RISK ASSESSMENT OF UNFAVORABLE INTERORGANIZATIONAL RELATIONSHIPS IN CSR PROJECTS CONSIDERING THE LOGISTIC ASPECTS

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Purpose: The aim of this paper is to present a new model for risk assessment of unfavorable interorganizational relationships, among other things, in ventures classified as corporate social responsibility (CSR) projects.

Design/methodology/approach: Scenario analysis, brainstorm sessions, literature study and own observations of interorganizational projects were used to develop a list of unwanted events and factors determining their occurrence. In the proposed risk assessment model, fault tree analysis and fuzzy logic were applied for qualitative and quantitative risk analysis. Thanks to applying the elements of fuzzy sets theory, it was possible to decrease the uncertainty and lack of precision in obtaining crisp values of the basic events' probability.

Findings: In this work 13 basic events and 41 risk factors determining occurrence of unfavorable interorganizational relationships in ventures were identified and described. The proposed model enabled to carry out qualitative and quantitative risk assessment of unfavorable interorganizational relationships projects. Its practical application was shown in an example of interorganizational CSR project concerning the organization of a mass event, considering its logistics aspects.

Research limitations/implications: It is necessary to involve experts in risk assessment. This could be overcome by applying machine learning in future research.

Practical implications: The application of the proposed model allows to effectively identify the critical risks, which should be of particular attention during the risk treatment stage. It aims to give a helping hand to all managers and practitioners who want to deliver attainable and successful interorganizational projects, supporting meeting the expectation of the engaged stakeholders.

Social implications: Socially responsible activities contribute to solving and counteracting social problems.

Originality/value: A novel risk assessment model of unfavorable interorganizational relationships in which 13 basic events and 41 risk determinants were considered. The model was presented at ventures classified as Corporate Social Responsibility projects.

1. Introduction

Corporate Social Responsibility (CSR), as a derivative of sustainable development (Zinenko et al., 2015b), is a modern way of business management by reflecting business activities for the benefit of society, care for the natural environment and relations with various stakeholder groups (Marakova et al., 2015). Running a business has social and environmental consequences that increase interest in the concepts of sustainable development and CSR (Brundtland, 1987). CSR is a complex and interdisciplinary concept (Sheehy, 2015), therefore it is virtually impossible to indicate one definition that would be acceptable to all researchers (Muñoz-Torres et al., 2018). However, it is recognized that CSR is activities that include the active, voluntary devotion of the company's resources (Kiessling et al., 2016) to the implementation of activities aimed at improving the quality of the environment, solving social problems (Kang, Liu, 2014) and responding to stakeholder expectations, going beyond the mandatory, imposed by law (Doh, Guay, 2006). CSR should include activities related to the needs of stakeholders (Mio et al., 2020), aimed at creating value for them (Goffi et al., 2018). CSR is a kind of consensus between profitability, meeting needs and social expectations (Clough, 2000). CSR activities often relate to goals that were previously within the responsibilities of the state, church institutions, or social organizations. CSR relates to corporate ethics (Carroll, 2010) and should be implemented strategically (Porter, Kramer, 2006).

Business entities increasing often implement prosocial and proenvironmental initiatives not independently, but jointly with other entities. Inter-organizational and intersectoral cooperation are increasing often established (Selsky, Parker, 2005), also in relation to socially responsible activities.Inter-organizational cooperation consists in undertaking mutually compatible and complementary activities of cooperating units that are important from the point of view of jointly defined goals (Phillips et al., 2000).Collaboration is usually undertaken by various entities if they are unable to achieve the assumed goals on their own (Schermerhorn, 1975). By working together, the entities increase their chances of overcoming the encountered difficulties and achieving the desired objectives, as well-planned cooperation provides benefits for all parties (Escher, Brzustewicz, 2020).

When different actors establish relationships, they can achieve joint goals faster and more effectively together, but on the other hand, various kinds of tensions can arise between them. They can take many forms and create challenges that the cooperating entities will have to deal with. Such a challenge may be the emerging communication problems between cooperating entities (Lewis et al., 2010), the lack of relational competences (tendency to trust, credibility,

the ability to create relationships based on cooperation) or the lack of a cooperation strategy that takes into account the risks associated with cooperation (PricewaterhouseCoopers). Therefore, it should not be forgotten that interorganizational cooperation as a part of socially responsible activities is associated with the need to accept a certain level of risk associated with it.

It is also vital to define how risk should be understood. New ISO 31000 (2018) explains risk as the "effect of uncertainty on objectives", which stresses the effect of incomplete knowledge of the adverse events or circumstances on an organization's decision making. However, this deviation can lead to positive, negative or both outcomes (opportunities, threats or both). It is vital that the organizations strive for increasing the probability of achieving objectives, improving the identification of opportunities and potential problems and fruitfully allocate and use resources for risk response. Risk assessment is a process that includes risk identification, risk analysis and risk evaluation (ISO 31000:2018). When identifying the risk, one should identify the sources of risk, predict potential impacts and consequences in various areas of the organization. The purpose of risk identification is to develop a list of possible risk factors based especially on unwanted events that may occur during the implementation of the analyzed project and pose a threat to the achievement of the objectives of a given organization. Risk analysis is the second step in risk assessment. Its purpose is to provide information necessary to carry out the third stage of risk assessment - risk evaluation and to make decisions about risk response. The classic risk analysis should take into account the probability of unwanted events occurrence and their consequences. The risk evaluation is the last step in the assessment and consists of comparing the results of the risk analysis with the benchmarks against which the significance of the risk is assessed. It is performed to determine whether the level of risk is acceptable or unacceptable. This supports decision-making regarding the selection of appropriate risk responses (active or passive risk retention, risk cause or effect reduction, risk transfer, risk elimination). It is vital to ensure the flow of information between the various stages of the risk management process and with the environment at each stage of the process.

