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BARRY BUZAN’S SECURITIZATION THEORY AND THE CASE OF IRAQI KURDISH MILITARY ACTION AGAINST ISIS IN 2014

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Abstract. Barry Buzan’s thought has shaped constructivism and International Security Studies since the 1990s. In this paper, it is argued that ISS does insufficient justice to the case of the Iraqi Kurdish military counterattacks and wider societal mobilization against ISIS. The paper introduces the concepts of spontaneous and semi-spontaneous securitization, where the referent object of securitization is not the nation state or even the Kurdistan Region but the more traditionally defined community and its individual members, plus religiously or ethnically defined groups that are under the protection of the regionally dominant identity community. Worryingly, in Sunni Arab areas such as Mosul, insurrection and semi-spontaneous securitization has been an aspect to how ISIS captured that city. Further theoretical problems such as the securitization of immigration in Buzan’s theoretical framework, are exposed and applied to the case of ISIS and Iraqi Kurdistan. Research for this article took place during on the field visits to Erbil and the KRI in 2016 by the author and his team of HDF General Staff Scientific Research Centre.

Keywords: ISIS; Kurdistan, Erbil siege, Kurdistan security, Securitization Theory, securitization of immigration

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JEL. Classification:

1. Introduction

In the contemporary world security enhancement has become precondition of sustainable development; various security facts are being continuously revealed and analyzed in scientific literature (e.g. Limba et al. 2017; Mikhaylov et al. 2018; Tvaronavičienė 2018; Lisin et al. 2018; Eddelani et al. 2019). International Security Studies (ISS) is among the most respected theoretical frameworks for security today, arguably surpassing even the popularity of the neorealist school, or ‘national security’ based classical realist schools, especially in the UK and in much of continental Europe. Barry Buzan’s and Ole Waever’s thought has shaped constructivism in International Relations, and specifically ISS in definitive ways since the latter’s inception in the 1990s. In this paper, it is argued that mainstream ISS, and specifically also securitization theory as expounded by Buzan, Ole Waever and Jacobus Hubertus “Jaap” de Wilde, in their current form do insufficient justice to the case of the Iraqi Kurdish military counterattacks and wider societal mobilization against ISIS, and to other, related cases of insurgency in the region. In Buzan’s theory of securitization, which focuses on institutional securitization and not ad hoc securitization (a category he mentions but does not elaborate on), the enunciator/actor who securitizes a given political, economic, social, or religious issue through a speech act, always has the choice of avoiding ‘securitization through communicative action’: a choice that is distinct from the securitizing speech act and which keeps the given issue within the realm of the political. Through my paper, I intend to prove that in the case of Iraqi Kurdish Peshmerga and their political representatives in and around Erbil in the late summer and
early autumn of 2014, there presented itself no such choice, and that as a result, we may refer to Iraqi Kurdish Peshmerga actions as guided by traditional concepts of (ethno-) national survival (rather than the constructivist notion of securitization); and without any fear of philosophical naivety. We will invoke historicity in the form of historical experience and precedent to aid us in our understanding of the forces at work here. On a more general level, this paper intends to prove also that Buzan’s constructivist concept of securitization, while it devotes a lot of attention to competing notions of group self-definitions, actually ignores the problématique that is presented by the imminence, or fact, of actual physical annihilation of bodies of humans, whose groups are at liberty to self-define as individuals or collectives – thus appears the historicity of collective experience as it transcends mere media projections, manipulations, and propaganda. Thus incorporating traditional concepts and historicity into a Buzanian theoretical framework in a more nuanced way, I propose the novel categories of spontaneous and semi-spontaneous securitization, as a corrective to the theory’s contemporary and modern, statist bias.

2. Historicity: nation, clan, and historical experience

Even in the sphere of thought that we might suspect to be farthest from acquiescing to the reality of communal or (ethno-) national historical experience, such as Marxism with its penchant for internationalism, multiculturalism and the global horizon, we find that in its best thinkers such as Gramsci, the historicity of communal experience and the centrality of national self-determination as an inescapable stage of development, are posited (Forman 1998). For thinkers on the right, the ethnic and pre-modern determinants of modern nationalisms are, perhaps predictably, not only admitted grudgingly, but celebrated (such as the intellectually very resourceful Azar Gat in 2012) (Gat 2012). That said, even those Marxist theoreticians of nations and nationalism, against whom Azar Gat railed (a well known example would be Eric Hobsbawm), on account of their severing modern political nations (as artificial constructs) from their pre-modern extraction (and who thus constitute the constructivist, as opposed to the primordialist school of Nationalism Studies) (Hobsbawm 1992): even they do not dream of doing away with the centrality of historical experience for communities, with the historicity of experience, indeed, with History (understood in the former’s case within the framework of historical materialism) (Mayer 2016).

Besides constructivist International Security Studies thinkers and IR theorists, the group of thinkers who are most ready to neglect the reality of History and its crucial (indeed, sometimes even calculable) effects on individuals and groups, are post-modernist, post-structuralist thinkers and literary theorists, among them such towering figures as Gayatri Chakravorty Spivak. One finds it commendable that (certain types of) Marxisms allow for speculative theorising, but one may well find it disturbing when theorising acquires qualities that are arguably ahistorical. When Gayatri Spivak intends to disconnect the appearance of modern nations and modern nationalisms from their chronological point of origin, the late 18th century, and offers vague and mystical definitions instead (“I do not locate the nation in the 18th century... I connect it to reproductive heteronormativity”) (Spivak 2010), one stands puzzled. While the reader keeps wondering whether Spivak means by this simply that women give birth and birth defines one’s nation (the conservative primordialist view par excellence) or she has some other goal in mind, one still finds this a reason to mourn the disappearance of vital historical sensitivity in some influential Marxist/post-structuralist critical theory.

It is admissible then to find the security theorist Barry Buzan more candid than Spivak in that he openly shuts out any Marxian inferences from his work whilst attempting to bury concepts of historicity (and even when it comes to his collaboration with feminist thinker Hansen, he opts for a version of critical theory that does not even pretend to offer Marxian tools of analysis.) (Buzan & Lawson 2015; Buzan & Hansen 2009). Naturally, there will be a price to pay even for this (not in the sense of losing articles of positivist “truth” but in the sense of loss through a negation of theoretical engagement). I will argue how the price that Buzan will pay for the lack of engagement with radical aspects of critical theory is blind spots of a normative nature, especially in his problematic securitizing of immigration: as relevant for Europe as for the Kurdistan Regional Government today.

Finally, this article introduces the concepts of spontaneous and semi-spontaneous securitization, where the referent object of securitization is not the Western liberal democratic nation state or even the Kurdistan Region but the more traditionally defined community and its individual members, plus religiously or ethnically defined groups that were under the protection of the (regionally) dominant identity community. Semi-spontaneous
(civilian) insurrection, *coordinated or not* by Peshmerga commanders on the ground, is a historically relevant phenomenon in the Kurdish case, which (luckily for the region and for all adversaries of ISIS) might have played out to beneficial effect in protecting Erbil Governorate from an ISIS attack in the second half of 2014. A similar case of semi-spontaneous securitization happened in late 2016, when Kirkuk experienced a sudden ISIS attack, which was repelled by coordinated Peshmerga action along with (significantly for our argument here) semi-spontaneous insurrectionary action by private individuals. Worryingly, in Sunni Arab areas such as Mosul, insurrection and semi-spontaneous securitization was an aspect to how ISIS captured that city.

3. The need for theory in the case of Iraqi Kurdish insurrection against ISIS in 2014

There is nothing unusual about people running away from danger, and as everywhere else, this did happen in Erbil in the late summer and early autumn of 2014, when ISIS approached the city’s environs and when it credibly threatened to overtake both the city’s airport and also the city itself. Members of the city’s thriving expat community, oil industry experts and NGO workers, the minority communities of Yezidis, Christians, Alawites, along with the city’s majority Sunni Muslim Kurdish population, were on high alert. With the airport closed, many Westerners simply packed all their belongings to their cars and drove off towards the Turkish border.

As Susan Strange puts it, we do not need theory when people run out of a burning building: self-preservation requires no elaborate explanations (Strange 1988). We *do need* theory however, if and when people run into a burning building.

Given ISIS’s track record by the late summer of 2014, joining the Peshmerga effort against ISIS on the frontline was akin to running into a burning building. *More than that, at that juncture, not only Peshmerga fighters (who were, after all, on the Kurdistan Regional Government’s payroll) joined the effort. It has been noted extensively how groups of students, young people with their cousins, young people individually and in small groups, gathered their light arms, sat in their car, and left off for the frontline with or without prior Peshmerga training in the hinterland. Foreign volunteers also joined in from various Western countries, but naturally, logistics in their case was not as simple (although it did require as much courage on the individual level) (Misri 2014; Dalshad 2014).*

4. Applying theory to the case

Now let us look at how such behavior concurs with securitization theory, specifically of the Copenhagen School of IR that of the founding fathers of International Security Studies. International Security Studies is among the most respected theoretical frameworks for security today, arguably surpassing even the popularity of the neorealist school, or ‘national security’ based classical realist schools, especially in the UK and in much of continental Europe.

In Buzan’s theory of securitization, in the case of institutionalized securitization, the enunciator/actor who securitizes a given military, political, economic, social, cultural, ecological, or religious issue always has the choice of avoiding ‘securitization through communicative action’: a choice that is distinct from the securitizing speech act; keeping the issue at hand in the regular sphere of regular politics. I argue here that no such choice presented itself for Kurdish political decision makers and (the overwhelming majority of) able bodied men and women in the late summer days of 2014. Although there existed some ethnic Kurdish supporters of ISIS both within Erbil and around it; they acted against the overwhelming majority of their identity community’s mainstream opinion. The key to understanding here is familiarity with the track record of ISIS prior to August 2014.

