EMPIRICAL RESEARCH ON THE RISKS AT THE STAGE OF DESIGN OF THE INNOVATION PROCESS CONDUCTED IN BULGARIA

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The design of the innovation is hardly reviewed in the literature which provokes the interest in defining the possible risks at this stage of the innovation process, their methodological justification and an empirical research. Expert evaluations and structured interviews of experts in this field in Bulgaria were carried out. Value and scale grades are used. The risks are identified as internal and external. Evaluation of possible ways to manage them is outlined. The most common risks are identified - related to supplying the finances of the design and interaction with the public administration and utility companies – water, gas, electricity, heating.

Introduction

The development of the society is related to the advancement of science and industry. The changes in it set the need for new ideas in order for businesses to survive today. Innovations are considered to be a necessity for the long-term success of companies. (Damianova, 1993) Innovation should not be modeled as a single stage process. Considering the existence of various involved actors like universities, research institutions, business enterprises, governmental organizations, etc., the innovation should be considered as an interactive, networking and collaborative process. It can also be percieved as a multilevel concept (Carayannis, Grigoroudis and Goletsis, 2016). There are different definitions of innovation (Mastrogiorgio and Gilsing, 2016, p. 1420; Colvin at el., 2014, p. 762; Stock et al., 2017; Damianova, 1996) and not only. Whatever definitions can be proposed of it, a differentiation can be made between technological and social innovation (Martin and Osberg, 2007).

Innovations are important because they are a means for the increase of a company's sales but their success is related to risks (Antonova and Pencheva, 2009). The implementation of innovation projects is related to large amounts of funds that are needed in the long term (Schmeisser (2010); Damianova, 1996). Many challenges stand before innovation (Neese, 2017; Guan, Zhang and Yan, 2015, p. 567). Adherent to innovations management is risk management.

The purpose of the current work is to research the risks at the stage of design of the innovation in Bulgaria.

1. Barriers to innovation

It is important to uncover the weaknesses and strengths of innovation which can take place by studying the processes that make up the innovation system (Edsand, 2017, p. 3) and the processes that take place all belong to particular stages of the innovation development. As a result of various reasons, both subjective and objective, the realization of company innovations is related to barriers which have to be overcome. Various barriers (Kirova and Ruskova, 2009; Kunev and Antonova, 2013) could be identified. A classification based on different indicators can be created:

- Some of them are related to financing and these are among the most difficult ones to overcome. They influence largely the company innovation activity (especially that of the SMEs). These barriers are a result of the large amounts of investments, the presence of a high level of risk in innovation projects, difficulties to define the degree of return of the investments and the amount of generated funds that are expected. That is why it is considered that long-term innovation strategies are more likely to be pursued when long-term investors are present (Bertoni and Tykvová, 2015, p. 928). Research shows that the main channel through which risk affects innovation capability appears to be that of innovation financing (Carayannis, Grigoroudis and Goletsis, 2016).
- Other barriers are related to the company policy (Papazov and Mihaylova, 2015, 2016, 2016) on innovation. The reason for them is usually the lack of clear priorities for the development of the innovations in the company, a lack of well-developed system to stimulate and acknowledge the work of the innovators, etc.
- Barriers related to the lack of conditions for the development of an effective company innovation practice. The reason for those could be lack of good conditions for training and work of the people who work on innovations; a weak network of contacts on company and field level, as well as national economy and international achievements; lack of sufficient and timely support of the innovation activity on behalf of the strategic managers and the company owners, etc. (Bertoni and Tykvová, 2015).

Different barriers and risks stand before innovation in Bulgaria (Damianova, 2000). On a national level for Bulgaria the barriers before the innovation activity could be separated into technological, infrastructural and behavioral. Among the causes for those are the outdated material and technical base, the impossibility of the SMEs to spare funds for new equipment, the lack of effective state policy in the economy field, low administrative capacity, etc. (UNWE, 2017).

2. Stages of the innovations

Innovations come into being after a number of stages that they go through. Each stage is exposed to risk. In order to establish which innovation phases are mostly related to risk for the innovation in Bulgaria, it is important to explore the various classifications of the stages in the innovation processes.

