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Zoran Keković*

Faculty of Security Studies, University of Belgrade

Vladimir Ninković

Faculty of Security Studies, University of Belgrade

TOWARDS A CONCEPTUALISATION OF RESILIENCE IN SECURITY STUDIES

Abstract

Resilience has become a catchword in academic and professional discourse due to, implicit or explicit, acceptance of traditional approaches to prevention and preparation. Derived from the Latin verb "resilire" – to jump back, currently mainly signifies the ability or capacity of a system to bounce back to the equilibrium, pre-disturbance state, but also the ability of the system to face with and adapt to change. The use of the term has a long tradition in different scientific disciplines – psychology, sociology, ecology, engineering, management, whereas it entered the scope of security studies at the beginning of 21st century. In the last two decades the growing use of the concept and the various conceptualizations have been observed in both academic papers and in strategic and legislative documents. There is a vast literature in the subfields of security studies such as national security, emergency and disaster management, human and corporate security that problematizes this concept. In security studies there are broadly two strands of thought – one that observes resilience as a desired state of the system, be it a nation, a community or infrastructure, and another one that proposes resilience as a risk management strategy that

* E-mail address: zkekovic@fb.bg.ac.rs

can be used when dealing with events characterized with a high degree of uncertainty.

Keywords: resilience, security studies, risk, uncertainty

INTRODUCTION

We can ascribe the recent popularity of the resilience concept to an increasing need for it, as we start accepting, implicitly or explicitly, the inherent shortcomings of traditional approaches to prevention and preparation. The earlier view of nature and society as systems near equilibrium is being replaced by a dynamic view that emphasises complex non-linear relations between entities under continuous change and facing discontinuities and uncertainty (Dahlman 2011). The growing importance of the knowledge generated by complexity science sheds a different light on complex phenomena such as globalisation, interconnection and interdependence between social, ecological and technical systems, new technologies, new forms of terrorism,[1] changing demography and climate change. System shocks have further established interest in the concept of resilience as a universal mode of thinking about the relations between unpredictable agents and their complex environments.

The term 'resilience' is derived from the Latin verb *resilire* meaning 'to jump back' and it has many meanings in academic discourse. Early studies, according to which the system 'bounces' back to the equilibrium state pre-disturbance, related resilience to stability and the capacity to absorb environmental shocks and still maintain function. Successively, the concept was enriched to include the ability of the system to face with and adapt to change (Fraccascia, Giannoccaro, and Albino 2018). Although the term "resilience" has classical etymological origins and a history of use in psychology and anthropology (Alexander 2013), it can be stated that it was brought forth into modern scientific prominence in 1973 when C. S. Holling – in his seminal paper *Resilience and Stability of Ecological Systems* – argued that the particular attractor around which a system is organised is only one of a multitude of

1) About terrorism and violence see more in: Đorić, 2018.

possible states, which emerge and disappear over time (Holling 1973). Therefore, this approach emphasises concepts like complexity, self-organisation, functional diversity and non-linear ways of behaving. Resilience provides complex systems with the ability to withstand and survive shocks and disturbances; it also emphasises the capacity for renewal. Indeed, a common theme across academic papers is the recognition of resilience as an emergent property of complex adaptive systems (Barasa, Mbau, and Gilson 2018). In contrast to the equilibrium-based view that interprets resilience as a generic feature and quality of a closed system, adaptation (and adaptability, as suggested by Pike, Dawley, and Tomaney 2010) presupposes a more open system that has to be accommodated or brought into balance by social agents. Resilience through adaptability emerges through decisions to leave a path that may have proven successful in the past in favour of a new, related or alternative trajectory. This adaptive kind of resilience may be necessary to cope with unforeseen futures and cognitive uncertainties. Thus, adaptive capacity is a dynamic capacity to effect and unfold multiple evolutionary trajectories, through loose and weak couplings between social agents in place, which enhance the overall responsiveness of the system to unforeseen changes (Pike, Dawley, and Tomaney 2010).

With this in mind, this paper aims to analyse the utilisation of the concept of resilience in security studies, focusing on socio-political (national state level), socio-economic (community level), and socio-technical (organisation level) systems. The following chapters will analyse the application of the resilience concept in national, community and organisational security, focusing on the research that treats resilience as the desired state of the system in question. Resilience as a security management strategy will be discussed in the fifth part of the paper. Finally, we will draw conclusions and discuss the possibilities of further work on the conceptualisation and application of the resilience concept in security studies.