ISIS ideologically is an offshoot of the *Wahabiyya* (House of Commons Library 2015), where the Shia, Sufis, or secular Muslims are not considered Muslims at all, and where *dhimmis* (Jews, Christians, Zoroastrians) are not protected and their rites and places of worship not tolerated (Cockburn 2015). To this ISIS added a cult of martyrdom, which is actually Shia in origin (Hezbollah, early 1980s) (!). ISIS uses suicide bombers in battle, a tactical innovation. In fact many ISIS fighters “went to Iraq and Syria with the express intention of becoming martyrs.” (Cockburn 2015). Not only ‘polytheists’ (Christians) were assaulted and forced to flee ISIS’s advances,
but so were Yazidis (Zoroastrians in origin) in early August 2014 (Cockburn 2015). Moderate Sunni (who are called ‘apostates’ in ISIS parlance) are also deemed enemies and moderate Sunni villages were destroyed to the ground. ISIS fighters are, and were, prior to the seizure of Mosul, “experts in fear.” (Cockburn 2015).

From 2005 to 2009, Abu Bakr Al Baghdadi, was the future “caliph” of ISIS, was a prisoner of the Americans, for taking part in the Sunni uprising (Cockburn 2015). He became, in the summer of 2010, the leader of al-Qaeda in Iraq (Cockburn 2015). When the Syrian Uprising destabilized the region from 2011, the ground was prepared for the appearance of an organization that put al-Qaeda to shame with its ferocity. ISIS in 2013 prepared an attack on the Abu Ghraib prison, and went on (in January 2014) to take over Falluja (another famous and symbolic spot). In March, it paraded through the city. Cockburn puts it thus: “Merciless in enforcing compliance with its own exclusive and sectarian variant of Islam, ISIS killed or forced to flee all whom it targeted as ‘apostates’ or ‘polytheists’ (…). Its leaders were the products of a decade of war in Iraq and Syria, and deliberate martyrdom through suicide bombings was a central and effective feature of their military tactics.” (Cockburn 2015).

When it comes to tactics and war materiel, ISIS proved both focused and lucky. ISIS became extremely well-armed. It captured Humvees from the Iraqi Army, and “ISIS members say they are always pleased when sophisticated weapons are sent to anti-Assad groups of any kind, because they can always get the arms off them by threat of force or cash payments.” (Cockburn 2015). Add to this the possibility of active help by private actors in Saudi Arabia, the UAE and other Gulf states.

As a result, in the battle of Mosul, on June 6, 2014, a 1300-strong force of ISIS won against a nominal 60,000-strong force including the Iraqi Army and the federal and local police – an almost incredible achievement from a tactical point of view (Cockburn 2015). Not even the above factors, nor the fact that by then, ISIS was “intoxicated by its own triumphs” (Cockburn 2015) could account for such a victory.

In fact, the key lies in the Sunni Arab popular reaction to ISIS and its advance. ISIS might have been tactically very apt (as in the case of diversions right before the battle of Mosul) (Cockburn 2015) but the key factor was that ISIS had had a continuous presence in the city since 2013, it was busy racketeering ever since then, and that it was viewed as a lesser evil by many Sunnis, when they compared them to Nuri al-Maliki’s Shia-dominated Iraqi Army, or the Shia militias. In fact, Cockburn asserts that “The fall of Mosul was the result of a popular uprising as well as a military assault.” (Cockburn 2015) as Army barracks were invaded by crowds of civilians even prior to the full takeover of the city by ISIS. Thus, we may see that ‘popular uprising,’ insurrection, and what I call in this paper ‘spontaneous securitization’ and ‘semi-spontaneous securitization,’ has been relevant not only to Kurdish community reactions to ISIS’s attack, but also to ISIS itself, and its relationship to its core identity community in Iraq (which is Sunni Arabs).

ISIS controlled territories exist in a space where nearly every aspect of life is subject to extreme interpretations of the Islamic religion, based originally on the Wahabiyya’s Salafism but reaching new lows in the dehumanization of women, non-Muslims, Sufis, Shias, etc. Whether it is forbidden to clap or for women to wear bras, smoke cigarettes (discouraged), watching football (that can get youngsters decapitated). In its West African affiliate Boko Haram, ISIS even subscribed to the “flat earth conspiracy.” Most of human knowledge, the past, culture, religion, customs, literature, music (banned under Taliban and also under ISIS) is securitized. ISIS held areas thus exist in a space where nearly everything is securitized, where there is no default sphere of “the political.” On 14th February, 2017, ISIS warned inhabitants of Mosul not to wear the color red because doing so would amount to celebrating Valentine’s Day (and as such, would bring on the perpetrator the death penalty) (!).

Utilizing to full extent, all possible modern means of social media, digital media, film, and PR, ISIS also makes a virtue of its callous brutality. (Besenyő & Prantner & Speidl & Vogel 2016) Its interpretation of who falls under the category of dhimmi in itself is extreme, but its observable practice on religious minorities is jizye as extortion, and punishment amounting to genocide. In both the Syrian and the Iraqi context, partly because of the secular movements that Kurds have actively supported (PKK, PYK, and partly PUK) and the Sufi orientation of its more conservative leaders (PDK), the Kurdish community has been labelled ‘kafir’ by al-Baghdadi, and treated accordingly.
Neither may we say that a given ‘speech act’ by President Barzani, Prime Minister Barzani, or Peshmerga generals and commanders, would have performed some kind of unitary, centralized, securitization in the manner of Waever, de Wilde and Buzan for volunteers who just drove to the frontline with their guns.

In *The Evolution of International Security Studies*, securitization is that which “frames an issue as a special kind of politics, or above politics” where existential threat is the key (Buzan & Hansen 2009). For the authors, “securitization is a self-referential practice” thus it is in practice “that the issue becomes a security issue” and the threat is not necessarily real in any sense. What “does” securitization is the securitizing discourse itself, which, together with the receptive reaction of the audience, acts as a combined self-referential practice (thus securitization is never completely enforced). It is predicated on the inter-subjectively perceived existential threat to a given identity community, territory, or values, thus starting any kind of emergency action. Security removes this emergency action from the realm of the political and negotiable. Security of course is clearly not the absence of threats in Buzan’s framework, but rather the act of pursuing such a state through a removal of (inter-subjectively perceived) existential threats. For Buzan, there is simply no possible case of an objective threat that requires no further explanation and herein lies a key aspect to his constructivism. I argue that this is an ahistorical view as it takes away the dynamic of not only the historicity of certain group conflicts (which is very relevant to the Kurdish – Sunni Arab relationship), historical experience of actors on the ground, chronological aspects (as just months before the ISIS advance on Erbil, Mosul was attacked with terrible efficiency, and showed startled populations the viciousness of its kind of rule). Thus Buzan simply ignores the possibility that given a certain existential threat, securitization may not need a securitizing speech act by enunciators or political actors (especially under the fluid conditions of the then rather unstable federal structure of Iraq), but communities, large and small kinship groups, individual actors (including expatriate Kurds and non-Kurds from as far as Canada) may see objectively, the nature of the existential threat to their survival or the survival of Iraqi Kurdish autonomy and decide to take security in their own hands, and join an attack on ISIS’s frontline with or without Peshmerga training, when their city is clearly in danger.

In *The Evolution of International Security Studies*, Buzan stresses that for ISS, the key referent object is the state, with its exclusive authority, clearly defined borders (as opposed to frontiers), sovereign, territorial, and secular. Even according to Buzan, it is very reasonable to challenge the state as the primary referent object of security when states are too weak or even failed to provide security (he singles out Somalia, Afghanistan, Haiti, and the Democratic Republic of the Congo). Iraq may or may not be considered a failed state or a state that is failing, but this is not the only reason why we may question whether the federal state, or even its Kurdistan Region, may be thought of as the key referent object of security. After all, it is *de rigueur* to distinguish between the official borders of the KRG administered area and its actual frontiers (which are less easily defined - the famous article 140 of the Iraqi Constitution is a case in the point); authority is shared between parties on a regional (intra-KRG) basis, full sovereignty has not been achieved, the principle of territoriality is not always stronger than ethnic ties and concepts of protection; and lastly, while the Kurdistan Region chooses not to implement most of Baghdad’s *sharia* inspired legislation, the Iraqi constitution is explicitly *not* secular (it posits Iraq as an Islamic state).

I claim that although in the case of the ISIS attack on Iraqi Kurdistan and Erbil Governorate in August/September 2014, the referent object of security was only very partially the state or its federal constituent the KRG. Rather, the referent object of security, and the entire focus of securitization went deeper and further than usual securitization (which is in itself, by definition, extraordinary as it moves action out of the sphere of the political), in this case reaching individuals, small groups, traditional clan and kinship structures within the ethnic Kurdish relative majority and within minority communities of ‘protected’ Christians, and Yezidis. As securitization reached the individual, the family and the clan as its referent object, it also acted in a way that is different in some ways from notions that Buzan and Waever posit as general. On p. 34, in *The Evolution of Security Studies*, Buzan writes that “The process through which threats are identified and given meaning is better understood through an analysis of identity building and institutional transformation that does not lend itself to causality or quantification.” (Buzan & Hansen 2009). While it is easy to agree with him that quantification would be the wrong approach when it comes to securitization, and that the process through which threats are identified and given meaning is better understood through an analysis of identity building,” in the given case the transformation is only partially institutional; and we must take into account a less-than-
centralized way of securitization, really the devolution of securitization down to the individual, what amounted really, to semi-spontaneous securitization (semi-spontaneous because attempts at coordinating it, in this case, were actually still made). Whilst more traditional securitizing processes were obviously happening (chains of command, originating in the top KRG leadership) through uttering words of securitization, identified threats and performed the Buzanian/Waeverian speech act, the sheer threat to individuals, the chronological connection which lent individuals the knowledge of how ISIS treated its perceived enemies prior to its attack on Erbil, and knowledge of atrocities happening simultaneously with Erbil (especially in Kobani, Northern Syria), pushed individuals to securitize their own (and their families’) individual survival, and decided to (with or without any training from Peshmerga commanders) grab their family held assault rifles and take off by private vehicle to the war frontier to confront ISIS; whereby securitizing their own bodies and often lives.

The military efficacy of such securitization is, and has historically been, not clear. Insurrectio, “the insurrection of warriors” was part of the traditional ‘law of the land’ in places as varied as historical Hungary and semi-Ottoman vassal Kurdistan. Incorporating and sometimes newly training foreign fighters must have been a draw on Kurdish Peshmerga resources, and this could have contributed to the (apparently) incomplete incorporation of volunteers within Peshmerga units. However, contrary to Buzan’s framework, this instance of insurrection, where the state lost (some of) its monopoly on being a referent object of security, did still not bring into operation any kind of Hobbesian situation. On the contrary, the historically informed nature of insurrection in Kurdish society provided an example of how traditional structures may contribute to centrally coordinated action. What might have been lost in military efficacy may be gained as heroic example and role model action for Kurdistan.