Various classifications and models demonstrate different stages (Silva, Oliveira and Moraes, 2016; Ceschin and Gaziulusoy, 2016, p.3; Livotov (2016). Some sources place an accent on the first stages of the innovation development related to setting company goals and ideas to develop (CPI, 2013; Stanleigh, 2017; Stock et al., 2017). Managing new ideas is a focus in the publications of (Suradi, Omar and Shahabuddin, 2015; Neese, 2017). Various sources give a specific position, an accent on idea management -

structuring, prioritising, storing and controlling ideas (Suradi, Omar and Shahabuddin, 2015; Neese, 2017). The start of the innovation is presented as a stage under various names and with various activities involved but it is common between the different innovation phases descriptions (cabinet research, identifying the innovativeness of an idea) (Suradi, Omar and Shahabuddin, 2015; Neese, 2017; Stage-Gate, 2017; CPI, 2013; Stanleigh, 2017). Suradi, Omar and Shahabuddin (2015) demonstrate that lab prototyping and intellectual property rights need to be addressed specifically when starting an innovation and that is why such activities are presented separately from the other innovation stages. The next stages like development, testing and mass production are proposed by various authors (Suradi, Omar and Shahabuddin, 2015; Neese, 2017; Stage-Gate, 2017; CPI, 2013). The development stage exists in more innovation phases' classifications which shows that the innovation design is more widely recognized than other phases. Marketing, sales and support as a stage is outlined by Suradi, Omar and Shahabuddin (2015). Stanleigh (2017) points out as a last phase - preparation to start the process again.

The advancement of the theories on innovation lead to models for the development of the innovation process that consider the relations between the functional units in the process of creating the design. Strategic are the time, stronger quality requirements, corporate flexibility, integration with providers, etc. The complexity and meanng of the design as an important part of development of the innovation is not an object of research as it is in most theories for the process of innovations. Observation and monitoring of the design including identification and management of risks is important for the contemporary, quick and corresponding to the market requirements development and commercialization of new ideas. This stage contains the actual characteristics of all aspects of the innovation, with many uncertainties, requirements, changes and development of the external environment (Köhler, 2014, p. 429; Kirova and Ruskova, 2009; Kirova, 2011; Carayannis, Grigoroudis and Goletsis, 2016). Neglecting the adaptation of the innovation to the requirements of the external environment especially at the stage of innovation design and not applying it in an adequate period of time will lead to omitting significant opportunities that are revealed at the evaluation of the innovation potential.

The stage of innovation development is also denoted by the term "valley of death". Also called the innovation gap, it describes a part of the innovation process through which many ideas cease their development. This is a phenomenon in the innovation industry where many new ideas going through the innovation process fail to progress any further and it can take anywhere between 5 to 10 years to work through. In Technology Readiness

Levels (TRL) terms, which are used by NASA and the UK's Technology Strategy Board (TSB) to demonstrate the innovation process, the "valley of death" occurs between TRL levels 4 and 7 (fig. 1) usually at the point where the idea is turned into a working prototype to show it works, production costs are assessed, the equipment and processes for the manufacturing are determined. At this stage the risks involved are very high (CPI, 2013).

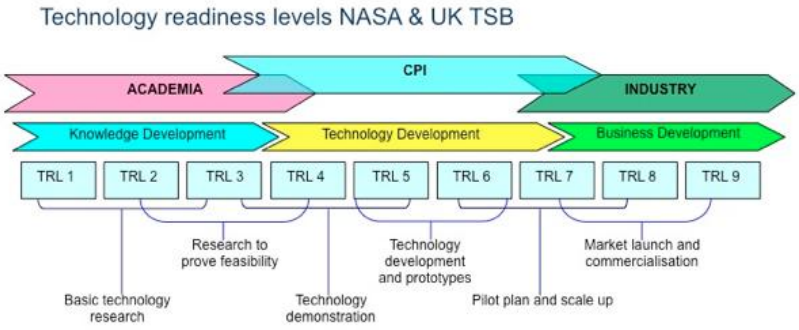

Fig. 1. Innovation stages

Keeping both innovation and risk-taking activities while introducing risk management is important which is the more contemporary understanding. An approach of several decades ago is the understanding that companies with less controls (which risk management is considered to be part of) are more effective innovators (Gurd and Helliar, 2017). Estimations of market success also at the early stages of the innovation process are necessary for the successful execution of the innovation project (Livotov, 2016). The literature review shows that there is a void in the theories for innovations management at a very important stage of their development.