THE CONCEPT OF RESILIENCE IN SECURITY STUDIES

A central and longstanding problem in the practice of security in complex environments is its inability to foresee, identify and act timely upon threats. Resilience promises answers to this problem and provides a new basis for engaging uncertainty *prima facie* (Dunn Cavelty, Kaufmann, and Kristensen 2015, 5). Following in the steps of Buzan, who successfully argued that security cannot only be applied to nation states but to all human systems (Buzan 1983), in this paper we will focus on the resilience of three basic systems – state, community and organisations – that in general correspond to macro, meso and micro levels of analysis.

There have been many attempts to discern dimensions and capacities pertaining to those systems deemed resilient. The dimensions, i.e. the constitutive elements of the system, will differ in accordance to whether we observe an organisation, a nation, a community or any other system, whereas resilience capacities are equal for any type of a system. Generally, three capacities are mentioned – absorptive, adaptive and restorative, while some also add the predictive capacity (Keković, Dragišić, and Ninković 2014).[2]

Absorptive capacity is the degree to which a system can automatically absorb the impact of system perturbations and minimise consequences with little effort. Adaptive capacity is the degree to which the system is capable of self-organisation for the recovery of system performance levels. Finally, the restorative capacity is the ability of a system to be repaired easily – either to its original, pre-event state, or to a completely new state that anticipates future system requirements (Keković, Dragišić, and Ninković 2014). A similar approach was proposed by the US National Academy of Sciences in 2012 with four management stages, corresponding to the mentioned four resilience capacities (National Research Council [NRC] 2012).

Although by no means absent prior to 2001 or restricted to the North American prosecution of the "war on terror", the term "resilience" has proliferated since the formation of the US

2) We understand capacities as abilities of a system. Some authors use the term capacities in the meaning of dimensions.

Department of Homeland Security and the publication of its *National Strategy for Homeland Security* in 2002 (Walker and Cooper 2011). Many national security strategies nowadays employ the term "resilience" as something nations should strive towards, mainly in the wake of catastrophic events, and a plethora of definitions of the term appeared in academic papers and in official legal and strategic documents related to national, community, disaster and organisation resilience:

- "Capacity of a system to absorb disturbance, undergo change, and retain the same essential functions, structure, identity, and feedbacks', whereas the systems in question "reorganise in the absence of direction" (Longstaff et al. 2010)

- Ability of systems, infrastructures, government, business, and citizenry to resist, absorb, recover from, or adapt to an adverse occurrence that may cause harm, destruction, or loss of national significance (U.S. Department of Homeland Security Risk Steering Committee 2010)

- Capacity of an organisation to recognise threats and hazards and make adjustments that will improve future protection efforts and risk reduction measures (U.S. Department of Homeland Security 2010)

- The ability to reduce the magnitude and/or duration of disruptive events. The effectiveness of a resilient infrastructure or enterprise depends upon its ability to anticipate, absorb, adapt to, and/or rapidly recover from a potentially disruptive event (National Infrastructure Advisory Council 2009)

- The ability to adapt to changing conditions and prepare for, withstand, and rapidly recover from disruption (National Security Strategy of the United States of America 2010)

- Robustness, adaptability, and capacity for rapid recovery (U.S. Department of Defense 2010).

NATIONAL SECURITY AND RESILIENCE

The transformation of global structure after then end of the Cold War has created a complex security environment in which

countries are losing their monopoly over the use of force (Friedman and Kaplan 2002). The progressive growth and unpredictable nature of various forms of threats to security that come from a turbulent geopolitical environment and internal structures led to numerous changes in the structure of the national security system of modern states. The concept of resilience has an implicit assumption that the world that surrounds us has systemic features and characteristics of dynamic change and interdependence (Haimes, Crowther, and Horowitz 2008).

The proliferation of new security threats created an atmosphere of insecurity on a global scale by forcing creators of national security strategies to anticipate the responses of various segments of the system to external or internal factors that threaten to disrupt the functioning of the system (Fjäder 2014). Furthermore, Fjäder argues that a resilient nation "has the ability to resist unwanted influences and maintain stability in given conditions, and recover in the short term with minimal unintended consequences for the safety of citizens and their property" (Fjäder 2014, 128).

