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Inter-Organizational Network Collaboration: How Organizations Modify Expected Benefits When Facing VUCA Environment

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Marcin Flieger[1]

Abstract:

Purpose: *The main scientific purpose of this article is to identify how organizations exploit inter-organizational network collaboration when they experience VUCA environment. The study focuses on diagnosing how they modify expected benefits (network and relational rent) when unfavourable operating conditions occur.*
Design/Methodology/Approach: *Conceptual development and positioning of the research aim at providing a generalizable contribution to management science, at the same time being accessible to practitioners. The research was carried out using the interpretative method of a multiple case study, following its methodological rigor. It was divided into two stages: within-case analysis and cross-case analysis. According to the replication logic, case studies constitute series of independent research which provide data corresponding with set research questions.*
Findings: *The research shows that experiencing VUCA environment leads to re-thinking and reconfiguring expectations concerning network collaboration benefits. Importance of most network benefits (both kinds of rent) increased slightly or considerably. Moreover, it appeared that the change supported mostly an egocentric approach; organizations gave priority to various kinds of network rent, which builds an advantage for an individual participant of network.*
Practical Implications: *The results allow identifying a pattern which shows how organizations exploit network relations in order to adjust to market conditions. The template serves as a practical tool for managers in the process of planning and developing relations with other network participants.*
Originality/Value*: The author adopts a new perspective to the problem of operating in VUCA environment, focusing on exploiting inter-organizational network in order to minimize the risk. The study expands our understanding of the nature of networks, how they adjust to changing environment and how network participants exploit collaboration to maximize benefit. It presents a concise theoretical construct which conceptualizes a pattern explaining how organizations react when facing VUCA environment, in terms of modifying priorities concerning expected benefits.*

Keywords: *Networks, network collaboration benefits, network rent, relational rent, VUCA.*

JEL classification: *D22, D85, L14.*

[1]*Assoc. Prof., General Tadeusz Kościuszko Military University of Land Forces, Poland*
e-mail: marcin.flieger@awl.edu.pl;

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1. Introduction

From managerial point of view, current conditions of doing business and operating on a market are rather unfavourable and demanding (He *et al*., 2020). They stem from both microeconomic and macroeconomic factors (e.g., rapid growth of inflation and interest rates) (D'Mello and Toscano, 2020; Xu 2020). Apart from that, organizations need to cope with difficult to foresee and prepare, sudden, negative events called 'black swans', which in last few years influenced global economy substantially (e.g., global lockdowns or dynamic military conflicts).

Such negative operational conditions started to be characterized by four features: volatility, uncertainty, complexity and ambiguity. They constitute a so-called VUCA environment (Barbier and Robertson, 2022). All these aspects lead to the question how to minimize negative impact and adjust to such unfavourable conditions.

As a consequence, taking into consideration that currently organizations operate in the environment characterised by multi-directional co-dependence of business partners (Peterman *et al*., 2020; Gebo and Bond, 2019; Tatarynowicz *et al*., 2016; Kim and Howard, 2016), they start to search for possibilities of initiating or/and joining inter-organizational networks. Network itself constitutes a collection of long-term, direct or indirect, formal and informal relations between two or more units (Choi and Lee, 2022; Edelenbos and Klijn, 2007; Kilduff and Tsai, 2003; Håkansson and Snehota, 1989; Camagni, 1995).

Inter-organizational network collaboration is characterized by free-will access, awareness of common objectives, partnership and trust (Bryson *et al.*, 2015; Newman *et at.*, 2004; Goerdel, 2006). Such networks allow achieving objectives not attainable either by individual units or through traditional administrative hierarchies (Siciliano *et al*., 2020; Hu *et al.*, 2016).

Therefore, exploitation of network relations in VUCA environment become a great value, as they may support securing market position of an organization (Pedersen *et al*., 2022; Srivastava, 2015).