Uncertainty is inherent to risk and is a constant for emerging technologies because often they evolve in ways that have not been expected. Risk assessment at the stage of development when uncertainty is high is very important. There is evidence that new product development suffers from risks. Reducing risk in new product development is related to expected positive results like increased customer value (Oehmen et al., 2014; Milcheva and Karev, 2012). Risk prevention and assessment is considered to be important in the innovation process and research on companies that balance creativity and product innovation with risk management exist.

Analysis on risk areas, factors, categories is rather scarce in the literature, especially when it comes to innovation risks. However, some sources point out results from their research. A list of development project risks is outlined for 7 risk areas (task distribution, knowledge management, geographical distribution, cultural distribution, stakeholders relations, communication infrastructure, and technology setup) divided into 24 risk

factors. Also, 142 R&D program risks are grouped in 12 categories, a risk collection for software development projects, falling into 12 project risk categories containing 49 risks is presented; four types of risks, that impact R&D project effectiveness and efficiency are reviewed, etc. have been enumerated in (Oehmen et al., 2014). 7 risk categories related to the exploitation of small energy plants have been idenitifed and explained in (Kirova and Velikova, 2016; Kirova, Sheludko and Velikova, 2012).

Despite the existence of some empirical data on risk areas, risk factors and risk categories in various research, there is scarce information related to the stage of innovation project development hence it remains greatly understudied. Currently the main barriers, uncertainties and risks for the innovations at the stage of design of the innovation in Bulgaria derive from the legislation. There is lack of instruments for risk management at the design stage and the danger of omitting opportunities when good ideas are present defines the direction of this work.

3. Risks at the stage of project of the innovation

In the literature concerning innovation the term "project" is used to denote an idea of a new product, service, improvement of a process and any other activity and novelty in an organization, which the company is working on or plans to implement. It refers to the time, activities, finances and effort of the decision for implementation until the end of the market cycle with all of its problems, decisions and results. In this material the term "project" is used to denote a particular stage of the development of innovations that refers to the research on the realization of the innovation, creating a description of the technology, calculations, technical equipment, drawings, sketches, maps and other documents, needed for the realization of the innovation, often called "design" of the innovation (Suradi, Omar and Shahabuddin, 2015; Neese, 2017; Stage-Gate, 2017; CPI, 2013). This stage is not examined in the literature concerning innovation due to the fact that it is precisely defined in the legislation regarding innovation activities. In this sense projecting or in other words designing is an inseparable part, a stage of the development and management of larger innovations. Its realization is related to uncertainties and risks since it develops future activities that contain obscurities and changes that are hard to foresee. That is why the management is obliged to know, observe and manage this important stage of the innovation process.

Predesign risks. The factors that are reviewed can generate risks from the start of an innovation and these risks can take place before, during the stage of design or later and they can be related to a part or the whole life cycle of the innovation.

Risks related to the development of the design assignment and single-phase design with a company's own development unit. They are reviewed altogether due to the small difference in time and their origin from the same sources.

Design risks at assignement. Design through assignement is undertaken at larger and more complicated objects whose development requires more phases that fall into the scope of project or design companies with the corresponding capacity and qualification.

Risk of negotiation of the design and the scope statement.

There are various approaches when negotiating the construction of the scope statement:

- Compilation of the assignment by the assignor;
- Compilation by the contractor and acceptance by the assignor;
- Joint compilation and acceptance by the assignor.

Risks when developing the design

At the early stage of innovation risks can be hidden since more tangible problems come out to be dealt with. The phase of early product development is the most critical determinant of competitiveness since up to 80% of the costs of product development, manufacture and use are determined during the initial design stages (Schoggl, Baumgartner and Hofer, 2007). Various strategies could be suggested for managing risks during the early technological innovation phase like implementation and further development of eco-design principles, clear regulatory framework or standards and governance of technology development processses (Köhler, 2014, p. 422, 427, 428). It is pointed out that every step of the innovation needs to be planned carefully (Griffin et al., 2014, p. 1364).