We may say that in the case of Kurdish action against ISIS in 2014, the extraordinary procedures of securitization themselves were superseded by individual and small group-action that was akin to certain historical forms of insurrection. Forces that were not Peshmerga members, could not possibly be ‘instrumentalized’ in neat and organized processes of even a clan based military force but were acting in a way in which individuals made choices that amounted to (a very high probability of) voluntary self-sacrifice.

On a general level, this paper intends to prove also that Buzan’s constructivist concept of securitization, while it devotes a lot of attention to competing notions of group self-definitions, actually ignores the problématique that is presented by the imminence, fact, or credible threat of actual physical annihilation of bodies of humans, whose groups are at liberty to at all self-define as individuals or collectives. The paper introduced the concepts of spontaneous and semi-spontaneous securitization, where the referent object of securitization is not the Western liberal democratic nation state or even the Kurdistan Region as a federal entity of Iraq but the more traditionally defined community and its members (individuals who are members of that community), plus religiously or ethnically defined groups that were under the protection of the (regionally) dominant identity community. Semi-spontaneous (civilian) insurrection, coordinated or not by Peshmerga commanders on the ground, is a historically relevant phenomenon in the Kurdish case, which (luckily for the region and for all adversaries of ISIS) played out to beneficial effect in protecting Erbil Governorate from an ISIS attack in the second half of 2014; and to the same (uncontestedly beneficial) effect when in late 2016, ISIS demonstrated its ability to strike in Kirkuk. Negative examples of insurrection included the attacks on the barracks in Mosul by Sunni Arabs prior to its full takeover by ISIS. Insurrection, that old “feudal” “insurrectio,” is thus not the ‘war of all against all’: on the contrary, it is a living, albeit historical, form of fighting wars with some relevance in today’s Middle East.

5. Insurrectio within and near the Ottoman sphere

As demonstrated by Ottomanist scholarship since the 1970s, uprisings and local insurrections were as inherent in the very modus operandi of the Ottoman state as the millet system (Inalcik 1973; Howard 2017), not only in the principalities and other peripheral regions but also in the Anatolian core. Although the Ottoman Kurdish political situation has been likened to the millet system, it was in fact different as Kurdish kings and rulers were not devsirme officials but held their positions in hereditary, some may say feudal, fashion (Ottomans relied mostly on local and hereditary rulers in Kurdistan) (McDowall 1996). The prerogative of the “free warrior” has oft been insurrection. An example of this on the North-Eastern periphery of the Empire was the case of historical Hungary (extant in exile in the Pressburg centred Kingdom of Hungary but a state, the majority
of which fell as *vilayets* under the core empire, while other parts such as Transylvania functioned as vassal principalities to the Porte); the refugee nobles of the North kept the legal framework of “insurrectio” as a right and privilege (Agoston 1992).

Kurdish insurrections of the Ottoman centuries have maintained a less legalistic, albeit as relevant standing as their Hungarian counterparts’. Technically, it might ostensibly be safer to refer to tribalism in the Kurdish case (with the addition of *aghas* and *shaiks*) than to feudalism (as in the case of the Jaf) (McDowall 1996). As McDowall points out, this in itself is not unproblematic as his classic passage demonstrates:

“The difficulty in discussing Kurdish tribal culture is that tribes are not easy to define since their size, structure and internal organization can vary from place to place and from epoch to epoch. The imprecision implicit in the term ‘tribe’ is evident from the various words used by Kurds in different parts of Kurdistan, drawn from Arabic, Persian and Turkish, as well as Kurdish, to denote a tribal group: *il, ashira, qabila, taifa, tira, oba, hawz* and so forth. (…) Very broadly, these terms range from tribal confederation down to clan, sept or section, and to a tented encampment of probably about twenty tents. The actual form taken by a tribal group may depend upon internal factors, such as the personality of its leaders, economic or kin relations with tribal or non-tribal neighbors, and upon external factors“ (McDowall 1996).

McDowall follows in his classic discussion of issues of Kurdish ethnicity and social organization thus: “Other peasant Kurds had no connection with tribes, (…) they lived in conditions of direct landlord-peasant relations (…). Landlords often controlled the essential of life: land, water, livestock and equipment, seed, and labour itself, a situation still true in parts of Kurdistan in the end of the 1970s. Peasants were often unable to move at will. As recently as the 1960s an Iranian Kurdish peasant had to obtain permission from the landlord or his agent to leave the village.” (McDowall 1996).

6. Feudalism: a contested social formation, and its relevance for past insurrections

Although the term ‘feudalism’ became a point of contention between Stalin himself and what he termed ‘Marxist heterodoxies’ in the 1920s-1930s, and any mention of ‘feudalism outside Europe’ tended to carry a Stalinist connotation since the 1960s-1970s when champions of the “Asiatic mode of production” successfully made this an article of faith for the de-Stalinization of historiography and history in both the Western academe and in Eastern Europe. Such an influence of politics over theory could be as limiting for historical analysis as Stalinism itself however (Sawer 1977/2013; Dunn 2012). Although Stalin was obviously guilty of millions of crimes, and administratively ordering the “correct” interpretation of Marxian social formations was definitely one of them, our analysis should not carry on, however unintentionally, this kind of limitation within or without the confines of Marxist analysis. The notion that feudal social organization could and did happen outside Europe is not in any way more Stalinist than insisting that language has an aspect that transcends class (a view that Stalin also chose to sponsor). McDowall avoids using the term *feudalism* in his generalized introduction but makes us understand nonetheless that if we want to utilize the concept of tribe with any descriptive power, then we may do the same with the concept of feudalism. If we stick to the structuralist notion that a warrior whose livelihood and military role are both supported by his peasants, we arrive at the concept of feudal relationships even when it comes to the concept of insurrection (*as separate from a peasant uprising*) (Mayer 2018). A separate but comparable group of people were “the warrior class, living by fighting in time of war and by stockbreeding in peace.” (McDowall 1996). Later when discussing the system that was formed after the battle of Chaldiran, McDowall openly (and bravely) endorses the idea that by setting up hereditary *amirates* in Kurdistan, Ottomans “created a quasi-feudal system,” (McDowall 1996) in which “the ruling class lived in the saddle.” (…) “The governing principle underlying all arrangements was that where Kurdish tribes maintained good order, provided troops when necessary, and defended the border regions (…), they would be allowed a measure of freedom enjoyed virtually nowhere else in the empire.” (McDowall 1996). Of course, David McDowall CBE, a recipient of the Most Excellent Order of the British Empire and a historian, may worry about using the term ‘feudalism’ less than most academics whose leftist leanings might make them vulnerable to inter-Marxian ideological attack (Mayer 2018).
The concept of feudalism is not analytically salient in most major works on Kurdish history and politics in an explicit way. Denise Natali in *The Kurdish Quasi-State* speaks of the “culture of dependency,” and explains especially the financial aspect of traditional societies thus: “The Kurdish cash-bazaar economy still had no banking system to finance economic projects or supply loans (…). Many depended upon the traditional *hawllana* system for loans for loans or turned to leading families or the parties as sources of financing, reinforcing the role of *wasta* in determining the allocation and distribution of resources” (Natali 2010) – pretty much describing the status of towns under feudalism in general. David Romano in *The Kurdish Nationalist Movement: Opportunity, Mobilization, and Identity* makes use of the concept of ‘tribal identity’ and nascent nationalism but does not discuss feudalism (Romano 2016). Neither does Michael M. Gunther in his *Historical Dictionary of the Kurds* (Gunther 2014). Mohammed M. A. Ahmed, in *Iraqi Kurds and Nation Building*, focuses on the role of the family in his chapter on Kurdish leadership style (Mohamed Ahmed 2012). A courageous exception to analytical disengagement with the problematique of feudalism in Kurdish history is found (apart from McDowall’s synthesis) in Ofra Bengio’s edited volume *Kurdish Awakening: Nation Building in a Fragmented Homeland*, where contrary to contributors such as Eli Amirilyo (who only mention tribalism and nationalism) (Amirilyo 2014), Michael Eppel, when discussing Shaikh Ubaydullah, explains that the latter’s “motivations were traditional, tribal, and feudal,” (Eppel 2014) and talks of “tribal-feudal Kurdish dynasties.” (Eppel 2014). When discussing the dissolution the Kurdish emirates (amirates) in the 18th century, he concludes thus: “The vacuum resulting from the elimination of the emirates created conditions for strengthening of tribal and clannish solidarities and for raising the status of Sufi shayks (…) and the last remnants of a clannish-tribal aristocracy.” (Eppel 2014). What we see in Eppel is thus the strengthening of feudal relations with the disappearance of the larger amirs and amirates.

Although already from the battle of Chaldiran onwards, we see a relative lull in the intensity of Kurdish insurrections, from the early 19th century up to (arguably) this very day (2017), we are witnessing all the more of them in most formerly Ottoman regions of Kurdistan. Already in the 18th century, *derebeys* (valley lords) turned their fiefdoms hereditary (McDowall 1996), and in the early 19th century, the central government could not avoid recognizing formally that the Sultan shared “his once absolute power with local potentates, among them the Kurdish chiefs, who derived their power from local sources.” (McDowall 1996). With Mahmud II, the Empire went on a counteroffensive, deposing *derebeys* and trying to eliminate the Kurdish hereditary kingdoms (*amirates*). First fell Mir Muhammad (McDowall 1996), then Badr Khan Beg (McDowall 1996), until certain Sufi *tariqas* rose to prominence due especially to the protection that they offered to former oppressed members of kinship structures, religious and spiritual credibility, and conflict resolution skills (such as the Barzanis) (McDowall 1996). With Shaikh Ubaid Alla of Nihri, such insurrections acquired a distinct Kurdish national and nationalist character in the 1880s, which they maintained ever since, as in the case of the Barzani Uprising (1908). The freedom associated with traditional uprisings and insurrections may cause rifts and can hinder unified action in any given historical epoch. Indeed, as McDowall puts it, “lack of coordination remained the Kurds’ Achilles heel.” (McDowall 1996). Historical notions such as insurrection, naturally, do not remain intact in ethnic or national communities in the vein of psychic residue or some kind of historical ballast (Mayer 2016). They remain and are maintained exactly as social forces necessitate them. The concept of the individual family clan, close kinship community to still feel responsible for the immediate security of a given family in most parts of Kurdistan, is a phenomenon that was kept alive by the historical challenges of Sykes-Picot, Sevres and Lausanne, the Kurdish Republic in Mahabad (McDowall 1996), the Barzanji and the Barzani Revolts, the Halabja genocide and the wider Baathist administered genocide against Kurds, the civil wars of the 1990s, and today’s fight against ISIS, intermittently the PKK, and occasionally the Popular Mobilization units (Shia militias) that gathered around Mosul together with Kurdish Peshmerga in 2016-2017.