This leads to a general problem whether organizations which experience operating in VUCA environment change perception of importance of benefits gained from network collaboration, in the search for optimizing their market position. In the paper I focus on answering the following research questions:

1. *What is the nature of volatility, uncertainty, complexity and ambiguity (VUCA environment) from an organizational perspective?*
2. *What sorts of benefit can be gained from participation in network?*
3. *How does the importance of network benefits change when an organization experiences VUCA environment?*
4. *What impact do relational rent and network rent have on minimizing negative consequences of each VUCA element?*

Thus, the main scientific purpose of the paper is to identify how organizations exploit inter-organizational network collaboration when they experience VUCA environment, focusing on diagnosis of how they perceive importance of network benefits. The research was carried out using the interpretative method of a multiple case study, following its methodological rigor.

Presented analysis and conclusions are intended to provide both theoretical and practical contribution. More profound understanding of the nature of network relations allow creating interactions between partners more consciously, and increasing efficiency of creating value by network participants. I present a concise theoretical construct which explains how some change in operating conditions influences benefits expected from participation in inter-organizational networks.

This leads to conceptualization of a pattern showing how organizations exploit network relations in order to adjust to market conditions. It may serve as a template for practical use by managers; it supports planning and developing network relations while operating in VUCA environment.

2. Literature Review

2.1 VUCA Elements

VUCA represents an acronym originally developed by U.S. Army and it was supposed to characterize unfavourable battlefield conditions. It refers to four elements: volatility, uncertainty, complexity and ambiguity. They describe a situation or conditions which are difficult to analyse or prepare for (Taskan *et al*., 2022). With time the term was adopted also in an organizational context and generally it can be explained in a following way (Barbier and Robertson, 2022; Rath *et al*., 2021):

- *Volatility* – refers to being subject to fast, frequent and significant change. It is unexpected or unstable and may be of unknown period of time. Moreover, very small variations of some factor may result in large changes of others. In a business context it may refer to change of prices; in a volatile market price of some commodity can rise or fall fast and dramatically. What is more, the trend direction can change instantly and repeatedly.

- *Uncertainty* – appears when it is difficult to predict events and outcomes, because our previous experience may not apply to the situation we are currently facing. The cause and effect is hard to notice and comprehend. Referring to an uncertain market, it is difficult to predict real demand for a new product the moment it is launched.
- *Complexity* – refers to direct or indirect relations between many elements of factors; a change in one element may lead to unintended changes to other things, which may be difficult to understand and control. It may cause problems in diagnosing which factors are crucial in the decision-making process. For instance, consumers' motivations to purchase some item may be very complex; consequently, it is difficult to create effective marketing content which would convince clients to act in a certain way expected by an organization.
- *Ambiguity* – takes place when the situation is unclear and hard to comprehend fully. Ambiguity often stems from misread or misinterpreted information. As a consequence, intended outcome may not be evident. Organizations may face ambiguous situations when they expand business activities into new markets.

2.2 Benefits from Network Collaboration

Generally organizations determine their effectiveness through economic rent, which historically was understood in various ways; it was related to finding better position on a market, resource optimization, increase in an organization's value, or advantages through innovations (Horn, 2018; Niemczyk, 2013a). However, measuring effectiveness of inter-organizational network is more demanding (Piccolo *et al*., 2022; Lucidarme *et al.*, 2015; Mu *et al.*, 2018; Vangen and Huxham, 2010).

Traditional methods such as resource optimization may be too simplistic, because network members focus on building strong relationships and achieving intangible outcomes, such as trust and reciprocity (Klaster *et al.*, 2017). Hence, it is crucial to identify the benefits that correspond with the very idea of the network relations and reflect the complexity of motivations and expectations of cooperating organizations.

The synergy effect which appears between collaborating units leads to creating unique value for both the whole network and individual participants. In case of network collaboration accordingly there can be identified two basic types of economic rent: relational rent and network rent.