4. Methodology of the research (expert evaluation)

4.1.Transforming the qualitative risk assessment into a quantitative one

The need to evaluate risks quantitatively appears when the various risk factors need to be graded and there are rules that are followed related to the transformation of the linguistic evaluation. The method that is most widely used is grading scales. The quality reviewed is separated into a certain number of levels and every level is assigned to a certain a number. Experts participating in the research have to define which level the quality is closest to and then the organizater [of the research] can compare the numerical characteristics. The choice of a scale is important in order to minimize the possibility for mistakes by the experts and give them more freedom. Scales that have a particular level of grades are called "discrete". The levels of all of the scale levels need to be formulated as precisely as possible. The formulations need to be clear and precise so that all experts will understand them in the same way. The experts have more freedom when only the beginning and end value are defined and the expert can choose a number of

the range. But in this way the experts give various grades to the same factors and the grades assigned differ. Limiting the differences can take place by assigning several areas to the grading scale which creates a grading scale of a mixed type. The number of experts is important for the quality of the grades. A discrete grading scale with 5 to 7 levels and 5 to 10 experts is recommended.

4.2.Ranking the risks

Usually the expert evaluation aims at defining the place of the evaluated objects in a certain arrangement – through change of some of their characteristics or more frequently – according to the level of their influence on a certain process. When arranging every evaluated object, it is assigned a number called rank and the arrangement - ranking. The numbers - a result of the evaluation, are in a scale. The object that has the highest evaluation could be given a rank one as a most significant or vice versa, the most insignificant one depending on whether the evaluation is for a positive or negative influence of the object on the process or the vision of the organizers' of the research for the convenience of the subsequent processing of the results. Ranking could be done in various different ways as well.

4.3.Risk research during the design stage

The purpose of the research is to obtain information regarding the quantity and weight of the risks at the design stage. The task is to collect and process information for the risks in order to point out the ones that are most significant and difficult to overcome in the design stage of the innovation which is the stage with the most uncertainties.

Interviewing is used. The evaluation is based on a 5-level scale that is mentioned in the questionnaire and that gives an opportunity for a more objective evaluation. Every level is described in detail so as to alleviate the respondents and to minimize mistakes during the evaluation. In order to achieve the needed results, the preparation is very important. The interviews provide freedom in the choice of questions and information without pressure on the experts which makes them more impartial. The interviewer can follow the reactions of the experts to make sure they understand the questions correctly. A way to limit the possibility to interpret the questions is to use a "structured interview" in which the questions are formalized and their arrangement is fixed. This approach can help the processing of the results afterwards. The interviewers are instructed on how to conduct the intereviews. The questions are formed in a way that protects the experts, companies and innovations. This will ensure participation of the experts and protecting company secrets.

Choice and preparation of the interviewers. The qualities and preparation of the interviewers are very important for the objectivity of the research. They

have information regarding the stage of design, content and meaning of the questions and the possible answers that the experts need to select. The interviewers are trained to explain the importance of the research regarding the easier and better design of the innovation and uncovering or decreasing the risks. They are also informed about the stage of design and the state of the matter concerning the uncovering and management of the risks at the stage of design of the innovations. Knowing the institutions which the companies communicate with at the design stage is part of the interviewers' preparation and of vital importance for the definition of the possible risks that can appear.

Choice of experts. The information that is needed can be obtained only by interviewing employees that are directly related to the design (investment construction departments or people on higher positions in relation to it). It is prefferrable that they have more experience, qualification and knowledge in the area of investment design. It would be useful if risk managers from the company can participate (if there are any employed). These characteristics are presented anonymously and they will help processing the results – when a choice needs to be made between answers that are not of equal value from different participants regarding the same risk. 12 companies participated in the research – 2 small and 10 large. In order to ensure equal weight of data from all companies, each one can fill in only one questionnaire. Collective participation is allowed, for example a department, if everyone invited agrees.

Content of the questionnaire for the interview. The introduction clarifies the purpose of the research, who makes it, what the collected information will be used for. It is cleared up how answers can be given anonymously. The presentation of the company and the experts that participate is in the beginning of the questionnaire and is also anonymous. The type of the innovation is described as a new product, new service or improvement of a process. Only one possible answer is given. The questions and answers are collected and presented in a text in such a way so as to contain and require objective information regarding the purpose of the research. For every question there are 5 possible answers. The expert chooses an answer that is closest to or matches his/ her perspective. Answers different from the ones given in the questionnaire are also accepted. This gives freedom to the experts if they want it. The answers can also be general or inspecific, for example: "I cannot answer", or a text given by the expert.