**Conclusions**

I thus argue that concepts such as historical experience (broadly understood), and on-going traditions of independent insurrection (that sees the young and married men of a family as warriors, especially in “tribal” rural areas but also in Kirkuk and even in “de-tribalized” Erbil), is relevant in situations of war, influencing even outcomes of wars occasionally in the region. Hence I talk about the historical nature of the stricter and more state-centric take on the concept of securitization and I offer a solution in the form of “semi-spontaneous securitization” in cases where the liberal democratic nation state does not exist and where more traditional
forms of securitization result in not Hobbesian “state of nature” but on the contrary, a relatively lower level of threat for all. This is not in any way to label any social phenomenon, including the phenomenon of insurrectio or semi-spontaneous securitization, somehow pre-modern. On the contrary: it is to remedy the ahistorical shortcomings of the mainstream theory. Modernity itself, as post-colonialist thinkers such as Ramon Grosfoguel and Tejumola Olaniyan remind us, is inclusive not only of the widely defined centers of the world economy (and the political and economic structures reigning therein) but also the periphery (Grosfoguel 2011; Olaniyan 1993). If one feels that historically extant phenomena serve us well when understanding a current political, economic and social phenomenon, it is not in order to deny the modernity of the latter, but indeed to shed light on a segment of the modern, global present.

A related and indeed, relevant blind spot in Buzan, Waever and de Wilde, is the somewhat glib and nonchalant way they include immigration as something that may easily and “legitimately” be securitized where the referent object of securitization is the ethnic self-definition, social cohesion, religion, or a particular concept of the nation (Buzan & Waever & de Wilde 1998). “Societal security concerns the sustainability, within acceptable conditions for evolution, of traditional patterns of language, culture, religions and national identity and custom,” the authors start the discussion (Buzan & Waever & de Wilde 1998). “In the societal sector, the analyst looks at the systems in terms of patterns of identity and the desire to maintain cultural independence,” follows the point from the vantage point of the analyst (Buzan & Waever & de Wilde 1998).

In the end, rather startlingly:
“In the societal sector, as we have defined it, the referent object is large scale collective identities that can function independent of the state, such as nations and religions. Given the peculiar nature of this type of referent object, it is extremely difficult to establish hard boundaries that differentiate existential from lesser threats. Collective identities naturally evolve and change in response to internal and external developments. Such changes may be seen as invasive and heretical and their sources pointed to as existential threats, or they may be accepted as part of the evolution of identity. Given the conservative nature of “identity”, it is always possible to paint challenges and threats to identity, because “we will no longer be us,” no longer the way we were or the way we ought to be to be true to our “identity”. Thus, whether migrants or rival identities are securitized depends upon whether the holders of the collective identity take a relatively closed-minded or a relatively open minded view of how their identity is constituted and maintained. The abilities to maintain and reproduce a language, a set of behavioral customs, or a conception of ethnic purity can all be cast in terms of survival.” (Buzan & Waever & de Wilde 1998).

Unfortunately, when Buzan carries constructivist notions of securitization and the concept of the non-participant observer this far, we are confronted with a framework of theory that becomes deeply problematic. After all, there is no statement in the above passage that alludes to normative issues or the question of morality. In fact, as all is in the eye of the beholder, or more aptly, in the mind of the securitizing actor (enunciator) and his wider social audience that enables him to perform the security speech act, the securitizing actor may legitimately become a Hitler, a Stalin, a Tojo, or a Milosevic and the analyst does not blink an eye. A “relatively closed-minded” electorate according to Buzan may compel or enable the actor to legitimately seal off borders or mercilessly let immigrants die at sea, or an inter-subjective perception of threat and securitizing move may well include gas chambers. There have been historians, such as Ernst Nolte, who argued seriously that Jews in the Third Reich were a fifth column and thus each and every securitizing speech act and course of action against them must logically have been in order, including but not limited to genocide.

Let us deconstruct Buzan’s take in terms of its language. When Buzan simultaneously claims that “Collective identities naturally evolve and change in response to internal and external developments” (Buzan & Waever & de Wilde 1998) and also that “such changes may be seen as invasive and heretical and their sources pointed to as existential threats,” he seems to defy logic. If “collective identities naturally evolve and change in response to internal and external developments” (italicization by A.M.) then the idea that exactly the same changes can be seen as invasive means that what was natural is now invasive: these two adjectives contradict each other. In fact, Buzan here seems to switch the vantage point of the analysis in between the two statements and what he, the external observer deems natural, seems or appears invasive for the participant. However, in a constructivist
analysis, we should not see “God’s eye’s view” type statements such as this. When Buzan’s text deems a change natural, he must mean this inter-subjectively, notably representing and including the view of the affected parties: in any other case he is nothing but a positivist thinker. However, if an affected party considers a change invasive, she cannot, by definition, look at the same phenomenon as natural. It is here that one is drawn to believe Buzan could have mentioned how electorates are manipulated by populist political actors who intend to twist and corrupt the views of their political constituencies and turn them to ethnicist, exclusivist solutions. I definitely consider Buzan’s omission of the misuses of identity centered discourse here significant.

Mercifully, Buzan later chose not include a discussion of immigration as a legitimate referent object of securitization. In his 2009 grand re-evaluation of the sub-discipline that he had launched, he skips any discussion on the subject (Busan & Hansen 2009). This is an especially welcome development when it comes to applying theory to our case study of ISIS and the Kurds. ISIS has a uniquely exclusivist conception of who should constitute the ummah, and thus how and when migration and immigration should be securitized. The forced emigration of Christians and others (even with the choice of an exorbitant, unsustainable jizye) from under ISIS rule could be looked at as an example of unfortunate but legitimate securitization if we took Buzan’s conception of societal security at face value. It would also be extremely bizarre to discuss this in relation to an ethnic and national group, the Kurds that suffered chemical gas attacks during Saddam Hussein’s Anfal campaign in the late 1980s. Thirdly, when it comes to the situation of ‘societal security’ as Buzan presents it, the treatment of IDPs from Mosul and its environs, would be affected in a terrible way, were the leadership of the Kurdistan Regional Government to consider Buzan’s inhuman option of societal exclusion even a possibility.

This will affect the way how the crucial Article 140 of Iraq’s Constitution, concerning the status of Kirkuk Governorate and other adjacent territories, would in future be carried out. As the relatively early stage of Saddam Hussein’s Anfal campaign, the Governorate of Kirkuk and also of Mosul were forcibly Arabized in their ethnic composition from the 1970s onwards, up to 1991. Article 140 stipulates that referenda should be held on the eventual status of these regions (Bartu 2010) but that the Arabization moves of the Anfal campaign and its human rights effects on the original Kurdish population should also be remedied and addressed before such referenda and appropriate censuses are organized. Naturally, along with the question of IDPs and their immediate needs, the issues connected with Article 140 (along with the international community, NGOs, intergovernmental organization, the human rights community, and even philosophical and mainstream religious conceptions of compassion and humanity) all urge the KRG to exercise self-restraint and in the face of IDP screening challenges and legal obstacles, when dealing with Sunni Arab and Shia Arab immigration and presence in KRG administered areas. Arguably, the livelihoods of many people, along with prospects for “deep conflict resolution” will depend on how the KRG manages to balance these considerations. A precondition of this is that the political leadership should not consider Buzan’s glibly termed “relatively closed-minded option” a possibility.

It is only prudent to note here that I am not the first to comment critically and point out dangerous ideatic liaisons between dubious ideology and Buzan’s theoretical framework. In “Inhuman Security”, Mark Neocleous uncovers a number of ways in which Buzanian constructivism is heavily indebted to Carl Schmitt. The ISS speech act’s enunciator according to Neocleous is similar to Schmitt’s famous ‘sovereign’ who decides on the exception and tells friend from foe (Neocleous 2011). It would be difficult to debate Neocleous’s criticism especially given the author’s sensitivity to the possible dangers inherent in marshaling security for the purpose of new and virulent versions of exclusion today in Europe and elsewhere. Through the above analysis, I also see an opportunity for historical methods to temper the potentially dangerous aspects of constructivist security theory in Iraq as well as in Europe. Other than this, I propose a rethinking of Buzanian concepts of securitization in general, especially in African, MENA, and West Asian contexts. Isurrectio and spontaneous and semi-spontaneous securitization has arguably been relevant to places as diverse as Western Sahara, the larger Sahel, Sudan, the Horn of Africa, Transylvania, historical Hungary, Kurdistan, and Arabia. Spontaneous taking up of arms without a clear enunciation that defines the Buzanian understanding of threat ends up diluting the philosophical generalization that defines Buzanian universal categories. Buzan’s enunciator and speech act are thus relevant in unitary, modern nation states with borders and centralized armies. But as since the 1990s, many locales in the world are becoming less and less easily territorially defined and less strictly unified in the
organizational sense, it is time to on the one hand conduct extensive studies of the cases of insurrection as opposed to the Buzanian speech act from Western Sahara to Somalia historically and today, and on the other hand, expand and deconstruct Buzanian logic as more suited to only some situations as opposed to being a universally valid “God’s eye view” type Western kind of theory. This way we allow Buzanian frameworks to operate in a more truthful and more relevant manner with cases where they really are applicable.