Relational rent constitutes an advantage from *the whole network's* perspective. Literature review allows identifying the following kinds of rent gained by the whole network:

- resource oriented (Ricardian) – generally it represents some gain from exploiting valuable, rare resources (Ricardo, 1817). The rent depends on the relation between demand and supply for some resource. Organizations concentrate on seeking rare resources and then exploiting them in an

efficient way (Niemczyk, 2013b). Concerning the network collaboration, it benefits from having and disposing such rare resources. In case of inter-organizational networks, the key resource is the knowledge which is created as a result of group learning (Peteraf, 1993). Additionally, this rent also can be interpreted as some benefit from having advantage over organizations which operate outside network,

- monopolistic – benefit from having privileged position in a sector (or a market), which allows limiting competition, e.g. by creating barriers for entering a market by other organizations. Thus, Ricardian rent is not enough to identify true sources of generated value, since the value depends not only on efficiency mechanisms. Inter-organizational network gains rent from having better competitive position on a market (Stańczyk-Hugiet and Sus, 2012) and creating rarity. For instance, monopolistic rent is common in case of public networks. For public organizations it constitutes quite a natural benefit from having a privileged position regarding other network members such as NGOs and private companies,

- innovative (Schumpeterian) – benefit generated from innovations (Schumpeter, 2003), which ought to be perceived in a very wide meaning. They may concern a product itself, but also development of technology, structures, processes etc. The gain stems from organizational abilities to identify and implement creative solutions, which at the same time corresponds with dynamic competences. Regarding inter-organizational networks, innovations mainly concern possibilities of developing flexibility and fast reactions to changes. Consequently, it leads to achieving advantage basing on difficult-to-imitate differences between network and organizations which operate outside network. Such advantage often results from the synergy of specific features, resources and competences of organizations representing different sectors,

- entrepreneurial, managerial – it refers to features and behaviour of an entrepreneur. It focuses on the ability to re-configure available resources in a creative way. New value is created thanks to exploiting new possibilities appearing in an organizational surrounding. In case of networks, competences to cooperate and to generate synergy from entrepreneurial actions constitute the main benefit and network advantage. The managerial aspect of this rent concerns exploitation of managerial knowledge, skills and competences, which are difficult to imitate,

- organizational – this kind of benefit appears as a consequence of collaboration of organizations which implement and exploit different management systems. A very friendly ground for such advantage is created in case of collaboration of units representing different sectors. Undoubtedly, making such an cooperation effective is a challenge. However, wise

interactions of specific features of network members can lead to creation of value which is unique and difficult to imitate,

- E. Penrose's rent – E. Penrose proposes a slightly different understanding of benefit possible to achieve by the whole network. It refers to the possibility of more effective exploitation of all resources disposable by network members. The benefit results not from the very fact of having joined resources, but from the possibility of conjuring up inner synergy effect. Network as a whole is able to use all resources delivered by network members more efficiently than if they were used individually.

Network rent, however, relates to an advantage that can be gained by an *individual* participant of network (egocentric perspective). In the literature scientists present various types of this benefit, depending on the context of the research. Taking into account different levels of network maturity and various contexts of operating, a network participant can gain following benefits:

- rent from lower transactional and hierarchical costs - lower transactional costs result from network contracting (both formal and informal) which replaces traditional contracts. They can be linked to e.g., verifying accessibility of goods on a market, comparing offers or controlling. Hierarchical costs refer to benefits of flat structures, which appear as a result of replacing hierarchical structures by network coordination. However, it ought to be stressed that this rent refers only to potential benefits from decreasing operational costs, and *not* from generating surplus by network,

- rent from participating in network of value - value within network is generated through a synergy effect of key resources and actions of collaborating units. However, this rent refers only to the situation in which an organization (as a knot in network) creates value for itself (and apart from co-creating value for the whole network). For instance, it can be related to exploiting network communication channels in order to reach new, potential clients,