Inter-organizational cooperation undertaken to implement socially responsible activities can be a way to spread the risk associated with taking socially responsible activities, but it can also be its source. In (Alawamleh, Popplewell, 2011) the authors identified 13 sources of risk related to cooperation between enterprises There are also studies pointing to the negative effects of interorganizational cooperation (Glinska-Newes et al., 2018) and pointing to the determinants of interorganizational relations and negative attributes of relationship quality, which can potentially be sources of risk related to inter-organizational cooperation (Jelodar, 2016).

The literature describes the role of CSR as a tool helping to reduce business risk (Bouslah et al., 2013) related to potential changes in legal regulations or environmental issues (Husted, 2005) and identifying the risk-management benefit of CSR (Kim et al., 2020). The researchers'

attention was also drawn to the issue of the impact of CSR on the reduction of risk borne by enterprises (Rehman et al., 2020), including systematic risk (McGuire et al., 1988; Albuquerque et al., 2019; Farah et al., 2021) and unsystematic risk (Kim et al., 2020). The studies also show the influence of CSR on the reduction of idiosyncratic risk (Luo, Bhattacharya, 2009). Some studies present the impact of CSR on the risk borne by enterprises through the prism of various areas of CSR (Kim, 2010; Nguyen, Nguyen, 2015). The relationship between CSR and the risk of entities operating in controversial industry sectors (e.g. alcohol, tobacco, gambling) is also examined (Jo, Na, 2012).

There are also works defining the relationship between CSR and risk considered in terms of reputation (Botero, 2015; Minor, Morgan, 2011), operational (Frederiksen, 2018) or environmental, social and governmental. CSR is examined as a kind of insurance against risk (Peloza, 2006), financial (Mishra, Modi, 2013; Viviani et al., 2019) – including the marginal cost of debt (Kordasachia, 2021). Some perceive CSR as a risk of wasting company resources (Jensen, Meckling, 1976; Barnea, Rubin, 2010).

There are few studies exploring the issue of risk related to socially responsible activities carried out as part of interorganizational cooperation. In the author's previous work (Krechowicz, 2022) some important relationship-specific risks and risk determinants which threaten to achieve the intended effect of interorganizational cooperation of engineering companies were identified. However, this research was limited to engineering companies. In another author's previous work (Krechowicz, Kiliańska, 2021) two-parametric risk and opportunity matrixes dedicated to risk/opportunity assessment in organizations carrying out of CSR ventures during the COVID-19 pandemic were presented. Risk and opportunities were assessed in four categories: significance, operational, reputational, financial, safety and legal liability. However, this research was dedicated for specific CSR ventures carried out during COVID-19 pandemic and did not take into account the specificity of inter-organizational cooperation.

Therefore, there is a research gap in the literature in relation to the issue of measuring the level of risk for CSR initiatives implemented under interorganizational cooperation. Due to the growing popularity of interorganizational cooperation established to implement socially responsible activities, a model for assessing the associated risk should be created. A model should be developed that can be used to determine the level of risk of initiatives that fit into the concept of corporate social responsibility, implemented by at least two entities. Risk assessment will allow you to protect yourself against undesirable consequences resulting from such cooperation and maximize the chances of obtaining the benefits associated with it.

This paper is an attempt to fill the identified research gap, thanks to the exploration of this issue, it provides information on the risk factors that must be taken into account by enterprises jointly implementing socially responsible activities.

The aim of this paper is to present a new model for risk assessment of unfavorable interorganizational relationships, among other things, at ventures classified as CSR projects.

In this model, Fault Tree Analysis (FTA) and fuzzy logic were applied for qualitative and quantitative risk analysis. Thanks to applying the elements of fuzzy sets theory, it was possible to decrease the uncertainty and lack of precision in obtaining crisp values of the basic events' probability.

Contribution to the body of knowledge of this paper is as follows:

- identification and description of unwanted events that are important for inter-organizational cooperation related to CSR projects,
- identification of risk factors that are important for inter-organizational cooperation related to CSR projects,
- developing a mathematical model of risk assessment using fuzzy logic and FTA, dedicated to inter-organizational cooperation related to CSR projects,
- presentation of an example of implementation of the proposed model,
- showing how various risks related to the implementation of inter-organizational projects may threaten the achievement of the overarching goal of mass event logistics, namely ensuring an appropriate level of safety and satisfaction of participants and support for organizational entities.

2. Methods

There are many methods that can be applied in risk assessment models, e.g. risk estimation matrixes (Rak, Tchórzewska-Cieślak, 2006), fault tree analysis (Gachlou et al., 2020), event tree analysis (Fang et al., 2020). When trying to apply the above-mentioned methods for risk assessment of CSR initiatives, it is necessary to involve expert groups in the risk assessment stage, as there is no adequate historical data to determine the probability distribution for basic events in CSR initiatives. Experts often emphasize that they are not able to give exact values of the probability of the occurrence of particular unwanted events. The solution to this problem is to use the fuzzy sets theory, which was introduced by L. Zadeh (Zadeh, 1965). A characteristic feature of fuzzy sets is the fact that they enable a gradual transition between the various membership degrees of a given element to the set. It is reflected by a membership function which takes values in the real unit interval [0, 1] (Zadeh, 1965). It means that the statement "Element a is a member of Set B" can be true to some degree, called membership degree. It enables gradual transition between the linguistic values (e.g. very low, low, medium, high). Fuzzy sets theory was successfully integrated with various risk assessment methods and applied in risk assessment – e.g. fuzzy risk estimates in (Skorupka, Kuchta, 2016), fuzzy fault tree analysis in (Abdelgawad, Fayek, 2011; Krechowicz, 2017; Shoar et al., 2019; Krechowicz, 2020), hybrid fuzzy fault and event tree analysis in (Krechowicz, 2021). In addition to risk assessment models where it is necessary to involve experts in risk assessment, there are also

some that use machine learning, eliminating the need for experts, e.g. (Hegde, Rokseth, 2020; Krechowicz, Krechowicz, 2021). However, in order to fit this type of model, one should have a large set of training data, and gathering such a set of data is often difficult or even impossible.