A complex security environment requires the establishment of balance between the reactive and proactive activities of the state and other relevant actors involved in the decision-making process. When it comes to national security, the resilience is implemented in the security strategies of economically stable countries and as such is focused on the adaptive capacity of an individual, community or system with the aim of maintaining an acceptable level of functioning, structure and identity (Keković and Dinić 2016). For instance, the 2007 issue of the United States' *National Strategy for Homeland Security* brings together the structural resilience of "critical infrastructures" and the "operational resilience" of emergency response organisations, government institutions and private enterprise in the face of crisis. The strategy is notable for its insistence that none of the threats facing these structures are fully preventable, and proposes, in lieu of prevention, the notion of "resilience" as default (Walker and Cooper 2011). In 2013, the World Economic Forum presented the definition of government resilience as an ability to adapt to change, to resist destructive influences and recover to the desired equilibrium, established before an unwanted event occurred, while preserving the continuity of vital functions (World Economic Forum 2013).

It is interesting to note that in national security issues we have a trend quite different from trends in community resilience. Whilst there is a "neoliberal" trend in the "new security paradigm" towards decreased government and institutional engagement, there is also an expecting increased responsibility for national security resilience. In fact, most global powers have incorporated the notion of resilience in their strategic documents, be it explicitly (USA, United Kingdom), or implicitly (Russia, China). The traditional threats to national security targeted at defence and security capacity were broadened by the Australian and UK governments after 2007, and now their respective national security strategies incorporate national and community resilience that concern responses to climate change, threats to critical infrastructure, cyber warfare, natural disasters and other emerging issues (McAslan 2010).

DISASTER AND COMMUNITY RESILIENCE

A definition of resilience that expresses the robustness and adaptation capacity of social networks is one of the most promising developments for disaster risk reduction. A disaster resilient community is a great asset to national security. According to the National Research Council's paper on "disaster resilience": "The nation needs to build the capacity to become resilient, and we need to do this now. Such capacity building starts with individuals taking responsibility for their actions and moves to entire communities working in conjunction with local, state, and federal officials, all of whom need to assume specific responsibilities for building the national quilt of resilience." (NRC 2012).

The promotion of resilience related strategies in the field of emergency and disaster management has been premised on a re-evaluation of the referents of security governance. In particular, the "mythbusting" of panic in emergency situations, together with the notion that human populations actually possess significant adaptive and self-organisational capacities in emergencies have been instrumental in the advent of the notion that government should not look to direct, but to supplement and encourage the natural tendencies of those in emergency events to help themselves. Rather than withholding information, for fear of inciting panic, populations in emergency should be provided with all the information

they require to self-organise an evacuation or response (Zebrowski 2013, 2). Therefore, recent resilience strategies of the UK Civil Contingencies are oriented towards facilitating and optimising the natural, self-organisational capacities, or 'resilience' of populations in emergency (Zebrowski 2009).

Apart from the academic researchers, the concepts of community and disaster resilience have found application in the number of strategic and policy papers of various international and supranational organisations. The World Resources Institute defines resilience as "the capacity of a system to tolerate shocks or disturbances and recover" and argues that this depends on the ability of people to "adapt to changing conditions through learning, planning, or reorganisation" (World Resources Institute et al. 2008). Resilience, therefore, can be related to the way that societies adapt to externally imposed change. According to the Australian National Strategy for Disaster Resilience, a disaster resilient community is one that works together to understand and manage the risks that it confronts. Disaster resilience is the collective responsibility of all sectors of society, including all levels of government, business, the non-government sector and individuals (Council of Australian Governments 2011). The British Department for International Development (DFID) defines disaster resilience as the ability of countries, communities and households to manage change, by maintaining or transforming living standards in the face of shocks or stresses – such as earthquakes, drought or violent conflict – without compromising their long-term prospects (DFID 2011).

Furthermore, the concept of disaster resilience has been of interest for urban planners. According to the UN-Habitat, urban planning may be one of the most important tools in reducing vulnerabilities and risk (UN-Habitat 2007). It can help cities to significantly increase their resilience in coping with disaster risks and climate change (International Federation of Red Cross [IFRC] 2010). Its importance relates to its potential to ensure planned adaptation, which consists of developing and investing in urban areas in order to reduce risks from climate-related impacts (and other hazards) and provide better protection for inhabitants, housing, infrastructure and enterprises (Bicknell, Dodman, and Satterthwaite 2009). Urban development attributes of wealth (e. g. land tenure, housing, stable income, infrastructure) and capacities (e. g. education, reliance on

community support) are fundamental determinants of resilience across cities worldwide and represent key determinants of urban resilience of social and economic structure (Keković, Džigurski, and Ninković 2018).