- rent from appropriating value created by other participants of network – in this context appropriation can be understood in two ways: 1) taking over a part or whole value generated by other members of network; 2) keeping for an organization (not sharing) the value created by the unit itself (Najda-Janoszka, 2016). Within network, appropriation mainly concerns taking over not material assets, but knowledge. This process can be done both in legal ways (contracts, licenses, franchising) and illegally, e.g. by taking over hidden knowledge,

- rent from creating and diffusing knowledge - it concerns the ability to create hidden knowledge and to diffuse it to other network participants. Such

knowledge sharing is supported mostly by a relational approach to collaborative work, which means that partners will be more effective when they have the possibility to come together and learn about one another (Fu, 2015). Moreover, it is supported by specific features of network itself (Whetsell *et al*., 2020), especially when there are substantial differences between network units in terms of knowledge resources,

- rent from convergence processes – in case of networks, the convergence effect is understood as a situation in which some network participant with a weaker position on a market develops faster than other network member with a better position, ultimately achieving similar market position. Assessment of the scale of this catch-up effect requires identifying objective criteria of differences between units

- rent from creating dynamic abilities – dynamic abilities constitute a skill of integrating, building and reconfiguring competencies in order to adjust to fast changes in organizational surrounding (Teece *et al.*, 1997). They are some routines, both operational and strategic, thanks to which a company is able to reconfigure its own resources (Eisenhardt and Martin, 2000). In case of inter-organizational networks, this rent derives from their unique features, which support development of dynamic abilities. Most of all they are: network's flexibility, reconfiguration possibilities, lack of hierarchical dependencies and coexistence of formal and informal relations,

- network effect – the benefit for all network members grows as the number of its participants increases, since each new member creates additional value for the whole network (Church *et al.*, 2008).

3. Research Methodology

In my research I adopted the interpretative paradigm. This perspective allows understanding fully the phenomenon in some particular context (Eisenhardt and Graebner, 2007). The situational context determined the research results in each organization, but at the same time it constituted a base for presenting characteristics of the whole class of researched objects (Yin, 2014).

Following this reasoning, I based my research on the methodological rigor of a qualitative research method, represented by a multiple case study (Yin, 2014; Eisenhardt, 1991). This choice corresponds with the above-stated research objectives and what is currently known about scrutinized problems (Graebner *et al*., 2012).

Inter-organizational networks are still a relatively new phenomenon, conditioned by many variables. Their nature requires a thorough examination, including the mechanisms of adaptation to a changing environment.

The multiple case study analysis consisted of two elements: within-case analysis and cross-case analysis. According to the replication logic, I carried out a series of independent case research which provided data corresponding with set research questions. The results of each individual case study served as a base for cross-case comparisons.

As a result, it was possible to make theoretical generalizations concerning organizations' reactions to VUCA environment; how they change perception of network benefits' importance and what impact two types of rent have on minimizing negative consequences. Within this procedure, I used the statistical method of clustering, which allowed me to operationalize benefits which organizations gain from participating in networks (benefits were clustered according to two perspectives: of the whole network and of the individual participant of network).

I carried out 18 case studies. Basing on the procedure presented by Flyvbjerg (2012), I implemented the following main criteria of selecting the cases:

- clarity of case – this criterion refers to two conditions: 1) researched organizations are active participants of inter-organizational networks, 2) organizations experienced operating in VUCA environment. Hence, collected data bases on real experience, which ensures its reliability,

- access to crucial data – it refers to the possibility of carrying out interviews and analysing internal documents.

General characteristics of scrutinized cases was presented in Table 1. All of them have headquarters in Poland and they represent different types and scale of business. Within networks, they collaborate not only with business units, but also with public organizations and NGOs. Such a diversity of cases served as a base for a complex and consistent analysis of the researched phenomena.