Fault Tree Analysis will be used in this wok. Fault Tree (FT) is a graphic representation of certain conditions and factors that cause or favor the occurrence of a specific undesirable event, the so-called peak event. With the application of FTA, both qualitative and quantitative risk analysis can be performed (NASA, 2002). Carrying out logical (qualitative) and numerical (quantitative) analysis of the system using the logical tree method lead to determination of events that may directly cause problem along with the determination of their probability of occurrence, estimation of the system's ability to work after the occurrence of a certain number of less significant problemsand obtaining information needed to locate critical elements and problem mechanisms (PN-EN 61025:2007). Due to the problems with obtaining crisp values of probability for basic events in the fault tree, it was decided to use fuzzy sets theory in this work. It resulted in decreasing the uncertainty and lack of precision in obtaining crisp values of the basic events' probability.

3. Proposed model

The proposed approach to risk assessment of not achieving the intended effect of interorganizational cooperation presented in a CSR venture was divided into several steps:
- familiarizing with the specificity of entities planning to cooperate and gathering data,
- risk identification,
- fault tree construction,
- qualitative risk assessment,
- quantitative risk assessment using fuzzy sets theory,
- risk evaluation.

These steps were described in detail below.

3.1. Risk identification

In order to identify significant risk factors that may cause failure to achieve the desired effect of interorganizational cooperation, a review of literature describing various aspects of interorganizational relations was carried out. Besides this authors' own observations of interorganizational cooperation and CSR projects and brainstorm sessions carried out among entities dealing with interorganizational CSR projects allowed to identify a number of problems in interorganizational CSR ventures. The relevant risk factors that may lead to failure to achieve the desired effect of interorganizational cooperation were described below.

When entering into cooperation with a particular economic entity, attention should paid to the relations built with it — the greater the extent to which the entity can be treated as a partner, the better it is, focus should also be placed on the communication capabilities, openness to joint problem solving, as well as the reputation of the entity — the better it is, the lower the probability of concealing problems by the entity(McWilliams, Siegel, 2001).Without the ability to properly shape and maintain relations with other entities, it is difficult to achieve high effectiveness of activities being part of the jointly undertaken initiatives. When assessing the ability to shape positive relationships, not only the relationship between a given entity and others with whom it has cooperated in the past can be considered, but also the relationship with stakeholders in general. Attention should be paid to the information that can be obtained from the partners and other cooperating parties of a given entity through various media (e.g. personal interview, Internet, press releases, media reports). To achieve the intended results as efficiently as possible, all entities involved in the process should trust each other and refrain from concealing from each other any relevant information about the problems encountered in carrying out the particular tasks. Concealing problems makes it impossible for other cooperating entities to provide assistance in solving them and, in addition, makes it impossible to create a synergistic effect (Krechowicz, Kiliańska, 2019).

If the entities are reluctant to provide information about their past activities and the projects they carried out, even though they are not asked about confidential matters, the risk related to the lack of transparency in their activities should be taken into account. Transparency of actions is of particular importance in the case of e.g. implementation of socially responsible projects or investment process, where transparency of actions taken introduces order, while at the same time building trust among cooperating entities (Ellonen, Blomqvist, 2008; Lee, H., Lee S.H., 2019). With regard to entities with which cooperation is intended to be established, the rules applied by them concerning the provision of information on their activities and the scope, accuracy and detail of the information and data made available should be assessed, as well as whether these entities allow access to documents and reports relating to previously implemented projects. Additional risks of collaboration relate to knowledge leakage and the possible misappropriation of the created value (Nyaga et al., 2010). Moreover noteworthy are opinions on the activities of entities with which it is intended to undertake cooperation obtained from entities that cooperated with them in the past or cooperate with them now. Such opinions, provided that they are verifiable, can be a valuable source of information that will facilitate the decision whether or not to cooperate with the entity concerned. Coherence of actions of all entities cooperating with each other may be ensured through efficient communication processes occurring between them (using formal and informal communication channels (Pupovac, Moeman, 2017). Problems with communication between parties translate into the quality of relations between them, as well as into lower effectiveness of activities and effectiveness of interorganizational cooperation.

Any economic entity intending to enter into interorganizational cooperation should pay attention to whether it can easily communicate with the other entity. If difficulties in communicating arise at the stage of preliminary discussions on cooperation, the risk that they may also occur during potential joint implementation of projects has to be taken into account (Krechowicz, Kiliańska, 2019).

A very important aspect of interorganizational cooperation is the shaping of the cooperation environment, which will be conducive to the development of common solutions for the implemented tasks. This requires a flexible approach to finding alternative solutions to emerging problems (Chebbi et al., 2006) and being open to consider different points of view and positions of the various entities involved in cooperation. It should be stressed that a dogmatic cooperation environment may cause the omission of valuable solutions that could effectively lead to the achievement of the intended objectives of cooperation. A conservative approach to problem-solving is not conducive to achieving the intended objectives and achieving assumed cooperation results. If the cooperating entities are unable or, for some reason, unwilling to use new, not previously applied solutions and ideas, they limit the range of possible actions that lead to the success of organizational cooperation, understood as achieving desired goals and results. The turbulent environment in which business entities operate forces flexibility of actions, therefore, not being open to new solutions results in a potential decrease in the efficiency of interorganizational cooperation. The flexibility of the entity with which it is intended to cooperate, the degree of bureaucratization of actions should be examined, as this translates into the possibility of using unconventional ideas, solutions and determines the effectiveness of action (Krechowicz, Kiliańska, 2019).

Entities considering joint initiatives should be willing to cooperate. At the initial stage of project planning, the following factors can be assessed the level of motivation of employees who are to be directly involved in the project, openness to suggestions and proposed solutions. If a given entity has participated in other projects as part of interorganizational cooperation, it is possible to assess the conscientiousness of performing the entrusted tasks — the more conscientious the entity is, the higher the likelihood of it being willing to cooperate in subsequent projects (Krechowicz, Kiliańska, 2019).