RESILIENCE OF SOCIO-TECHNICAL SYSTEMS

The adoption and application of ecology principles and system thinking subsequently recognised the complex adaptive nature of socio-technical systems. This recognition prompted a view of resilience as involving the adaptation and transformation of systems though the emergence of new structures such as policies, processes and organisational culture that enabled organisations to continue to perform their functions in the face of challenges (Barasa, Mbau, and Gilson 2018; Pike, Dawley, and Tomaney 2010).

The adaptation, as one of the distinctive features of complex adaptive systems, is generally done through the process of organisational learning, which is among the main factors behind the organisational resilience. In socio-technical systems, people's actions modify system resilience and therefore a system's adaptability may arise from its social aspects (Walker et al. 2006). Where an existing system becomes untenable, a new stability landscape may be created through adaptive governance, which requires change without affecting the system's structure or function, and its capacity to self-organise, learn and adapt (Walker et al. 2002; Walker et al. 2006; Ridley 2017).

The conclusions of a recently published review of empirical literature on organisational resilience in the health sector by Barasa, Mbau, and Gilson (2018) are that a "common theme across the selected papers is the recognition of resilience as an emergent property of complex adaptive systems. Resilience is both a function of planning for and preparing for future crisis (planned resilience), and adapting to chronic stresses and acute shocks (adaptive resilience). "

The characterisation of resilient socio-technical systems introduced by Hollnagel et al. (2011; 2006) is widely adopted in resilience engineering literature (Righi, Saurin, and Wachs 2015; Madni and Jackson 2009; Rankin et al. 2014). According to Hol-

lnagel, Woods, and Leveson (2006) resilient engineering systems must be able to monitor – know what to look for; anticipate – know what to expect; respond– know what to do; and learn – know what has happened. Hollnagel (2012; 2014a; 2014b) applied the functional resonance analysis method to show how each of the resilience processes are dynamically coupled to the other processes and to identify the dependencies among them. The four abilities are focused on different ways of knowing and thus emphasise a cognitive perspective of how humans influence system resilience (Hollnagel et al. 2011).

Organisations adapt to external environmental change using integrated processes, such as adopting standards (McAslan 2010). That the resilience paradigm has obtained a strong foothold among professionals in corporate security can be proven by the adoption of BSI and ISO standards on Organisational Resilience (International Organization for Standardization [ISO] 2016). In addition, business continuity management has been suggested as a way of putting the organisational resilience into practice by establishing mechanisms through which an organisation can navigate crises and other hardships. The attention to supply chain management, collaboration and communications between organisations and various stakeholders is also deemed to improve the organisational response to crises, thus making organisational systems more resilient. However, collaboration depends on factors existent between systems before the crisis ensues (Therrien, Tanguay, and Beauregard-Guérin 2015).

Critical infrastructure resilience, represents an interplay of national (as these are objects of national importance), community (they provide benefits and welfare to the communities that use their products and services) and organisational (as they are socio-technical systems) resilience. In particular, the amount of literature on critical infrastructure resilience increased greatly after Hurricane Katrina and the Fukushima Daiichi Nuclear Disaster. A subset of critical infrastructure resilience thinking is aimed at the critical informational infrastructure, due to the dependence of states and communities on informational-communicational systems, and the increasing instances of cyber terrorism and cyber warfare. The research efforts of the Sandia and Argonne laboratories in the USA have yielded particularly important results in defining framework and metrics for assessing the resilience of critical infrastructure and

networks (Biringer, Vugrin, and Warren 2013; Argonne National Laboratories 2010).

RESILIENCE AS A RISK MANAGEMENT STRATEGY

Risk and resilience are important paradigms for guiding decisions made under uncertainty, in particular decisions about how to protect systems from a portfolio of threats. The term "paradigm" in this context can be defined as conceptual frameworks or ways of thinking. The risk paradigm tends to emphasise a reduction in the probabilities and magnitudes of potential losses. The resilience paradigm tends to emphasise an increase in the ability of systems to retain critical functionality by absorbing the disturbance, adapting to it, or recovering from it (Baum, 2015). The threats generated by complex phenomena are characterised by low levels of predictability, but with potentially huge impacts to modern societies. If we cannot predict an imminent threat, prevention and protection become difficult and characterised with low cost-effectiveness. While risk and resilience are related, resilience has been favoured for unknown, unquantifiable, systemic risks (Baum 2015). In other words, resilience is an "asset based" rather than "threat based" approach.

