competencies. Persons' interests are the main priority in the DSS for self-employment. According to this approach, building a new career around the type of work that takes an interest can bring additional efficiency and value added. The tests for preliminary tasks were constructed as follows: a person is asked to write up to 50 keywords, which describe his interests, hobbies and aptitudes; after that program analyzes input data and gives the recommendation for the business start-up activities.

After testing the person's interests and hobbies, the program is testing his transferable competencies; so the second step is for the person's ability for entrepreneurship. The program is analyzing and evaluating overall motivation to start and operate his own business. This part of program is designed for analysis of professional competency, abilities for decision- making, and innovative thinking. The competency test is a measurement system that is capable of testing person's qualifications for a particular job in a particular field. In this case competency test is created according to the guidelines of the Lithuanian Standard Classification of Occupations. The standard characterises 10 main groups and 5509 occupations, whereof 2876 occupations are directly related to the business activities, and are used for our DSS. Decision-making test identifies whether the person is decisive, and whether he is able to manage successfully his favourite activities associated with risk. The innovative thinking test recognizes whether the person is innovative and is able to find a solution to challenges.

The third part of the program creates the network of people with complementary competencies for chosen business. This last level of the program is designed to help an unemployed to start a new business together with others. The system selects complementary profiles and creates a group of 2–5 unemployed. All together they compose a potential business network. This network is a business start-up meet-up group (Evers, Knight 2008). At the beginning this group needs advice for business-start (system experts), while in the long period of time it can develop itself into the network where start-ups are learning from the experience of others on the basis of e-consultations. After consumers analyzing is done, a person can make a decision by getting automated recommendations or can ask for help from experts. This possibility is intended in the DSS architecture, because there is not only a need to choose a new way of professional life, but also to integrate back the professionally unemployed into active economic life and reclaim the experience from previous employment.

6. Conclusions

Reintegration into the labour market is an exceptional complex of decisions for the long-term professionally unemployed. In order to improve the quality of these individuals' decision- making, formal DSS was developed. DSS is tackling the main social challenges of long-term unemployment: it conveys an experience from previous employment; provides new business opportunities, which are highly related to person's hobbies; and it connects people by developing complementary groups of same interests and same positive attitudes towards entrepreneurship.

The proposed and created architecture of the DSS for professionally unemployed allows: (1) to systematically integrate all existing information that is already collected through the last years; (2) to add new information by even four groups of system stakeholders (system administrator, developers, experts and consumers); (3) to create Internet delivery infrastructure.

DSS was developed in accordance with the input data that culls necessary steps such as multilayer tests. The functions and subsystems reside on a networked multi-server infrastructure with Internet connectivity and a number of databases. The Internet portal systems are used to provide different types of users, specific and customized services by user's type. The databases are designed to collect data about a number of processes and entities, such as: the activities; consumer database; facilitator database; the assessment objects database; and business partner's databases. The multiplex database system gears up, so there is a need to elaborate system environment and structure additionally. The important task is to create the administrator subsystem, which leads to simplicity and integration of administration and author's subsystems to one application.

The recommendation access flow algorithm of DSS consists of three interconnected blocs: the first bloc is constructed for the self- containment as a process of logic and analysis of consumer objectives; the second one analyses person's ability for entrepreneurship, it also evaluates individual's overall motivation to start and operate his own business; the third bloc provides with potential complementary business partners or business start-up.

By evaluating the architecture of DSS for counselling the professionally unemployed, it is worth to stress on one changing point. The proposed DSS system is high in complexity; therefore the need to evaluate uncertainty at all stages becomes very important. Most important area that needs to be addressed in relation to incorporation of uncertainty is associated with human input.

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