As part of interorganizational cooperation, each entity involved in the implementation of joint ventures should strive for the most effective use of resources to achieve the intended goals. Any act that puts the welfare of one of the entities above that of all the entities involved in interorganizational cooperation is undesirable. When assessing this factor in the presented model, it is necessary to take into account how the given entity engaged its resources in projects implemented in cooperation with other economic entities. If an entity has sought to use its own resources and those of other entities involved in the cooperation in such a way as to obtain the best possible individual benefits, it can be assumed that they will do the same in the next project. The more developed the culture of individualism in a given entity, the greater the risk that by undertaking cooperation with said entity, it will be difficult to achieve common goals due to

the prioritization of own, individual benefit over collective goals (Krechowicz, Kiliańska, 2019).

Despite the very precise definition of the objectives and resources needed to achieve them, each of the cooperating entities may use these resources in a slightly different way or achieve the same objectives using different methods. In order to avoid such discrepancies and to give a single direction to the actions taken, coordination mechanisms should be developed jointly. The coordinator should prevent different entities from carrying out the same activities at the same time in order to avoid wasting material resources, time and energy. It is safe to say that the coordinator, by providing a clear framework and guidelines for action, harmonizes the efforts of the autonomous entities. Before selecting a coordinator, the candidates for this function should be assessed. The assessment may cover not only the knowledge concerning project management, their competencies or skills, but also the ability to approach problems and actions in a holistic manner (Krechowicz, Kiliańska, 2019).

Modern economic entities are linked by various types of relationships, both vertical and horizontal. Sometimes these links can be a significant obstacle to interorganizational cooperation, making it difficult to clearly identify the organizational affiliation of employees. Lower level employees and managers may at the same time have employment contracts with more than one economic entity, which may give rise to problems of different specificity. In the event of a desire to establish interorganizational cooperation, it should be assessed whether the personal relationship between employees of different entities will not hinder effective cooperation or whether there is no conflict of interest between the parties. Transforming business problems into personal problems and vice versa may adversely affect the process of cooperation, therefore the risk of such problems occurring should be eliminated as far as possible (Krechowicz, Kiliańska, 2019).

Experience in interorganizational cooperation may refer to mutual knowledge of the specifics and modes of operation of particular entities cooperating with each other, as well as to the ability to work out such rules of cooperation that will enable the multi-entity implementation of tasks (Czakon, 2007). The less experience the parties have, the greater the risk. When assessing experience, the number of projects (similar to those that could potentially be the subject of cooperation) in which the economic entity concerned participated, the obligations assigned to it by the project and, where possible, the extent to which those obligations have been met should be considered.

Uneven involvement of the parties during inter-organizational cooperation means that one should take into account the risk of crisis situations resulting from unforeseen events, a surprising turn of events, or the behavior of entities with whom relationships are established during the performance of tasks. Crisis situations require the ability to react quickly to them, modify behavior and introduce changes quickly. The capacity of the entity with which cooperation on crisis response is being considered should be assessed. Consideration should also be given to whether the entity is constantly improving the competences of its employees

(who will potentially be involved in interorganizational cooperation) and whether these employees have the ability to think creatively, make rational decisions when faced with stressful situations and in difficult to predict conditions (Rydlewski, 2004). Uneven involvement of the parties may lead to increased tensions and conflict situations. However, it is possible to assess its involvement in past projects. It is therefore necessary to collect as much information as possible on the progress of similar projects carried out and to pay particular attention to the level of commitment of a particular economic entity. It can be assumed that the higher the number of projects, the lower the level of involvement of the entity in each of them. The reason for this is that tangible and intangible assets are limited and, where different undertakings are carried out simultaneously, they must be divided between all of them (Krechowicz, Kiliańska, 2019).

Through consultations, a decision-making model should be developed which will relate to the precisely defined goals that the cooperating entities want to achieve, the development of an action plan and assignment of decision-makers. Entities wanting to carry out joint tasks should assess the mutual ability to balance the interests of all the entities involved in the cooperation, so that no decision is taken against them, to collect the information needed to take the most rational decision possible, to analyze such information and to take account of the limitations of the cooperation agreement. The risk of failure to achieve the intended effect of the cooperation may arise from an agreement if its provisions are inadequate. A well-formulated agreement should be unambiguous for each of the parties to whom it is binding. All provisions contained in the agreement should be clearly specified so as to eliminate the possibility of different interpretations of individual provisions contained in the agreement by entities cooperating with each other (Lange et al., 2015). The vague framework of accountability, both with regard to the entities involved and to the individual cooperation activities undertaken, entails a risk (Xu, Beamon, 2006) of reducing the efficiency and effectiveness of the cooperation activities. When analyzing the framework of accountability, particular attention should be paid to whether entities wishing to establish cooperation have clearly and unequivocally divided responsibility for the results achieved (Aulakh et al., 1996).

Problems can largely be avoided if entities decide to develop a strategy prior to the commencement of interorganizational cooperation. The document may include not only clearly formulated objectives, which entities want to achieve through the interorganizational cooperation, but also the resources, methods and means to achieve them. Lack of a strategy may result in all activities undertaken as part of interorganizational cooperation being done in an intuitive manner and not supported by prior analysis, critical assessment of potential alternative options for action. Moreover, without said strategy, it is difficult to monitor progress and therefore to react quickly enough to problems identified. The lack of a strategy results in an increase in the risk of inefficient use of resources, the need to devote more time to solving emerging problems, which in turn leads to a decrease in the efficiency of the actions taken.

Table 1 presents the identified unwanted events and risk factors determining their risk levels. They were identified based on the literature study, authors' observations of interorganizational cooperation and CSR projects and brainstorm sessions carried out among entities dealing with interorganizational CSR projects. These events are basic events in the fault tree, which was presented in the subsection 3.2. Basic event is the indivisible event on the lowest level in a fault tree branch.