As opposed to the preventative paradigm, resilience policies act on the assumption that a disruption will take place (Kauffman 2013). In other words, it starts from the acceptance of risk as a given that cannot be controlled or changed but it can be overcome, mainly through the process of strengthening so that the encounter with risk is solved with a kind of preparedness (Pavićević 2016).

Preventive measures can be costly with little effect and, occasionally, completely counter-productive. According to Aaron Wildawsky, resilience and anticipation are two strategies that when used in a balanced manner can result in the optimal level of security. "If our most serious risks come from unpredictable or low-probability sources, then resilience (by conserving generalised resources that may be shifted around and applied where and when they are needed) is best. If danger will come from reliably foreseeable sources, then anticipation makes sense. Real human situations usually involve a mixture of the known and unknown; hence, there is a trade-off – the most likely large dangers, if they

are known and can be countered without making things worse, can, and should be prevented. […] To show that anticipation is the best strategy in a particular situation, therefore, one would first have to demonstrate that the worst risks we face are in fact the ones we already can predict with high probability" (Wildavsky 1991, 80).

Wildavsky also quotes Holling's insight about resilient systems possessing low stability and states "the very purpose of anticipatory measures is to maintain a high level of stability. Anticipation seeks to preserve stability: the less fluctuation the better. Resilience accommodates variability – one may not do so well in good times, but learns to persist in the bad" (Wildavsky 1991, 78). Even though he states that both anticipation and resilience strategies have their preferred use, it seems that he is slightly inclined towards resilience, as "anticipatory strategies should be used judiciously because the future is necessarily uncertain with respect to many types of hazards: thus, many hypothetical hazards are always possible, though most possibly will not materialise" (Wildavsky 1991, 80).

Wildavsky's ideas have been further developed in more recent literature. For instance, Fjaeder even opposed the concept of resilience to the concept of security. According to him: "security is essentially preventive and proactive in nature, […] whereas resilience, is a combination of proactive and reactive measures aiming at reducing the impact but not at preventing threats as such" (Fjäder 2014).

CONCLUSION

The concept of resilience is supported by an immense, diverse yet immature library of literature (Ridley 2017). Given the close ties of resilience to contingency and uncertainty, it is not surprising that its prominence is reflected in the field of security studies. In our opinion, the resilience concept retains the potential to be crafted into a coherent analytic framework that, on the one hand is able to incorporate scientific knowledge from the accepted concepts of vulnerability and risk, and on the other hand is forward-looking and opens up a fresh perspective on today's challenges of global change.

Building resilience requires an understanding of the complex interaction among the different components of time and space rel-

evant for the system (Dahlman 2011). As Dunn Cavelty noticed, resilience links security to the logics of governance rooted in ecology, engineering, and psychology, which were previously not prominent in the security discourse (Dunn Cavelty, Kaufmann, and Kristensen 2015, 5).

Different to the risk paradigm, which is possible to measure given its use of probabilities and the size of potential loss, the resilience paradigm focuses on increasing the essential functionality of the system to absorb, adapt and recover from a disturbance, and is thus difficult to measure (Ridley 2017). Without possibility of the quantitative assessment of resilience, it has been claimed that monitoring and measuring is only possible in a qualitative way by using scenario analyses (Ehlen and Vargas 2013). Developing a method of assessing and measuring resilience applicable across various domains is a priority for various government and academic institutions with many ongoing research projects in the European Union, United States and Australia trying to provide a solution to this complex issue.

It should be noted too that the resilience construct has not remained unchallenged in the social sciences. Critics from the new left and "critical theory" have accused the resilience paradigm of depoliticising, of being a tool for disguising power relations and a strategy for repositioning responsibility away from the government and decision makers. For example, the geographers Cannon and Müller-Mahn have argued that the concept of resilience is "inadequate and even false when it is being uncritically transferred to social phenomena", and that it disguises power relations as the essence of the issue (Cannon and Müller-Mahn 2010, 623). Due to its empirical heritage rooted in ecosystem sciences, the concept is feared to lead to the "re-naturalisation of society" (Lidskog 2001) and to the re-emergence of a simplistic natural determinism (Judkins, Smith, and Keys 2008). As such, the concept bears the risk of 'depoliticising' social structures and unconsciously reinforcing the status quo of society by overlooking those mechanisms that put people at risk in the first place (Pelling and Manuel-Navarrete 2011). The future oriented 'new security paradigm' of resilience views citizens as vulnerable and needing resiliency training to "overcome their own obstacles" (Schott 2013, 212). A focus on resilience in national security has replaced the former "promise of

security", which not only mitigates citizens' dependency and anxiety, but it also mitigates consequences of a government's inappropriate or untimely response to a disruptive event (Aradau 2014, 76). Ultimately, the popularity of resilience corresponds with recession, austerity, climate change concerns and lowering of living standards in many western nations (Diprose 2015). Resilience is, thus, seen as a strategy to persuade communities to tolerate unpredictable conditions, postpone demands for change and reposition responsibility away from government to communities and individuals who have little influence (Diprose 2015; MacKinnon and Derickson 2012).