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EV ALUATION OF THE ENERGY SECURITY AS A COMPONENT OF NATIONAL SECURITY OF THE COUNTRY

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Abstract. The methodical approach to the integrated evaluation of the energy independence of the country and its regions has been improved based on the multidimensional mean, which includes the selection of statistical indicators, the choice of the base of their normalization, the use of the analytic hierarchy process for evaluation of weighting coefficients and the method of aggregation of indicators in the integrated evaluation of energy independence. Using the coverage ratio of consumption with the production of fuel and energy resources, the state of energy dependence has been analyzed for some world countries, which have successes in conducting the energy policy and experience of which should be implemented in the national strategy for the development of the energy complex. The calculation of integral indicators of energy independence for each region will make it possible to determine the “strong” and “weak” regions in the energy sector, identify the reasons of lagging of the most “energy-dependent” areas, and develop appropriate recommendations for improving energy independence for each region.

Keywords: national security, energy independence, energy complex, energy intensity of production, energy security, integrated evaluation


JEL Classifications: F52, O39

1. Introduction

The most important conditions for the stable and proportional development of the state are solving problems of energy intensity of production and energy supply of the economy, the failure to fulfil which is a threat to economic and national security.

The success of a policy of energy efficiency depends on scientifically based economical and statistical analysis, forecasting and optimization of the state’s energy balance. The fuel and energy complex, its state, opportunities and prospects of development, the effectiveness of the state energy policy significantly affect the economic situation in the country and the conditions for its sustainable development.

The general processes of integration of the country’s economy and energetics into world and European structures considerably increase the requirements for ensuring its energy security and energy independence. Therefore, the factor of energy independence as a country’s ability to independently formulate and implement a policy independent from external and internal interference and pressure becomes of particular importance as one of the main elements of ensuring energy, economic and national security, economic and political independence.
The problem of achieving energy independence is one of the main tasks of many countries of the world. The development and optimal functioning of the fuel and energy complex of the state is one of the main factors in ensuring the effective functioning of the economy and meeting the social needs of the population, which determines the relevance of this topic.

The problems of ensuring national security and its main components such as economic and energy securities are the subject of research in the works of scientists of various fields of knowledge: economists and political experts, specialists in energy production and lawyers, military and public administration specialists.

The energy security has an integral nature and is a complex category, on which the normal functioning and development of the state and society depend. It includes the following components:

1) energy supply (economic component);
2) social stability;
3) ecological suitability (ecological component);
4) energy independence (political and economic component).

Energy supply (economic component) characterizes the state of fuel and energy supply of the national economy and population. This condition depends on the adequacy, reliability, quality of deliveries, as well as on the efficiency of energy production and energy consumption. Social instability characterizes the social tensions in a country related to energy supply. Ecological suitability is characterized by the state of pollution of the environment by the objects of energy production and transport of energy carriers (oil and gas pipelines) and the possibility of reimbursement of the ecological and economic damage caused to the environment.

2. Literature Survey

According to the author’s content analysis, it is stated that an effective energy policy should cover:

– development and implementation of a transparent and effective legal and regulatory framework for the functioning of all energy sectors, which envisages regulation, coordination and control over the activities of state energy systems, nuclear power and natural monopolies (Aitzhan, N. Z., & Svetinovic, D. (2018));
– creation of economic conditions for energy supply to domestic and foreign markets (Biresselioglu, M. E., Yelkenci, T., Ozyorulmaz, E., & Yumurtaci, I. Ö. (2017));

– effective management of strategic reserves of energy resources, which includes: diversification of energy resources supply, prevention of inefficient use of energy resources, harmonization of the rates of consumption of exhaustible resources with the rates of development of renewable energy resources, increase of the part of atomic power industry and hydropower in the overall balance of FER, quality control and ecological safety of mineral deposits for compliance with the requirements of the legislation and international standards (Bakhtiyari, Z., Yazdanpanah, M., Forouzani, M., & Kazemi, N. (2017); Rogalev, A., Komarov, I., Kindra, V., Zlyvk, O. (2018); Smaliukiene, R.; Monni, S. (2019));

– implementation of investment policy in the national energy sector, which envisages modernization of the outdated technological base of the fuel and energy complex, expansion of the infrastructure of scientific, engineering and technical support and maintenance of complex equipment of the power industry (García-Gusano, D., Iribarren, D., & Garrain, D. (2017));

– establishment of technical regulations and the development of standards and targets for the safety and efficiency of the operation of power facilities and installations, as well as the development of a mechanism for state supervision of their compliance (Kirshner, J. (2018)).

Industry is driven by energy production, which provides vital functions of the state, as well as guarantees its security and independence. Energy production is a vital component of the world economy. In the world economy there is an active process of rising cost of energy resources (oil, gas, coal). This is primarily due to the sharp increase in the consumption of hydrocarbon energy by industrialized countries such as the USA, Japan, Germany, as well as the significant development of the economy of China, India and other countries of the world. All this in aggregate determines the search for energy-saving technology and technology in the world economy.
3. Methods

The modern theory of the development of the world economy states that the role and international situation of the countries of the world is determined not only by the availability of natural resources (oil, gas), but also intellectual potential, the ability to implement innovative advances in scientific and technological progress.

Statistical analysis of data, including the energy sector, becomes an integral attribute of the management system at all its levels - from a small firm to a national economy as a whole. Statistical models are used to diagnose the state of objects of management, in studying the causal mechanism of the formation of variation and dynamics of socio-economic phenomena and processes, in monitoring economic conditions, in forecasting and optimal managerial decision making (Gil’orme, T., Ryzhyk, Y., & Yaresko, A. (2016); Pająk, K., Kvilinskyi, O., Fasiecka, O., Miśkiewicz, R. (2017)).

Growth curves describing the regularities of development of the phenomenon are obtained by analytical alignment of time series. Alignment of time series with the help of some or other functions in most cases is a convenient approach of describing empirical data, characterizing the development of the phenomenon in time. The obtained models, taking into account a number of conditions, can be applied for prediction purposes.

The process of alignment of time series consists of two main stages: the choice of the type of the curve, the shape of which corresponds to the nature of the change in time series or type of growth process; definition of numerical values (evaluation) of curve parameters. The found function allows one to get aligned or, as they are sometimes called, the theoretical values of levels of time series. This function is also used for extrapolation. The question of choosing the type of curve is fundamental when aligning time series. In all other equal conditions, the error in choosing the form of the growth curve in solving the problem is more significant in its consequences (especially for forecasting) than the error associated with the statistical evaluation of parameters (Augutis, J., Krikštolaitis, R., Martišauskas, L., Pečiulytė, S., & Žutautaitė, I. (2017)).

Adaptive methods of modelling and forecasting are based on maintaining the rigidity of development, but taking into account the factor of “outdated” data, in other words, the model is adapted with the help of special parameters to the conditions formed at each instant. They make it possible to construct self-regulating models which are able both to respond promptly to changing conditions and on this basis to make in the near future more accurate forecasts, taking into account the result of the forecast (or aligning) made in the previous step and the different informational value of the components of time series (Radovanović, M., Filipović, S., & Pavlović, D. (2017); Mazurkiewicz, J., Lis, P. (2015)).

The range of application of statistical methods in managerial activity is quite wide. This, first of all, concerns the preparation of information, its analysis, comparison with the relevant criteria, and on this basis, the identification of problems and ways of their solution on the basis of practical analysis. Statistical methods are used at the stage of implementation of managerial decisions, while monitoring their implementation and assessing the effectiveness of the results obtained (Glynn, J., Chiodi, A., & Gallachóir, B. Ó. (2017)).

Therefore, statistical provision of regulation of energy independence is to form an analytical basis for making managerial decisions that captures the efficiency of energy use, dependence on imports from other countries, estimates the dynamics and trends of energy consumption and production, predicts possible changes in future periods, and also estimates the potential for increasing energy independence of the country (Su, M., Zhang, M., Lu, W., Chang, X., Chen, B., Liu, G., ... & Zhang, Y. (2017)).

Objects to which the statistical provision of regulation of energy independence is directed are those phenomena and processes of the energy sector that require the implementation of transformations (Nakashydze, L., & Gil’orme, T. (2015); Lakhno, V., Malyukov, V., Bochulia, T., Hip ters, Z., Kvitinski, A. & Tomashevska, O. (2018)). Such phenomena and processes are the production and consumption of FER, FER imports, FER efficiency, FER structure, investment inflows into the energy sector, etc. The research of the objects of statistical regulation of energy independence in the complex will reveal the weaknesses and strengths of the national energy sector.
The statistical study of the energy independence of the country involves the use of the following statistical research methods:

- method of summarizing indicators (allows one to evaluate the efficiency of FER use in the economy, to identify the weaknesses of enterprises and organizations, which slow down the further development of the energy situation in the country, and to develop the necessary measures for their elimination) (Bompard, E., Carpignano, A., Erriquez, M., Grosso, D., Pession, M., & Profumo, F. (2017))
- analysis of time series – reveals the trends and dependencies of production and consumption of FER in the production of products and services, allowing one to understand the reasons of adverse events and to develop proper solutions (Cox, E. (2018)).

4. Results

The analysis of time series enables to model time series and calculate perspective evaluations of indicators. Among the classes of models, one should distinguish trend models (linear, parabolic, power, exponential, hyperbolic, logarithmic one), adaptive models (exponential smoothing, linear and parabolic Brown models, Hellwig method), autoregressive models (with lags of delay, the Box-Jenkins model and generalized linear time series models).

An element of development of statistical provision of regulation of energy independence of the country is the formation of research directions (Table 1).