Table 1.
*Basic events and factors determining risk levels for particular unwanted events*

Event symbol	Event name	Factors determining the risk level
F1	Hiding problems	- unfavorable financial condition of one of the entities - information in the media about the entity's dishonesty, - hidden lack of competence, insufficient level of competence, - hidden lack of experience in implementing projects of a given type, - the attitude of the entity visible already during the initial talks, ambiguities as to the entity's intention to establish cooperation (it declares cooperation for a given reason, but its goal is something else, e.g. gaining knowledge about the cooperator in order to destroy it on the market).
F2	Self-interest orientation	- contractual regulations, form of cooperation (partnership, cooperation, coordination of activities, consortium cooperation), - the discrepancy between the intentions declared in the contract and the actual ones (whether in the case of disputable issues, apparently clear provisions in the contract will be interpreted in the same way), - is the interest common, or can each entity focus more on achieving its own goals.
F3	Communication problems, problems with listening to each other	- lack of experience in projects implemented in cooperation, in partnership, in cooperation, consortia, - market / objectively unjustified belief in the rightness of one's own actions, - reluctance to share information, - the method of organizing the communication process between the entities (efficiency of message transmission, their completeness, information transmission channels - official/credible, informal/formal).
F4	Lack of willingness to cooperate and engagement of the parties	- history of the company's/ entity's cooperation with others, - no recommendations from previous partners.
F5	Confrontational, dogmatic environment of cooperation	- form of ownership of the enterprise (private enterprises, sole proprietorship, etc.), - lack of international experience, - the nature of the entity (number of levels necessary to pass in order to make and formalize a decision), - "outdated" styles of organization management (derived from centralized economic systems), - the nature of the entity (number of levels necessary to pass in order to make and formalize a decision).
F6	Good project coordinator missing	- lack of awareness of the need to appoint a coordinator, - improper definition of the role of the coordinator, - staff weakness of entities participating in the cooperation, - lack of experience of the selected coordinator in multi-agency projects.

Cont. table 1.

F7	Converting work problems into personal problems and vice versa	- personal and property ties between entities willing to cooperate.
F8	Inability to build beneficial relationships as part of cooperation	- opinions about the entity in the environment, - previous experience in cooperation.
F9	Inability to react quickly to crisis situations	-lack of internal procedures for responding to crisis situations, - inability to define potential threats to the project or overly optimistic approach to project implementation.
F10	Imprecise and unfavorable contract	- lack of proper right handling, - work carried out carelessly and at a rapid pace, - one party's use of the other party's inexperience (disproportionate contractual penalties), - inability to apply contractual standards to a given cooperation (there are contractual standards, but entities begin to rewrite them, that an imprecise contract is created, e.g. a consortium contract template).
F11	Unclear way to make decisions	- whether the person(s) responsible for approving the decisions have been identified, - whether a decision-making model has been developed, - whether the decision-making model was developed through joint consultations of the entities cooperating with each other.
F12	Unclearliabilities and responsibility framework	- whether the responsibilities have been clarified and written, - whether all parties confirmed that they understand the provisions, - whether all parties clearly defined their expectations.
F13	Lack of prepared action strategy	- no time to prepare a strategy, - no possibility to use previous, already existing strategies, - lack of awareness and skills of strategic thinking, ad hoc in running a business.

3.2. Fault tree construction

Fault tree was developed in a vertical format, so the peak event was placed on the top of the page. The 4 intermediate events were further divided into 13 the basic events on the bottom of the page. The peak event was fully defined as not achieving the intended benefit of interorganizational cooperation in a CSR venture. Basic events were divided into 4 categories, which are intermediate events in the Fault Tree: trust issues, problems with teamwork, problems with work progress, problems with the strategy of operation. The 13 identified basic events were shown in Table 1. The proposed fault tree is presented in figure 1.
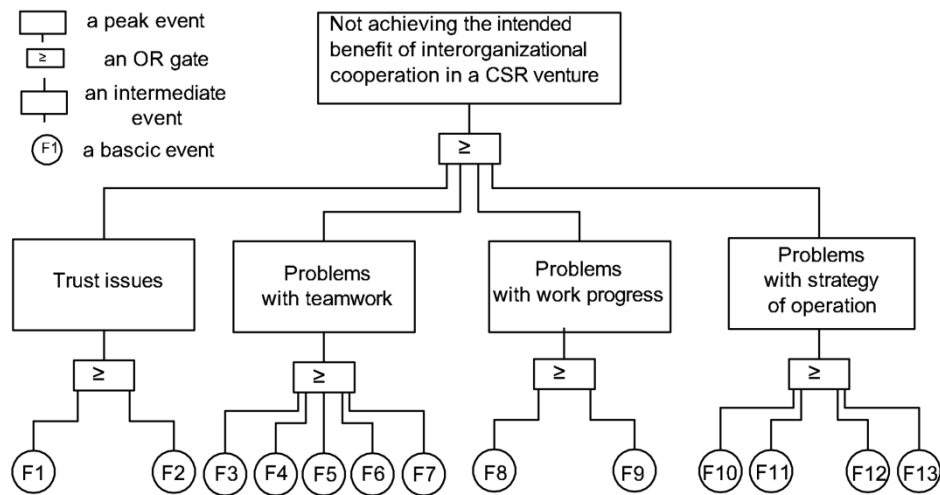
Figure 1. The proposed fault tree for not achieving the intended benefit of interorganizational cooperation in CSR ventures.

3.3. Qualitative risk assessment

Looking at Fault Tree structure it can be seen that it has only OR gates and identical events are not placed on separate FT branches. That is why, a simple methodology of general tree studies was applied to the qualitative risk analysis. Looking at the structure of the fault tree, it can be noticed that any of the 13 basic events' occurrence is sufficient to cause the peak event occurrence.

3.4. Quantitative risk assessment using fuzzy sets theory

A carefully selected group of experts should be asked to assign one linguistic value (very low, low, medium, high, or very high) to each of 13 basic events. When selecting the group of experts, particular attention was paid to their experience in risk assessment and the implementation of projects in the field of inter-organizational cooperation and CSR ventures. The group of experts was acquainted with the project details and specifications and familiarized with the proposed risk assessment model.