Table 1. *Characteristics of researched cases*

Criterion	**Variant**	**Number of cases**
Type of business	production	6
	trade	4
	services	8
Size	1-9 employees	3
	10-49 employees	11
	50-99 employees	4
Type of partners	business	18
	NGO	3
	public	9

Source: *Own study.*

As the multiple case study method is characterized by complexity of the analysed phenomena and variety of information, I implemented the strategy of triangulation of gathering data methods (Yin, 2014). These methods were: an expert interview and an analysis of documents. I carried out the in-depth group interviews between October 2022 and April 2023. In order to minimize subjective assessment, I implemented triangulation of informants, interviewing from 2 to 3 representatives of each organization.

Depending on the case, they were: managing director, vice-managing director, manager of department (or other organizational unit), spokesperson. I used semi-structured forms which allowed identifying the change in the perception of network benefits' importance when organizations faced VUCA environment (which corresponds with the results presented in Table 2) and what impact two types of rent have on minimizing negative consequences of each VUCA element (Table 3).

Regarding the documents analysis, it included: operational reports, development strategies, statistical reports. It allowed me to confront the gathered data with the information provided by the interviewees.

The interviews were transcribed and analysed (Miles and Huberman, 2000). According to the methodological rigor, the qualitative data was: 1) reduced – all interviews were transcribed and the whole material was coded according to adopted conceptual frames (*a priori* codes); 2) displayed – the codes (benefits from network collaboration) were particularized and ordered; 3) verified – the empirical data was interpreted with reference to literature concepts and theories.

Correctness and trustworthiness of the research was ensured by fulfilling three evaluation criteria for qualitative research, which stem from the methodological rigor: credibility, transferability and confirmability. Credibility (presenting a real picture of the investigated phenomena) was ensured by:

a) interviewing people who have in-depth knowledge of the researched phenomena (they actively participate in developing network relations with other organizations and have an experience in operating in VUCA environment),
b) conducting interviews in time and places convenient for interviewees, in this way providing conditions to speak freely,
c) iterative collection of data and detailed analysis of the material.

Transferability (understood as a possibility of formulating some recommendations for other units which were not subject to research in question) was met by presenting the contextual aspect of the research and explaining in what way the research results may be useful for other organizations which participate in network collaboration and are exposed to VUCA environment. Finally, confirmability means ensuring that the findings are strictly correlated with the collected data and that the risk of potential subjective assessment of the researcher is minimized.

This criterion was met by using triangulation of methods (interviews, documents analysis), triangulation of informants (Mason, 1996) and a thorough description of the methodological perspective in relation to the empirical findings.

4. Research Results and Discussion

4.1 Modifying Importance of Network Benefits

The key part of the research referred to diagnosing how organizations change perception of network benefits' importance after experiencing VUCA environment (Table 2). As a consequence, it shows the way they exploit inter-organizational network collaboration in order to adjust to more demanding conditions and to optimize their market position.

When we consider all types of *relational* rent (benefit from the whole network's perspective), generally the change was rather limited; the importance increased slightly or did not change. The increase referred to two kinds of rent:

– network as a whole allows limiting outside competition by creating stronger position on a market for all network participants (monopolistic position of the whole network),

– synergy effect which is understood as the possibility of exploiting resources delivered by network members more efficiently within close collaboration.

Apart from that, perception of most types of relational rent did not change. They included: 1) having access to valuable, rare resources, 2) creating and implementing innovations which stem from difficult-to-imitate differences between network and other organizations, 3) exploiting unique entrepreneurial skills and competences. The only advantage for the whole network which became slightly less important referred to the synergy of different management systems represented by network members.

However, there is a noticeable difference in the research results which refer to *network* rent. When we analyse this egocentric approach (focusing on securing own interest and maximizing own benefit), it appears that the increase in network benefit importance for organizations facing VUCA environment is quite significant. Thus, there were three types of rent whose importance increased considerably:

– possibilities of limiting transactional and hierarchical costs, thanks to network contracting and flat structures,

– generating value within network by the synergy effect of key resources delivered and available for all network participants,

– participating in convergence processes – taking advantage of a so-called catch-up effect: an organization develops faster as a members of network than if it operated outside network.