Conducting the interviews. The interviews take place according to a particular and strict scenario that is specified in advance. This phase begins with a meeting with the manager of the company – participant which is informative of the research – its essence, how it will be conducted, possible benefits for the organization or at least lack of harm. Suggestions are made to the manager regarding who can be most competent for participation in the research

(department manager, deputy-director, risk manager, etc). The time and place for the interviews is arranged. They begin with the introduction. If needed, clarifications are given in order to assist with precise and sufficient responses.

5. Processing and drawing conclusions from the expert evauations on the risks and the design

The possible risks at the stage of design of the innovation are reviewed. In order to be able to research the risks at this important stage of the development of the innovations they need to be classified:

- Origin of the risks – generated by factors that are external or internal for the innovative company;
- Sensitivity of the risks towards an influence on them – possibilities to manage them;
- Capabilities of the innovator to cope with the risks.

Every response of an expert contains an answer for each of the latter classifications.

The results of structured interviews of employees in 12 companies of various size, type of activity and location within Northern Bulgria are used as a source of information for the actual state of the companies and the risks at the design stage of the innovations. The research was conducted by a lecturer and PhD students at the department of "Management and business development" from the University of Ruse "Angel Kanchev". The information from the classifications that is processed gives the opportunity for general conclusions and evaluations in several directions:

- The innovation design takes place in large production units, located mainly in large industrial centers from various departments.
- In micro- and small companies – 2 of the 12 companies that have been researched in total, the innovations, as much as they exist, take place through an idea and specific work by the owners; no design, standardization and research for compatibility with the legislative base of the country. These are mainly small consumer goods, services, spare parts for the industry and households, and their improvement. The reason for the small companies to restrain themselves from design comes from the fear of risks of strenuous expenses for design and market difficulties in the realization of the innovation and providing finances for it.

External risks

In the innovation activity, the external environment is an influence in various ways and with various changes – sources of risks. The risks refer to different stages of the innovation but they all reflect on the design stage as a very important aspect of the development of the innovation. The more the investor has the abilities and possibilities to identify the risks, the more complex becomes the situation which he creates himself. In order not to hinder the

innovation activity from fear of the multiple risks, the risks have to be more than uncovered and identified. The next activities for evaluation and risk management, possibilities of the organization to influence the risks or avoid them in time are necessary. The risks at the design stage impede the innovator, on one side. On the other side, overcoming them at an early stage from the development of the innovations which the design is, decreases considerably the risks at the more advanced stages when significant finances have been invested along with time and effort, and the damages could be larger.

The results from the interviews of experts working on innovations in various organizations point out external risks arranged in the following manner:

- Sources from working with beaurocracy – state and local administrations. They impede the innovators with multiple requirements when issuing different permits. There are also cases of refusals to issue such documents. These risks are pointed in the research as "moderately difficult to overcome" (two out of ten), "moderately easy to overcome" (five out of ten) from the experts and organizers; nevertheless they can be overcome with loss of time to acquire qualification and experience for the timely satisfaction of the main requirements of the administration. The work with the beaurocracy is evaluated as highly risky by the experts due to the danger of the so called "secondary risks" that can originate in time, when overcoming risks with work with the beaurocracy. They are caused by delay in the implementation which can be a reason to omit deadlines for using finances from public funds, change in the legislative documents and actions by the competition. The refusals to issue permits are more complicated and difficult to overcome. In such cases actions to change the place of positioning of the innovation or change in the technology regarding environmental preservation, infrastructural conditions and other radical actions are needed. Refusals of the innovation are also possible due to inconsistency with its main parameters with the legislative requirements that have not been taken into consideration on previous stages or due to changes that have appeared in the course of work on the innovation that lead to immense increase of costs.
- Risk that a certain phase of the design will not be approved. There is one answer evaluating it as "moderately difficult to overcome".
- Risk when issuing a building permit. One evaluation is given: "easy to overcome". This and the latter risks have been evaluated as comparatively easy to overcome since the administrational requirements have been satisfied at the early stage. The requirements made do not have great omissions at the last phases.
- Risks from interaction with the companies – operators. These risks are frequent and difficult to overcome. They derive from the conditions that the

companies – operators' position before investors in order to issue permits. They are related to creating physical conditions to the equipment of energy sites for reserving utilities, building parts of infrastructural networks with finances owned by the investor, construction of facilities to process waste, etc. They are all related to considerable increase of costs of the innovation and increase of the time for the design. Issuing an official statement without increase of the investments is marked by ten of the interviewed experts as "moderately easy to overcome" risks, one – as "moderately difficult to overcome" and one – as an "easy to overcome" risk. The risks that can be overcome by increase of the value of the innovation are pointed out: one - "moderately difficult to overcome", one - "difficult to overcome" and eight - "easy to overcome".