A membership function should be drawn individually for each group of experts, so that it could best capture the way they understand each linguistic value describing the probability of basic event occurrence (very low, low, medium, high, very high). A group of experts was asked to express the probability of the occurrence of individual basic events using the above-mentioned linguistic values. They then determined the significance of each linguistic value by assigning each fuzzy probability value to the degree of membership that best reflects the significance of the linguistic value represented by the fuzzy set. The trapezoidal membership function was used, which is often used to represent linguistic values.

Formula (1) can be used to calculate the risk of the peak event occurrence($\widetilde{R_{tot\alpha_{jk}}}$):

$$\widetilde{R_{tot\alpha_{jk}}} = \left[1 - \prod_{i=1}^{n} \left(1 - \frac{\widetilde{P_{Fi\alpha_{jk}}} \cdot C_{Fi}}{100} \right) \right] \cdot 100\% \tag{1}$$

where:

$\widetilde{P_{Fi_{\alpha_{jk}}}}$ – fuzzy probability of the basic event Fi occurrence,

α_{jk} – jk-th membership degree to the set of fuzzy probabilities defining each linguistic value,

$j=0,1,2,...,m-1,$

m – the number of the analyzed membership grades,

k – the step of changes of the membership grades to the fuzzy set, $k=1/(m-1)$,

C_{Fi} – the factor determining consequences of the basic event occurrence Fi, -.

In the proposed approach the occurrence of each basic event can result in peak event occurrence, thus is equally important in terms of its effect. Therefore, the factor describing the consequences of a basic event Fi occurrence $C_{Fi}= 1$ for all considered basic events.

Fuzzy probability of the basic event Fi occurrence ($\widetilde{P_{Fi_{\alpha_{jk}}}}$) is read for each analyzed membership grade α_{jk} from the trapezoidal membership function from the left $(\widetilde{P_{Fi_{a\alpha_{jk}}}})$ and right side$(\widetilde{P_{Fi_{d\alpha_{jk}}}})$.

From the membership function, the extreme values of the fuzzy probability for individual basic events for the values of α are read with the step k between each α. By substituting different values of fuzzy probability into the formula (1) for different degrees of membership α, one can calculate the fuzzy risk of a peak event for successive degrees of membership α. Based on the performed calculations, it is possible to draw a graph of the fuzzy risk distribution of a peak event for the analyzed CSR venture.

In order to select the appropriate risk of a peak event based on the fuzzy set, a defuzzification process was performed using the Center of Area (COA) method. The process of defuzzification is an operation consisting in determining the crisp (non-fuzzy) value of risk, which will represent a given set in the most "sensible" way.

The risk of a peak event is calculated from the formula (2):

$$R_t^{COA} = 0,5 \cdot \left(\frac{\sum_{j=0}^{m} \widetilde{R_{ta\alpha_{jk}}} \cdot \alpha_{jk}}{\sum_{j=0}^{m} \alpha_{jk}} + \frac{\sum_{j=0}^{m} \widetilde{R_{td\alpha_{jk}}} \cdot \alpha_{jk}}{\sum_{j=0}^{m} \alpha_{jk}} \right) \tag{2}$$

where:

R_t^{COA} – the defuzzified value of the risk of the peak event occurrence (%),

$\widetilde{R_{ta\alpha_{jk}}}$ – the extreme (read from the left side) values of the peak event risk for jk-th membership grade (%),

$\widetilde{R_{td\alpha_{jk}}}$ – the extreme (read from the right side) values of the peak event risk for jk-th membership grade (%).

3.5. Risk evaluation

In order to determine if the risk level is acceptable or unacceptable it is important to compare the results of the risk analysis with the borderline risk level. Such analysis should be performed for both the individual basic events and the peak event. The borderline risk level should be set individually for each analyzed CSR venture, taking into consideration its specificity, the characteristics of cooperating entities, including technical, economic and legal conditioning.

4. Example of the application of the proposed model

The Polish city and the commercial TV station decided to organize a TV concert. Both sides acted for the public good and spent considerable financial resources, not charging money for tickets to the amphitheater for the concert. As a result, 5.5 thousand people (mainly city residents) took part in a high-quality concert for free. The concert took place in an amphitheater and was broadcast live by a TV station. The accountability framework was established from the very beginning. The city was responsible for providing the amphitheater and its technical preparation, and for promoting the event in such a way as to ensure a full amphitheater, and at the same time to avoid situations where the city residents would be frustrated that they could not attend the concert due to the lack of places. This required the development of an efficient ticketing system. The TV station was responsible for providing the artistic program, building the stage, creating the event and its transmission. The city was not prepared to build and launch a ticketing system. The risk was compounded by the fact that the decision to organize the event was made only one month in advance. The TV station had trouble organizing the artists in such a short time. Each side tried to solve its problems on its own. The TV station wanted to have a nice picture of the audience amused in the amphitheater, to get good viewership. There was a kind of buzz and communication crowd, there was a great media impact for this event and many entities became interested in it. The television did not share all the information with the city (e.g. what artists would come), which made it difficult for the city to promote the event. There was also no joint coordinator of the project. On the side of the city, there were no employees with experience in coordinating such projects. Due to the fact that the city is a public entity, it is not able to minimize problems as flexibly as it would like. It is limited by the legal and financial framework as well as the lengthy decision-making process in formal matters. The amphitheater infrastructure itself had experience in organizing such events, but the city had no experience with ticketing.

The TV station was able to react quickly in situ, and the city has experience in responding to emergencies resulting from other events (but of a different type). The city department that was supposed to deal with the event may have treated it as an "unwanted child", since it had

never been involved in such projects before. There was a week of time to work out an agreement between the city and the TV station. It generated costs on both sides, and included contractual penalties for failure to meet obligations. It was an unusual type of contract for a TV station, as it was a contract for one event, and the station was used to concluding long-term contracts with well-known partners. The city also did not have experience in concluding such type of contracts. There was no time to develop a model of how to make decisions, they were made spontaneously.