Next, organizations considered another two types of rent as more important, but in this case the change in perception was slight: 1) possibilities of creating dynamic abilities – building and reconfiguring competencies useful in adjusting to fast changes in the environment, 2) possibilities of appropriating value from other network participants. Finally, the benefits whose importance did not change related to the access to knowledge created within network and a so-called network effect (benefit grows along with the increase in number of network participants).

Table 2. *Change in the perception of network benefits' importance when facing VUCA environment**

Type of rent	**Importance of benefit**				
	Considerably less important	**Slightly less important**	**Not changed**	**Slightly more important**	**Considerably more important**
Relational rent					
resource oriented (Ricardian)			x		
monopolistic				x	
innovative (Schumpeterian)			x		
entrepreneurial, managerial			x		
organizational		x			
E.Penrose's rent				x	
Network rent					
lower transactional and hierarchical costs					x
participating in network of value					x
appropriating value created by other participants of network				x	
creating and diffusing knowledge			x		
convergence processes					x
creating dynamic abilities				x	
network effect			x		

Note: ** 'x' mark reflects a dominant feature from answers collected in all 18 cases.*
Source: *Own study.*

4.2 Importance of Rent Types in Minimizing Negative Impact of VUCA

In the second part of the research I concentrated on understanding what impact two types of rent (relational and network) have on minimizing negative consequences of VUCA environment. As a result, the two elements of the research allow making the whole, concise picture of what lays beneath the modifications of expected benefits from network collaboration when organizations face demanding, unstable and unpredictable environment.

I analysed the impact importance separately for each element: volatility, uncertainty, complexity and ambiguity (Table 3). The importance was marked according to the following scale:

2 – considerable importance
1 – moderate importance
0 – no impact

It appeared that both types of rent have a visible importance. However, when comparing each VUCA element, we can notice that impact on minimizing volatility and uncertainty is higher than in case of complexity and ambiguity. For the first two elements the range is between 1.26 to 1.52, for the latter it decreases to moderate level of 0.78 to 1.11.

Table 3. *Importance of rent types in context of minimizing negative impact of VUCA elements*

	VUCA environment			
Type of rent	**Volatility**	**Uncertainty**	**Complexity**	**Ambiguity**
Relational rent	1.35	1.31	1.11	0.78
Network rent	1.26	1.52	0.81	1.08

Source: *Own study.*

5. Conclusions, Proposals, Recommendations

Based on the research results, I was able to identify a pattern which shows how organizations exploit network collaboration in order to adjust to changing market conditions. It appeared that when facing VUCA environment, organizations indeed modify priorities regarding benefits expected from participation in inter-organizational networks:

1. The very fact that there is a noticeable change in the way organizations perceive network benefits' importance shows that network participants treat collaboration as an instrument which can be used to adjust to the demanding situation and improve their market position. Experiencing VUCA environment leads to re-thinking and reconfiguring expectations concerning network collaboration benefits.

2. Generally, importance of most network benefits (both kinds of rent) increased slightly or considerably (in case of a few, the importance did not change). This finding supports the notion that developing and exploiting network relations is perceived as a way of supporting management, and inter-organizational collaboration becomes even more important when there is a need for minimizing threats and adjusting to demanding, unfavourable conditions. Organizations do it by modifying/increasing importance of expected benefits.

The only benefit perceived as less important was organizational rent, which stems from joining different management systems implemented by various network participants (especially when they represent different sectors). This sort of synergy was not given a special attention in VUCA surrounding. This assessment may result from the fact that this sort of benefit has a long-term, strategic dimension. Synergy of different management systems (methods, concepts, procedures etc.) is built gradually, step by step, it requires time and systematic adjustments. Reaction to VUCA, however, needs more operational approach. It is quite an interesting issue and in my opinion these assumptions should be an object to further scientific investigation.