- Risks in the relations with the designers. For some of the innovations, providing for the appropriate designer is not an easy task. The explanation could be that the designers prefer objects with routine decisions due to the improved production and fewer risks. Accepting unknown and risky designs comes at a higher cost. The research shows one case with a "difficult to overcome risk", seven – "moderately easy to overcome" and two – "easy to overcome".
- Risk for a deficit of qualified design organizations for industrial innovations. According to the interviewed experts in the energetics field and in industrial activities there aren't good designers. Most of them specilise in the design of residential and administrative buildings and also in certain specific parts (water, electricity, etc.) of the infrastructure. The design in industry and energetics requires the temporary use of specialists from the company innovator or experts from other organizations. The designer is involved in the structure and a specific part is implemented by the experts from other organizations. This risk situation is evaluated as "difficult to overcome", one that the innovators cannot cope with. It reflects negatively the qualities of the projects and the time for implementation. It imposes the need to overcome formal reqirements for legal capacity with temporary decisions and help from the chamber of engineers. The answers given are: a "moderately difficult to overcome risk" – one, "moderately easy to overcome" – seven, "easy to overome" – one answer. Due to a very rare for the country design specialty, the organization of innovation slows down the work on the design. In this case the risk is "unacceptable".
- Risks when interacting with financial institutions. These kinds of structures are typically firm in their positions when they impose their conditions which is where risks from working with them could appear. Nevertheless, they are frequently sought for. Innovational activity is undertaken mainly with finances from public funds on national and European programs and

cofinancing from local authorities. The share of own financing is small. The main reason is – a risk when providing financing for the design and innovation and a high risk for changes in the external environment. If only own financing is used there is a possibility for a higher weight that can come from the financing through credits and interests in comparison to using public funds. Providing for finances from public funds requires the preliminary execution of the design. If finances are not provided by the funds, the expenses from the design remain as a loss for the investor. The evaluation of the interviewed experts for financial provision of the innovations is as highly risky which is the reason to undertake design through assignment only if there is no other option. The interviewed experts have pointed out one "unacceptable" risk, four - "difficult to overcome", one - "moderately difficult to overcome", two - "moderately easy to overcome" and also two - "easy to overcome" risks.

- Risks when defining the internal economic characteristics for the innovation depending on market conditions. Risk when implementing design with consciously decreased internal economical indicators of the innovation is a result of the low purchasing power of the population, when designing a household product. For some goods the national market is contracted by the low purchasing power of the population. Even if the innovator can provide high user qualities of the innovation he is forced to look for design that will ensure a marginal cost and a low market price. This approach will provide results but the risk of limited possibilities to decrease the prices in future in the case that strong competition and market saturation appear, remains. This case is predominantly evaluated as "moderately difficult to overcome risk" (six out of ten interviewed experts). It is acceptable, if the share of the designed innovation in the total production of the company is small and allows its problemless existence in case of a stop due to market difficulties. In this case it is appropriate to make a quick entry to the market with design by an own development unit. This risk can be decreased when high productivity is achieved in the future which would ensure possibilities for competitive prices. This condition has to be sought for when designing the organization of production, qualification of the executive staff and the ability of the equipment. These are the internal conditions to overcome external risk.
- Risk of temporary refusal from design at the presence of strong competition at production import or export. At export, clients from abroad often require prices much lower than the market ones. Such requirements are possible if the internal market is contracted or saturated with imported goods. This conclusion at preliminary research of the design stops the design or the innovational activity in general. The company – innovator is forced to constantly look for markets and distributors for its future product before

undertaking the design. The risk of negative changes in the market conditions remains after a market has been found. The situation in which design is undertaken without solving the abovementioned issues or they have been neglected because of good production or technological capabilities of the organization, is more dangerous. The situation is evaluated as "difficult to overcome risk" – two answers, "moderately difficult to overcome" – three, "moderately easy to overcome" – two, and "easily overcome" – two out of ten interviewed experts. This situation imposes permanent work on providing a market, competitive parameters of the product and temporary interruptions of the design with the possible negative consequences become possible. There has been one answer: "unacceptable" risk and temporary discontinuation of the work on the design.