Figure 2 presents the membership function which was developed for a group of experts assessing basic events' probability of occurrence. Table 2 presents basic events with linguistic values assessing their probability of occurrence.
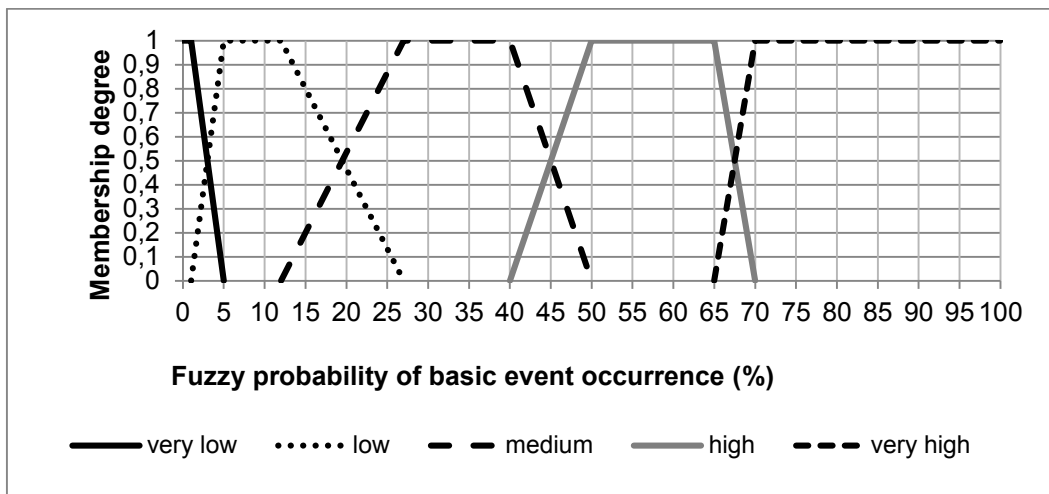
Figure 2. The membership function for the probability of the basic events occurrence for the group of experts.

Table 2.
Basic events with linguistic values assessing their probability of occurrence for the analyzed CSR initiative

| Symbol	Event name	Fuzzy probability
F1	Hiding problems	High
F2	Self-interest orientation	Low
F3	Communication problems, problems with listening to each other	Low
F4	Lack of willingness to cooperate and engagement of the parties	Very low
F5	Confrontational, dogmatic environment of cooperation	Low
F6	Good project coordinator missing	High
F7	Converting work problems into personal problems and vice versa	Very low
F8	Inability to build beneficial relationships as part of cooperation	Very low
F9	Inability to react quickly to crisis situations	Low
F10	Imprecise and unfavorable contract	High
F11	Unclear way to make decisions	High
F12	Unclear liabilities and responsibility framework	Very low
F13	Lack of prepared action strategy	High

Table 3 shows fuzzy probabilities of the basic events occurrence for the analyzed CSR initiative. They were read for various membership grades α with step 0,05 from the membership function presented in figure 2. Due to the limited length of the article, only the results for the three selected grades of membership are presented.

Table 3.
Fuzzy probabilities of the basic events occurrence for the analyzed CSR initiative (for α values with the step 0,05)

Membership degree (α_{jk})	Fuzzy risk of basic event occurrence (%)					
	F4, F7, F8, F12		F2, F3, F5, F9		F1, F6, F10, F11, F13	
	$\widetilde{P_{Fi_{a\alpha_{jk}}}}$	$\widetilde{P_{Fi_{d\alpha_{jk}}}}$	$\widetilde{P_{Fi_{a\alpha_{jk}}}}$	$\widetilde{P_{Fi_{d\alpha_{jk}}}}$	$\widetilde{P_{Fi_{a\alpha_{jk}}}}$	$\widetilde{P_{Fi_{d\alpha_{jk}}}}$
0,00	0,00	5,00	1,00	27,00	40,00	70,00
0,50	0,00	3,00	3,00	19,50	45,00	67,50
1,00	0,00	1,00	5,00	12,00	50,00	65,00

Knowing fuzzy probabilities of basic events occurrence, risk of the peak event occurrence was calculated from formula (1) for various membership grades. Figure 3 presents the distribution of the fuzzy risk connected with the peak event occurrence. The risk related to the occurrence of the peak event of not achieving the intended effect of inter-organizational cooperation was calculated from the formula (2) and equals $R_t^{COA} = 98,10\%$
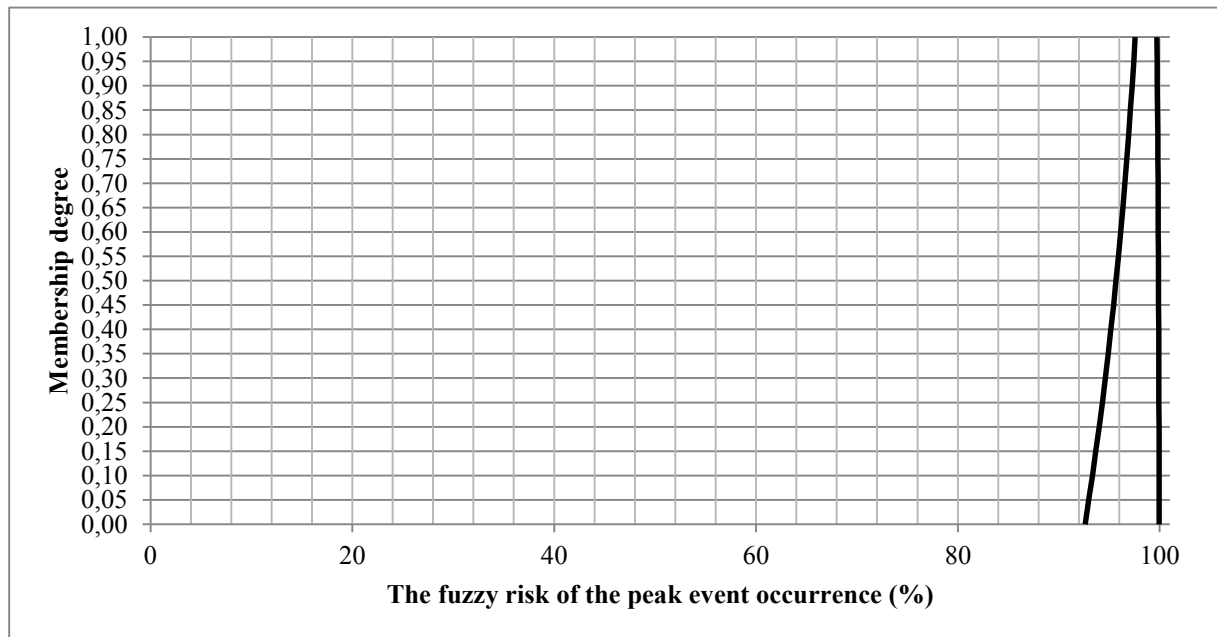
Figure 3. Distribution of the fuzzy risk connected with the peak event occurrence.