Table 1. Research directions of energy independence of the country

<table>
<thead>
<tr>
<th>Research directions of energy independence</th>
<th>Statistical methods and models used for the analysis of energy independence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Macroeconomic analysis of the country’s energy dependence situation: - analysis of volumes and structure of production and consumption of energy resources, all and including for different types of resources; - analysis of the effectiveness of FER use in the country.</td>
<td>Method of aggregated analytical indicators of structure, series, comparison, intensity</td>
</tr>
<tr>
<td>Evaluation of energy independence level in the regions and analysis of series of the integral indicator in the whole country</td>
<td>Relative intensities, the method of multidimensional mean, the use of statistical methods groups</td>
</tr>
<tr>
<td>Evaluation of monopoly level in the market of energy services</td>
<td>Herfindahl-Hirschman index</td>
</tr>
<tr>
<td>Evaluation of interconnections of FER consumption with other socio-economic indicators</td>
<td>Methods of paired and multi-factor correlation and regression analysis</td>
</tr>
<tr>
<td>Prospective evaluation of the country’s energy independence level</td>
<td>Statistical methods and forecasting models: trend, adaptive, autoregression one</td>
</tr>
</tbody>
</table>

The proposed directions of the study of energy independence will allow one to comprehensively and qualitatively analyze the current state of the energy complex, identify certain regularities, trends, interconnections, provide predictive values of the key indicators of the energy sector, draw conclusions about the prospects of achieving energy independence of the country and develop effective recommendations for improvement of the situation.

Implementing an effective energy policy, attracting investment, developing alternative energy, optimizing the regulatory framework will contribute to the development of the energy sector of the country, which will reduce the volumes of energy borrowing from other countries, increase the efficiency of their use and, accordingly, achieve an acceptable level of energy independence of the country.

One of the main determinants of the sustainable functioning of the energy complex is the mismatch of FER consumption and production. In order to analysis the given determinants, a new indicator is proposed - the coverage ratio of FER consumption with the production.

If this ratio is more than 100%, this means the country can fully provide the population and the economy as a
whole in energy, while it will have savings in the form of FER, which can be sent for export. If the ratio is equal to 100%, this indicates a complete supply of energy to the country without the possibility of saving it. The ratio of less than 100% suggests the country’s need to import energy resources to meet the needs of the population and the economy.

The coverage ratio that is suitable for comparative analysis for some world countries is given in Table 2. For comparison, countries that have success in energy policy and whose experience needs to be implemented in the national energy development strategy are selected.

<table>
<thead>
<tr>
<th>Country</th>
<th>Coverage ratio, %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Russia</td>
<td>180.1 178.0 185.0 182.2 188.1 191.6 190.6</td>
</tr>
<tr>
<td>China</td>
<td>87.6 85.1 84.7 84.5 83.9 80.9 80.5</td>
</tr>
<tr>
<td>USA</td>
<td>81.5 84.4 86.1 90.8 82.3 88.3 91.7</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>74.9 75.5 70.8 71.1 68.9 67.3 65.9</td>
</tr>
<tr>
<td>Poland</td>
<td>67.6 73.2 72.9 71.8 71.6 69.2 61.6</td>
</tr>
<tr>
<td>Sweden</td>
<td>66.7 72.1 71.0 71.7 74.8 72.4 74.7</td>
</tr>
<tr>
<td>Germany</td>
<td>39.6 39.5 37.9 39.2 38.9 37.4 38.7</td>
</tr>
</tbody>
</table>

Among the represented countries, only the Russian Federation is able to fully provide its economy with energy resources (in 2017 the coverage ratio was 190.6%) and to export energy and energy resources to other countries. Today, Russia is the world’s largest exporter of FER, in particular, electricity, natural gas, and oil. At the same time, Germany has the worst coverage ratios of FER consumption with the production. In 2017, the FER consumption is covered by its own production only by 38.7%, which indicates the import dependence on energy resources from other countries.

Providing tools for regulating energy independence is a complex political, economic, socio-economic, and scientific problem that, for its solution, requires comprehensive research on a wide range of issues. One of these issues is to determine the quantitative characteristics of probable threats and determine their influence on the level of energy independence of the country.

As the characteristics of the level of energy independence in the regions, economic indicators that determine the potential for energy independence are used, among which the following are highlighted:

1) energy intensity of production (x1). FER energy intensity is a general macroeconomic indicator that characterizes the level of FER costs per unit of produced GRP, one of the fundamental characteristics of the energy efficiency of the economy as a region and the country as a whole (Valdés, J. (2018)).

2) export (x2), import (x3) of energy products and part of FER import in the total volume of import of goods (x4). Foreign FER trade is one of the main factors in the development of the energy complex. That is why these factors were included in the calculation of the integral indicator.

3) the analysis of the state and development of the energy sector by regions is impossible without determining FER consumption in each of them, since the level of energy efficiency of the region depends on the level of this indicator. Since the regions are characterized by different population size, which affects the level of FER consumption, for the purpose of comparability of the data in the work, the indicator of total FER consumption per capita (x5) is proposed.

4) the important role in the determination of integral indicator is the volume of sales of mineral industry and quarry development (x6). Mining and quarry development involves mining of minerals found naturally in the form of solid rock (coal and ore), in liquid (oil) and gaseous state (natural gas).
Table 3. Factors for integrated evaluation of the energy independence of the regions of the country

<table>
<thead>
<tr>
<th>Indicators of the energy sector</th>
<th>Indicator distribution depending on the influence on the level of energy independence of the region (incentive/disincentive)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy intensity of production</td>
<td>Disincentive</td>
</tr>
<tr>
<td>Export of mineral fuel, oil and products of its distillation</td>
<td>Incentive</td>
</tr>
<tr>
<td>Import of mineral fuel, oil and products of its distillation</td>
<td>Disincentive</td>
</tr>
<tr>
<td>Part of FER import in the total volume of import of goods</td>
<td>Disincentive</td>
</tr>
<tr>
<td>FER consumption per capita</td>
<td>Disincentive</td>
</tr>
<tr>
<td>Volume of sales of mineral industry and quarry development per capita</td>
<td>Incentive</td>
</tr>
</tbody>
</table>

In studying socio-economic phenomena at the macro level, one often uses groups, intervals of which are randomly constructed, therefore, based on the research results, the following groups were identified by the level of energy independence of the regions: up to 0.4000 - extremely low level of energy independence (problem regions); 0.4001-0.5500 - low level of energy independence; 0.5501-0.6000 - middle level (promising regions); more than 0.6001 - high level of energy independence (regions-leaders).

In line with the level of energy independence of the regions, appropriate measures are being taken to improve the state of the energy sector. The volume of FER consumption in the country is determined by a number of factors, among which the most significant is the dollar exchange rate, because it generates state expenditures on FER imported, which are not enough in the country to meet the needs of the economy and population; capital investments, since they characterize the technical level of production, the level of energy conservation and energy efficiency; the index of physical volume of GDP, since the amount of energy consumed depends on the volumes of social production; FER production, the amount of which depends on the level of savings in FER consumption. Therefore, the influence of these factors on FER consumption in the country is studied in the paper.

In the same way at the macro level we allocate such indicators of energy independence (Table 4).

Table 4. Indicators of energy independence

<table>
<thead>
<tr>
<th>Indicator</th>
<th>The influence on energy independence</th>
</tr>
</thead>
<tbody>
<tr>
<td>GDP per capita, USD / person</td>
<td>Incentive</td>
</tr>
<tr>
<td>Production of energy materials, thousands of tons</td>
<td>Incentive</td>
</tr>
<tr>
<td>Export of energy products, thousand USD</td>
<td>Incentive</td>
</tr>
<tr>
<td>Investments in fixed capital for type of economic activity “Electric power, gas, vapour, and conditioned air supply”, million USD</td>
<td>Incentive</td>
</tr>
<tr>
<td>The volume of industrial products sold as a type of economic activity “Electric power, gas, vapour, and conditioned air supply”, million USD</td>
<td>Incentive</td>
</tr>
<tr>
<td>Total FER consumption in the country, millions of tons of conventional fuel</td>
<td>Disincentive</td>
</tr>
<tr>
<td>Energy intensity of production, tons of conventional fuel /1000 USD</td>
<td>Disincentive</td>
</tr>
<tr>
<td>The level of FER import to GDP, %</td>
<td>Disincentive</td>
</tr>
<tr>
<td>Import of energy products, million USD</td>
<td>Disincentive</td>
</tr>
<tr>
<td>The degree of wear of fixed-capital assets by type of economic activity “Electric power, gas, vapour, and conditioned air supply”, %</td>
<td>Disincentive</td>
</tr>
<tr>
<td>Specific gravity of natural gas in the structure of FER consumption, %</td>
<td>Disincentive</td>
</tr>
</tbody>
</table>

The state and development of the level of energy independence of the country includes various socio-economic indicators, which cannot be uniquely evaluated, therefore, a multidimensional mean method is used for the comprehensive evaluation of energy independence. Multidimensional groups allow developing an integrated evaluation of such a complicated category as energy independence. It monitors the overall orientation of the country’s energy independence as a whole, enabling comprehensive research into the dynamics of energy...
development and the identification of factors that adversely affect energy independence and, accordingly, require managerial intervention from both the enterprises and the state as a whole to effectively implement the necessary measures; The multidimensional mean method also makes it possible to grade and group regions by the integral level of energy independence.

In order to improve the quality of the results of the study, the weight of each factor using the analytic hierarchy process (AHP) is calculated. The established evaluations were based on the next ratio scale (Table 5), proposed by Thomas L. Saaty, the AHP founder.

**Table 5. Ratio scale**

<table>
<thead>
<tr>
<th>Weight</th>
<th>Evaluation</th>
<th>Characteristics of advantages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Same weight</td>
<td>Equivalent value, that is, two judgments make the same contribution to the achievement of the goal</td>
</tr>
<tr>
<td>3</td>
<td>Some weight advantage of one judgment over another (weak weight)</td>
<td>There are insights in favour of the advantage of one judgment over another, but these insights are not sufficiently convincing</td>
</tr>
<tr>
<td>5</td>
<td>Considerable or significant weight</td>
<td>There are scientific data or logical judgments (or own feelings) about the advantage of one judgment over another</td>
</tr>
<tr>
<td>7</td>
<td>Obvious or very significant weight</td>
<td>Convincing advantage of one judgment over another</td>
</tr>
<tr>
<td>9</td>
<td>Absolute weight</td>
<td>Evidence or feeling in favour of the advantage of one judgment over another is most convincing</td>
</tr>
<tr>
<td>2, 4, 6, 8</td>
<td>Intermediate values between two adjacent judgments</td>
<td>A situation where a compromise solution is needed</td>
</tr>
<tr>
<td>Reverse values of reduced non-zero values</td>
<td>1/2, 1/3, ¼, etc. are assigned for symmetric (in relation to the diagonal) ratios</td>
<td>Significance of judgments are less significant of that compared to it</td>
</tr>
</tbody>
</table>

The complexity of calculating the integrated evaluation of energy independence of regions requires wide application of expert evaluations in the process of forming and choosing solutions. Expert evaluations as a way of obtaining information have always been used in decision making, since using information from experts in a particular industry is very useful.