- Risks from disasters and important political events. They are difficult to preview and evaluate. The answers are: "difficult to overcome" risk with temporary stop of the design – one, "moderately easy to overcome" – two, and "I cannot estimate" – seven.

Risks from the design that originate from the company – innovator – internal risks

- Risks from lack of sufficient qualification of the staff from the middle levels in the company regarding the possibilities to conduct design. It refers to knowing the legislative base of this activity and the ability to communicate and work with design organizations and state and local authorities for the timely and qualitatively implementation of the obligations of the company – innovator. In this aspect, most of the interviewed experts evaluate the capabilities of the staff working on the design as good or average, and the risks – as "easy to overcome" – five answers, and "moderately difficult to overcome" – three answers out of ten.
- The risk from the abilities of the production personnel is related to the success of the innovation when it is more different from previous production. This poses the need for re-qualification, engaging the qualified staff that is lacking. The risk is evaluated in a wide range due to the differences in the innovations: "difficult to overcome" – one answer, "moderately difficult to overcome" – four, "moderately easy to overcome" – two, and "easy to overcome" – three out of ten.
- Risks from disturbancies in the current production when inspecting the equipment and evaluating the capacity, productiveness and the current resources, in relation to the design. It is related to temporary interruptions in the production and contacts with the staff, and as a result – decrease in the motivation of the personnel which follows from the uncertainties for them related to the implementation of the design and the inspections. The

predominant evaluations are: “easy to overcome” – four, “moderately easy to overcome” – two out of total ten interviewed experts.

- Risks from fear of changes. Usually workers and employees meet innovation as a threat to their working places, fear of dismissal or merging positions and professions which leads to any kind of resistance to the designed innovations and generates psychological tension within the company – innovator. Such a situation is evaluated as “moderately easy to overcome” – three responses, “moderately difficult to overcome” – one, six answers have been given - “I cannot answer”.
- Risk from bad image of the innovator because of temporary difficulties when not complying with the requirements for environmental preservation and working conditions by the staff employed with the company innovator. Such omissions of the companies lead to a negative attitude of the society towards them. Designers external from the company avoid relating to similar problems out of fear for their own image. This situation is evaluated by the respondents as highly risky for innovations and design in the energetics and in some of the industrial enterprises. It is important to acquire special conditions and arrangements when negotiating assignment of the design with a contract. When designing with an own development unit it is highly probable that the risk that appears when approving the projects is going to be higher than if an external designer company or designers are involved. This makes systematic observations and monitoring with public announcement of the positive results needed. The respondents have pointed out one evaluation for a “moderately difficult to overcome” risk, one evaluation for “moderately easy to overcome” and one - for “easy to overcome” risk. For understandable reasons 7 of the experts have not given an answer.

Conclusions

From the summary of the results from the structured interviews of experts from innovation organizations and the juxtaposition made by the team conducting the research of the evaluations obtained, the following conclusions can be made:

- The experts evaluate as most difficult to overcome and manage risks from the external environment. On first place are the evaluations for work with the administrations and the companies – operators when providing the starting documents. Next come risks of providing the financing of the design and the innovation on the overall. This grading is explained with multiple requirements of the administration without consideration that in this way conditions for less problematic work in the next phases of the design and realization of the innovation can be created. There is a subjective element in the results from the answers of the experts.

- The work of the business organizations on creating internal conditions and staff for the innovational activity is not sufficient because in most cases such activities are episodic. In organizations with a constant innovational process the evaluations are for risks that are easier to overcome.
- Legislative documents that regulate the innovational activity and the design as a stage of the innovational activity are too complex and multi-directional with plenty of regulations from various structures of the administration. This hampers the staff of the organizations when studying the legislative requirements, following the consecutiveness of the actions when applying them and the most appropriate ways to present the intentions and goals of the organizations before the administrative organs, financial institutions and companies-operators.
- The administration works with the organizations in parts, every institution observes the application of its own rules. There is no unified system that can provide operational service, information and that can alleviate the companies when implementing the design.
- The organizations have serious difficulties in supplying finances for the innovations and the design as a specific stage of the innovational process due to risks of inconsistency in the changes of the legislative documents. The aspiration to use public funds is natural. Despite their diversity, the business does not always choose the most appropriate one for its activity, although there is a system to inform candidates for the financing.

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