5. Discussion

The project for which the level of risk of a peak event was calculated is interesting because, despite a very high-risk level (98.10%), the project was successfully completed. However, the high level of risk for some of the basic events and the peak event corresponds to the undesirable events that occurred during the implementation of the analyzed joint venture. A number of problems were encountered during the implementation of the project. The problem for the city was the fact that it did not receive information from the TV station about the final line up (artists who will perform). In addition, the slow pace of decision-making by the television station was a problem due to the procedures that existed there, requiring successive levels of approval. The ticket distribution system was prepared by the city ad hoc. As a result, twice as many tickets were distributed as there were seats in the amphitheater. It was also not possible to fully prevent free tickets from being traded for a fee. An hour before the concert it started to rain and as a result a large part of the residents did not come. Finally, all residents that came fit into the amphitheater. Competitive TV stations followed the event. In case of visible problems (e.g. an overcrowded or not fully filled amphitheater) they could use it to publicize problems with organizing the event. In the absence of an audience, competing media could publicize that the event did not attract the attention of the public as a result of, for example, inappropriate selection of artists. In the case of an overcrowded amphitheater, the publicized problems could be related to an ineffective ticketing of the audience and the poor organization of the entire event.

It is also important to discuss how various risks related to the implementation of inter-organizational projects could threaten the achievement of the overarching goal of the analyzed event. Logistics in the organization of mass events mainly concerns planning, organizing and managing the flow of materials, people and information (Płaczek, Jaroszyński, 2012). In the analyzed case, hiding problems, lack of good project coordinator, imprecise and unfavorable contract and lack of prepared action strategy threatened the achievement of the overarching goal of mass event logistics, namely ensuring an adequate level of safety and satisfaction of participants, unabling also the proper support for organizational entities. There were problems with the flow of information causing problems with the promotion of the event, and the flow of people was severely endangered due to the ad hoc ticketing system.

All in all, the concert was successful and achieved a high level of viewership. The assembled audience was also very pleased. Both sides decided to organize such concerts every year, but already on a commercial basis and payable. The parties decided to plan them 6 months in advance.

Despite the lack of experience in cooperation in this type of projects, lack of adequate flow between the co-organizers, an agreement that was created in a hurry, the lack of a developed decision-making model, as a result of which they were made in a spontaneous, and sometimes

even chaotic manner, the concert occurred and satisfied the needs of the beneficiaries in terms of entertainment and access to cultural events. However, attention should be paid to the seemingly insignificant element that - it can be said - decided about the success of the concert. This element was the weather conditions prevailing on the day of the event, which made a large group of concert beneficiaries resign from coming to the amphitheater (experience shows that much fewer participants of cultural events come to the amphitheater if on a given day there are such weather phenomena as rainfall or low air temperature). Because it started to rain before the concert, there was no situation where people who wanted to take part in the event had nowhere to sit or could not even enter the amphitheater due to its overcrowding.

6. Summary

This paper is the first one to propose risk assessment model dedicated for assessing the overall risk of unfavorable interorganizational relationships occurrence in CSR ventures, as well as the occurrence of 13 unwanted events connected with interorganizational relationships in CSR ventures. Thanks to applying the elements of fuzzy sets theory, it was possible to decrease the uncertainty and lack of precision in obtaining crisp values of the basic events' probability. The practical application of the proposed risk assessment model for CSR ventures was shown on the example. The main contributions to the body of knowledge include: identifying 13basic events leading to unfavorable interorganizational relationships occurrence in CSR ventures, identifying 41 risk factors that are important for inter-organizational cooperation related to CSR projects, developing a model of risk assessment using fuzzy logic and FTA dedicated to inter-organizational cooperation related to CSR projects, and implementation of the proposed model.

To achieve increasing demanding business goals, as well as social and environmental goals, companies (regardless of their size) sometimes have to cooperate with other entities. The assessment of the risk related to the implementation of socially responsible activities becomes more important, especially in the case of interorganizational cooperation, where at least two different entities jointly pursue one goal.

The risk related to the achievement of socially responsible goals, where sacrifice of enterprise resources is required, should be a subject to the same assessment as in the case of economic goals. Socially responsible activities compete for resources with activities aimed at multiplying profit and require the commitment of limited resources of enterprises, which should be managed wisely.

Managing the risk related to the implementation of socially responsible activities as part of interorganizational cooperation is not an easy task due to its dynamics and complexity. The process of identifying risk sources is necessary to determine their level and take actions

aimed at eliminating or minimizing the negative effects of the occurrence of unfavorable quality attributes of relations between cooperating entities. Without analyzing the risk, it is difficult to take actions to correct its level, which means that identifying the sources of risk related to the implementation of the assumptions of the CSR concept as part of interorganizational cooperation is necessary to assess its level and is crucial for its management.

Failure to assess the risk may lead to failure to achieve the intended benefit of interorganizational cooperation in CSR projects. Therefore, it was important to develop a risk assessment model so that entities deciding to jointly pursue socially responsible goals could determine risk level before starting any action.

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