The principle of method of expert evaluations is the rational organization by experts the analysis of the problem with the quantitative evaluation of judgments and the processing of their results. The general opinion of the expert group is taken as a solution to the problem. The probability of an expert group’s evaluation depends on the level of knowledge of individual experts and the number of members (Tetiana, H., Chorna M., Karpenko L., Milyavskiy M. & Drobyazko S. (2018)). With AHP, which allows one to make the right managerial decision, it is possible to select the most significant indicators of the integral indicator of energy independence. AHP is used to solve multicriteria problems under uncertainty. According to this method, the choice of priority solutions is carried out using pair comparisons. AHP is based on the principle of identity and decomposition, contains procedures for synthesizing multiple statements, obtaining priority criteria and finding alternative solutions (Tetiana, H., Karpenko, L., Fedoruk, O., Shevchenko, I., & Drobyazko, S. (2018); Karpenko, L., Serbov, M., Kwilinski, A., Makedon, V. & Drobyazko, S. (2018)).

5. Discussion

The country’s energy independence requires quantitative evaluation to ensure regulatory actions in this area of government activity. In order to do this, it is necessary to highlight the most significant both absolute and relative indicators, which evaluate the country’s energy independence. At the stage of formation of the attribute space, a priori qualitative analysis of the essence of the phenomenon plays a crucial role. When forming the information space it is important to ensure the unidirectional effect of the indicators on the phenomenon under consideration, so all factors are divided into 2 groups: incentives aimed at increasing energy independence, and the disincentives restrain it. Using logical analysis, indicators are selected that characterize energy independence.
Among the main energy saving and energy efficiency measures should be:

- **for the industry:** implementation of the regulation system of demand for energy for industrial enterprises with significant volumes of consumption; the establishment of the monitoring system, evaluating and reporting on energy consumption in industry and energy efficiency at the level of an individual company and industry; inclusion in state standards of equipment, materials and constructions, transport methods of indicators of energy efficiency; certification of fuel and energy consuming, energy saving and diagnostic equipment, materials, structures, vehicles, as well as energy resources; bringing normative documents in accordance with the requirements of reducing the energy intensity of material production.

- **for the population:** conducting energy audit of housing buildings and 100% installation of accounting facilities that will identify housing problems, formulate plans for energy efficiency measures, identify the cost and payback period; maximum reduction of heat losses (replacement of windows, insulation of walls and ceilings); strict compliance with existing rules and regulations for energy efficiency; the modernization of the heating system and the installation of automatic thermostats in heat supply points and/or batteries for multi-apartment buildings; installation of energy-efficient equipment and its rational use.

At the state level, policy priorities in the field of energy efficiency should be: implementation of a state expert assessment of the energy efficiency of project decisions; creation of a system of financial and economic mechanisms that will ensure the economic interest of producers and users in the efficient use of energy resources; continuation of the information campaign on energy saving, advanced domestic and foreign experience in this field.

The important factor for implementation of the proposed measures is improving legislation on energy efficiency, renewable energy sources and fuels. National documents in the energy sector regulate energy saving, energy efficiency and establish the respective competence of public authorities, giving them the necessary powers. Legislative and regulatory documents in the sphere of energy saving directly concern the issues of reducing the use of energy, practical opportunities for implementation of energy saving measures and mechanisms for their financing.

The development of energy production has a decisive influence on the economy in the state and the standard of living of the population. One of the most important components of welfare in civilized states is to provide citizens and companies with the necessary energy resources. The key to achieving this goal is to become a reliable, economically feasible and environmentally safe meeting the needs of the population and the economy in energy products.

In the modern world, the FER access and availability, the continuity of supply and the efficiency of their use largely determine the sustainability and pace of development of any country.

**Conclusions**

The current situation poses the issue of saving energy resources in one line with the key issues of the country’s economic security, and the implementation of energy saving measures at all levels of the economic mechanism is determined by the primary task. The timing and qualitative problem solving make the functioning and even survival of the entire country dependent on this task (e.g. Hilorme, T., Nazarenko Inna, Okulicz-Kozaryn, W., Getman, O. & Drobyazko, S. (2018); Mishenin, Y., Koblianska, I., Medvid, V., Maistrenko, Y. (2018)). The formation of plans and strategies of national development in the conditions of functioning of market relations involves the use of scientifically grounded forecasting of the main indicators that are crucial for the energy independence of the country. Therefore, it is advisable to analyse the dynamics of the main indicators that characterize energy saving and energy efficiency. Based on construction and calculation of statistical models of energy saving and energy efficiency, one has to evaluate possible scenarios of development.

Thus, technological and structural restructuring of the economy, social infrastructure, creation of economic, managerial and legal mechanisms of state policy of the energy efficiency remains strategic directions for
improving energy efficiency and implementation of energy potential. At the same time, the improvement of the regulatory framework for the effective use of energy resources should be preceded by other measures, expanding the motivational and incentive potential of legislation, in particular: implementation of energy-efficient technologies and equipment; stimulating the development of the domestic bioethanol and biodiesel market, encouraging enterprises using renewable energy sources; improvement of the mechanisms of state regulation and state control in the field of energy efficiency.

By implementing these directions of energy efficiency development, the qualitative and quantitative indicators will increase significantly, which will lead to the growth of economic indicators of the country and, accordingly, the achievement of an acceptable level of energy independence of the country.

Thus, the basic concepts of statistical provision of regulation of the country’s energy independence have been determined. It covers a set of sources of statistical information, a system of indicators of the energy complex, statistical research methods, the use of which allows for a systematic analysis of energy independence, to evaluate its effectiveness, to perform modelling and forecasting in the future, and to formulate managerial decisions, aimed at achieving an acceptable level of energy independence in the future.

The development of measures to counteract negative processes in the energy sector requires an appropriate statistical instrument for regulating energy independence, which will allow reaching a certain level of energy independence of the country and bring it to a new level of development. Statistical support is based on statistical methodology as a set of principles and methods of statistical research, the formation of a system of indicators on their basis, the justification of rules, approaches and methods for analyzing phenomena, and the development of forecasting models.

Based on the analysis of different approaches to the study of energy independence, its concept has been generalized, as well as the role of energy independence in ensuring the national security of the country. Energy independence as one of the components of energy security is a key place in the system of national security of the state, which requires a comprehensive theoretical and methodological justification for evaluation its level, taking into account interdependence and interaction with other indices and indicators of energy and economic security.

Energy independence of the state as a component of energy security is a complex socioeconomic category, characterized by a complex of statistical indicators, the level of state independence in conducting an energy policy that is able to withstand external and internal challenges through intensive measures of economic development without harming society and national production as a whole. The complex of statistical indicators of energy independence includes the efficiency of the FER use, the volume of attracted investments, the state of logistics, import dependence from other countries, the volume of FER production and consumption, etc.

The main indicators of the energy independence evaluation were determined: GDP per capita; production of energy materials; FER import and export; investments in fixed capital for type of economic activity “Electric power, gas, vapour, and conditioned air supply”; volume of industrial products sold by types of economic activity “Electric power, gas, vapour, and conditioned air supply”; total FER consumption in the country; energy intensity of production; the level of FER import to GDP; specific gravity of natural gas in the structure of FER consumption; the degree of wear of fixed-capital assets by types of economic activity “Electric power, gas, vapour, and conditioned air supply”.

Thus, the study allowed a comprehensive analysis of such a category as energy independence and to identify the weaknesses and potential for further development of the energy complex of the country. The analysis provided an opportunity to develop practical recommendations for improving energy independence, the implementation of which may bring the energy complex of the country to a qualitatively new level of development.
References


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SECURITY ASPECTS: PROTECTION OF PEOPLE IN CONNECTION WITH THE USE OF PERSONAL IDENTIFICATION NUMBERS

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Abstract. User identifiers for financial transactions are widely used for personal identification numbers (PINs). PIN numbers are deposited at ATMs, card payments at POS terminals and electronic banking services. Bank card (ATM) credit card fraud has dramatically increased over the last decade. When analyzing the most common attacks and the reasons for successful frauds, it is clear that the main problem is PIN authentication, which itself does not produce any security features (except for the use of stars). This means that security is based solely on user behaviour. Research has focused on areas where personal protection and security is most failing, and that’s where the user is carrying a PIN along with a credit card, whether he or she changed the PIN on the payment card, and whether the PIN does not specify the date or year of his birth.

Keywords: personal identification number, security, PIN, payment card, credit card fraud, ATM, electronic banking services


JEL Classifications: F5, F52, K42, K24

1. Introduction

Increasing possibilities of hardware and software, growing Internet speed and importance of wired and wireless data transfer, the emergence of big data and cloud computing services, take-over by smart phones of increasingly more human communication functions, and emerging of other functions important to people means that information technologies play an increasingly more important role in our lives (Štitilis et al. 2016; Štitilis et al. 2017; Fuschi, Tvaronavičienė 2014; Tvaronavičienė et al. 2016; Cseh Papp et al., 2018; Tvaronavičienė 2018a; 2018b; Limba, šiūlaskas 2018; Radu, 2018; Kovařová & Kulčár, 2017; Koraus, Kelemen 2018; Koraus et al. 2017; Koraus et al. 2018; Šišulák 2017; Benešová, Hušek 2019; Kazansky, Andrássy 2019).

When users enter a PIN, they are vulnerable to shoulder and key logging attacks. When entering PIN numbers using virtual keyboards, it is possible to mitigate attacks caused by piano playback but increases the risk of surfing on the shoulders. A series of resistive keyboards for the shoulder were designed. However, many of them offer inadequate security and are useless. They also require important user information, training, user memory and other PIN input devices. Since PIN security should not be made on the basis of unpleasant user experience, it is important to mention the risks that arise from the first PIN entry.