Further research assisting organisations, communities and nation states in their understanding of how to become resilient is needed. Although there are some empirical studies on ecological and socio-ecological systems, more empirical research in applied socio-technical and socio-political settings will be required to validate the concept, using both case study and survey methods (Bhamra, Dani, and Burnard 2011). Furthermore, as empirical evidence on resilience accumulates, scholars need to consolidate findings periodically, identifying themes that recur across methodologically diverse studies as opposed to those identified in relatively few instances.

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Зоран Кековић*
Факултет безбедности, Универзитет у Београду
Владимир Нинковић
Факултет безбедности, Универзитет у Београду

КОНЦЕПТУАЛИЗАЦИЈА ОТПОРНОСТИ У НАУКАМА БЕЗБЕДНОСТИ

Резиме

Отпорност је последњих деценија постала свеприсутан термин у академском и стручном дискурсу услед, имплицитног или експлицитног, прихватања недостатака традиционалног приступа превенције. Изведеница из латинског глагола "resilire" – скочити уназад, отпорност означава способност или капацитет система да се врати у стање равнотеже након ремећења, али и способност система да се суочи са променом и да се на њу адаптира. Примена термина има дугу традицију у различитим научним дисциплинама – психологији, социологији, екологији, менаџменту – док се почетком XXI века овај термин широко усваја и у наукама безбедности. У последње две деценије приметно је све учесталије коришћење овог термина као и његове бројне концептуализације и операционализације како у научним радовима, тако и у стратегијским и легислативним документима. Пролиферација нових безбедносних претњи створила је атмосферу небезбедности на глобалном нивоу и приморала практичаре и законодавце да антиципирају одговоре различитих сегмената система на спољње и унутрашње чиниоце који представљају претње по функционисање система. Аутори су анализирали како је концепт отпорности дефинисан и операционализован у различитим потпољима наука безбедности, као што су национална безбедност, заштита и управљање катастрофама и корпоративна безбедност. Шире посматрано, у наукама безбедности постоје два тока промишљања отпорности – једно које посматра отпорност као жељено стање система, било да је реч о држави, заједници или организацији, и друго које отпорност посматра као

* Имејл-адреса: zkekovic@fb.bg.ac.rs

стратегију менаџмента оних ризика које карактерише висок степен неизвесности. Термин отпорности је данас присутан у стратегијама националне безбедности великих сила и других развијених држава, а означава тежњу ка одржавању прихватљивог нивоа функционисања, структуре и идентитета државе. Популарност концепта безбедности у пољима управљања ванредним ситуацијама и катастрофама у складу је са премисом да људи и заједнице поседују адаптивне и организационе капацитете што је довело до закључка да надлежне институције не треба да просто управљају, већ да помажу и допуњују природне тенденције самопомоћи и самоорганизације особа и заједница изложених неповољним догађајима. Комплексна природа организација као социо-техничких система такође је окарактерисана њиховом способношћу адаптације на непредвиђене негативне догађаје, а која може бити унапређена кроз адекватне политике, процесе и организациону културу које могу помоћи организацијама да одрже циљани ниво функционисања током и након реметилачког догађаја. Напокон, отпорност се посматра не као жељено стање система већ као стратегија за управљање ризицима са високим степеном неизвесности, насупрот антиципацији и традиционалном менаџменту ризика заснованом на идентификацијама претњи и проценама вероватноће настајања нежељених догађаја. Ипак, треба напоменути да приступ отпорности није без противника, а напади најчешће долазе са позиција Нове левице који оптужују овај приступ за „деполитизовање социјалних структура", „прикривање односа моћи", „ре-натурализацију друштва" и представљају је као нео-либералну стратегију којом се одговорност за одговор на ризике помера са доносиоца одлука на оне који трпе последице догађаја. Даља истраживања о могућностима операционализације концепта отпорности су неопходна како би се дале конкретне препоруке како систем може „постати отпоран", односно како се концепт може применити на управљање системским ризицима и неизвесностима.

Кључне речи: отпорност, науке безбедности, ризик, неизвесност

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