3. When comparing both types of rent in terms of the increase in importance, it appeared that the change supported mostly an *egocentric* approach; organizations gave priority to various kinds of *network* rent, which builds an advantage for an *individual* participant of network. The difference is quite noticeable, the change of importance of *relational* rent (advantage for the whole network) was relatively slight. This finding leads to a very interesting conclusion that when facing VUCA environment, organizations behave rather selfishly – they exploit network relations in order to secure their own needs and gain benefit for themselves. For network participants it meant most of all: minimizing costs of operating, benefitting from synergy of various resources available within network, and exploiting convergence processes.

This tendency reveals a quite disturbing paradox – on one hand organizations perceive network as an important tool for minimizing risk, but on the other hand they do it by prioritizing own benefit, which may be dangerous for network as w whole. Thus, these egocentric reasons may endanger development of network in a long term. Hence, we can make an assumption that negative conditions of operating (for an organization which is a part of network), generally constitute a destructive factor for development of network as a whole. It may be hazardous for the network cohesion (Cavalcanti *et al.*, 2017; Sharkey *et al.*, 2021), since it undermines one of key conditions of network's development: understanding and respecting common expectations and goals, building one team that cares equally for the good of all network participants.

Another natural direction for scientific research is the question of network development in environment which is favourable for organizations – stable,

predictable. Then, would network members give priority to relational rent? Does it constitute an optimal environment for development of network as a whole? Where is the safe balance between gaining own benefit and caring for benefit for the whole network? Research results presented in this study suggest following tendency: in favourable environment organizations strengthen network as a common good by focusing on generating common benefit (relational rent), whereas in unfavourable conditions they concentrate on own, egocentric benefit, which may undermine long term development of network. This problem is definitely worth further research.

4. In the context of minimizing risk in VUCA environment, both types of rent (relational and network) have quite similar importance. It is worth to notice that in each diagnosed impact (on each VUCA element) the level of importance was either significant or moderate. Thus, benefits gained from network relations help minimizing every aspect of negative operating conditions. It supports the notion that the idea of network collaboration works, for organizations network becomes a vital way to protect and develop position on market, seen as an efficient element of strategy for dealing with unfavourable conditions.

What is especially interesting, organizations do not perceive the impact in question equally on each VUCA element. They expect that benefits gained from network collaboration would allow minimizing mostly uncertainty and volatility. The priority is to be able to predict upcoming events or situations, and to minimize exposition to instant and repeated changes. However, this finding leads to another intriguing question: do the higher marks for these two VUCA elements reflect the way organizations assess risk of all four elements (they believe that uncertainty and volatility is more dangerous and therefore they focus on them) or do they suggest that it is the question of the very character of network benefits which fit better to minimize some particular types of risk (in this case - uncertainty and volatility)?

Regarding theoretical contribution of the study, it expands our understanding of the nature of inter-organizational networks, how they adjust to changing environment and how network participants exploit collaboration to maximize benefit. I presented a concise theoretical construct which conceptualizes a pattern explaining how organizations react when facing VUCA environment, in terms of modifying priorities concerning expected benefits (including division into network and relational rent). As for practical contribution, the pattern may serve as a tool for managers who perceive network as a chance to minimize risk when operating in VUCA environment.

Concerning the limitations of the paper, it ought to be noticed that although implemented research methods provided all expected data which led to achieving research objectives, natural character of case studies requires cautiousness concerning the scale of generalizing results. My intention was to deepen our understanding of some phenomenon which has not yet been fully identified and

explored. The limitations should be treated as a starting point for further scientific explorations (Yin, 2014).

Apart from the suggestions expressed in the above conclusions, I would recommend expanding the research area into a *structural* dimension – focusing on how organizations react to VUCA environment in terms of modification of network structure (for instance, broken chains of supply resulting in focusing on local suppliers, etc.), and then linking it to the changes in priorities of expected benefits. The next direction of scientific explorations could lead to Necessary Condition Analysis, e.g. identifying hierarchy of VUCA elements in terms of influencing strength of ties between network members. Such further studies would expand and deepen our knowledge in terms of complexity and dynamics of inter-organizational networks which operate in VUCA surrounding.

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