Today, security is very much essential for all kind of activities. Illegal activities are happening in every place today. Therefore, government and corporate sections are concentrating mainly on the security levels with their
every invention. In today’s technically advanced world, autonomous systems are gaining rapid popularity. Quantitative systematic risk assessment methods are preferred such as RM/RA CRAMM (Mullerova 2016, Mamojka, Mullerova 2016, Palková 2018) to be combined with crime forecast maps (Mullerova, Mamojka 2017). Systematic detection of UBO is dependent upon the development and introduction of new software based on scientific methods. As the social computer and automation has been increased and the ATM and credit card has been installed and spread out to simplify the financial activity, and the banking activity. However the crime related with financial organization has been increased in proportion to the ratio of spread out of automation and devices. Those crimes for the financial organization have been increased gradually from year 1999 to 2003, little bit decreased in 2004, and then increased again from year 2005 (Narmada, Priyadarsini, 2016). Payment cards represent a contemporary tool of cashless payment systems (Kocisova, Gavurova and Sopko 2018), which are commonly used to cover expenses and realize cash withdrawals.

An automated or automated ATM (ATM), also known as an automated ATM, is a computer telecommunication device. Nowadays many people use ATMs to select, deposit money, account information, recharge credit on mobile phones, and more. Therefore, not only personal protection and security but also security at the centre of ATM is important. These protection practices are designed to prevent users who have been attacked by foreigners during money withdrawals in particular by innovative ideas designed to improve security.

ATM card is a plastic card that contains a unique card number and security information such as expiration date. It has a 4 - digit PIN number for authentication. ATM card is inserted into the ATM machine enter the PIN number, machine identifies the customer and completes the transaction. CPU (Central Processing Unit), magnetic card, crypto - processor, a display device, function key buttons, record printer, and vault these devices used in ATM centre. Most ATMs are connected to an interbank network enabling people to withdraw and deposit money from machines not belonging to the bank where they have their account. This is a convenience, especially for people who are travelling: it is possible to make withdrawals in places where one’s bank has no branches, and even to withdraw local currency in a foreign country, often at a better exchange rate than would be available by changing cash. ATMs rely on Authorization of a Transaction by the card issuer or other authorizing institution via the communications network.

Transaction via an ATM payment card requires privacy to maintain personal protection and user safety. Privacy must be secured around the world. Therefore, in the idea of bringing privacy through the security level, an ATM security system has been developed, which mainly uses three divisions, such as IR sensors, a metal detector and a biometric sensor. Each unit has its own main role over the protection model. The IR sensor serves to enable one person at a time. Transaction is safer. A metal detector mounted on metal detection doors, knife, gun, etc. If a user is not educated or unconscious about an ATM, then the proposed work is given at that time the authorized person providing security protection only to help customers with a biometric fingerprint (Sako, Miyatake, 2004; Vlacseková, Mura 2017). People need to know about the ATM’s working condition without going to the ATM centre. It was linked to a global mobile communications system (GSM) an ATM network that provides all ATM information working conditions for payment card users (Hamad et al., 2006).

2. Theoretical background

Banks currently use sophisticated tools to track and detect fraud and fight against them at every stage of the buying process, even before they buy. Banking experts are constantly expanding and enhancing technology to take a step forward from fraudsters, so that once MasterCard identifies smartphone clips as its own, no one else can shop with client mobile credentials. Card payer cardholders are also able to make safer digital payments even through tokenisation - the process of exchanging a token card master account number.

The smart cards are equipped with an additional security element, which is embedded in the form of an inserted microchip, safely storing user data.

The service provider is assigned or the user selects the Personal Identification Number (IPIN) numbers that
contain 3 to 6 digits. PIN numbers are typically associated with different types of banking services. If a user completes a transaction, it is a requirement for users to enter their PIN assigned to their account. User numbers will be verified based on saved numbers. Sometimes a dynamically generated number called a one-time password (OTP) can be used as a PIN. Although PINs are simple and effective in securing accounts, they are prone to attacking the shoulder. When attacking the shoulder surf, the attacker follows the user authentication process and identifies the PIN number. Using virtual keyboard shortcuts makes it easier for an attacker to make keyboard entries on the screen. A security precaution to prevent this attack ensures that no one is entered before the PIN is entered. But in public places such as ATMs, cyber cafes, department stores, etc. It’s hard to push. Another option is to use OTP for transactions. However, additional costs and delays could arise. OTP attacks are also prevalent (Raddum et al. 2010).

In the case of a human arm attack, the attackers rely on their ability to observe and remember the details they have observed (De Angeli et al. 2005, Tari et al. 2006, Roth and Richter 2006; Hitka et al., 2017; Mura, Vláseková 2018; Mészáros, 2018; Zulova et al., 2018; Vláseková, Mura 2017). When entering a PIN on a virtual keyboard, a user clicks the numbers one at a time and gives enough opportunity for the observer to see individual digits reconstruct the entire PIN. So any security mechanism that prevents direct entry of numbers and increases the trouble of the attacker tracking the pin input to track the real number is enough to alleviate attacks on the shoulder. But when the attack on the shoulder is surfing with a recording device such as a mobile camera or malware that could record video activity on the screen, it is very difficult to defend (Wu 2014). This is because the attacker could view the recorded video several times and reproduce the PIN number in succession. There are many suggestions to limit recorded attacks on the shoulder. Such models are more complicated for implementation and follow-up for regular users.

Recognizing the potential for PIN attacks during the PIN process, many scientists have focused on developing new schemes to mitigate these attacks. A survey of many virtual keyboards takes place in (Kölsch and Turk 2002). Method (Wilfong 1999) requires that the user performs a math operation on each digit of his / her random number PIN provided by the authenticators. The result is entered by the user. At the end of the server, the same digits are repeated to get digits. Verified based on actual saved PINs. This approach requires users a certain level of competence to perform mathematical computations, and may lead to several erroneous inputs.

In the mobile environment, there is a high risk of the observing attacks which is the way to steal a password, because many people have a camera-equipped mobile phone and a miniature camera. The biometric authentication technology is one of the methods to solve this problem. However, some equipment does not have the device of biometric authentication. Moreover, some system requires PIN or password when failing in the biometric authentication. The PIN or password authentication is still used widely (Fujita, Hirakawa, 2008).

3. Research objective and methodology

The results of the conducted survey and its subsequent analysis are a contribution to the enhancement of knowledge and comprehension of the behaviour of payment card users from the point of view of their security. The study analyzes one of the basic security features of payment cards and is focused namely on PIN code and basic rules for its use. The survey as well as the selection of a representative sample was carried out as follows:

- Time horizon of the survey: 20/02/2018 - 20/07/18
- Representative sample: 1 012
- Number of questionnaires issued: 4 700
- Number of (completed) questionnaires collected: 3 288

The representative sample of 1,012 of fully-completed questionnaires was selected by random number generator from the total count of 3,288 to represent the SR population over the age of 18 in terms of gender, age, education, settlement categories, and regional breakdown.
The research file is represented by 5 age categories. Respondents aged 18-30, 31-40, 41-50, 51-60 and over 60 years. In the category from 18 to 30 years, there are 206 respondents, representing 20.22% of the research population. The second age category represented by age from 31 to 40 years is defined by 212 respondents, representing 20.80%. The third age category from 41 to 50 years contains 192 respondents, which is 18.84% in relative terms. The age category from 51 to 60 years is represented by 196 respondents (19.23%) and the age category over 61 years by 213 respondents (20.90%). The survey was attended by 540 men, representing 52.99% and 479 women representing 47.01%. As per geographical region, 134 respondents were from Prešov region (13.15%), 140 respondents from Košice region (13.74%), 117 respondents from Banská Bystrica region (11.48%), 127 respondents from Žilina region (12.46%), 127 respondents from Nitra region (12.46%), 144 respondents from Trenčín region (14.13%), 112 respondents from Trnava region (10.99%) and 118 respondents from Bratislava region (11.58%). In terms of achieved education, 300 respondents were with basic education (29.44%), 438 respondents with secondary education (42.98%) and 281 respondents with higher education (27.58%). The structure of respondents participating in the survey in age groups of 18-30 and over 60 years, is presented in Figures 1 and 2.

Figure 1 Structure of respondents aged 18 – 30 years

Source: own research
As seen from Table 1, the result of the analysis of responses to question No 1 of the questionnaire as to whether the respondents would carry a PIN along with their credit card showed that 13.24% of those aged 18-30 years chose the answer of “definitely not”. The same response was reported by 10.79% of respondents aged 31-40, 9.12% aged 41-50, 9.42% of respondents aged 51-60 and 9.81% aged over 60. Overall, 52.40% of all respondents answered by choosing this option while 24.34% of the respondents opted for a “no” option. The answer “I do not know” was chosen by 1.37%, “yes” by 9.72% and “certainly yes” by 12.17%.

<table>
<thead>
<tr>
<th>Age (5)</th>
<th>Definitely not</th>
<th>No</th>
<th>I do not know</th>
<th>Yes</th>
<th>Certainly yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 30 years</td>
<td>13.24828</td>
<td>5.78999</td>
<td>0.000000</td>
<td>0.294406</td>
<td>0.88322</td>
<td>20.2159</td>
</tr>
<tr>
<td>31 - 40 years</td>
<td>10.79490</td>
<td>5.29931</td>
<td>0.294406</td>
<td>1.864573</td>
<td>2.55152</td>
<td>20.8047</td>
</tr>
<tr>
<td>41 - 50 years</td>
<td>9.12659</td>
<td>5.88813</td>
<td>0.196271</td>
<td>2.749490</td>
<td>2.55152</td>
<td>18.8420</td>
</tr>
<tr>
<td>51 - 60 years</td>
<td>9.42100</td>
<td>3.72915</td>
<td>0.490677</td>
<td>2.747792</td>
<td>2.84593</td>
<td>19.2345</td>
</tr>
<tr>
<td>More than 60 years</td>
<td>9.81354</td>
<td>3.63101</td>
<td>0.392542</td>
<td>3.729146</td>
<td>3.33660</td>
<td>20.9028</td>
</tr>
<tr>
<td>Total</td>
<td>52.40432</td>
<td>24.33759</td>
<td>1.373896</td>
<td>9.715407</td>
<td>12.16879</td>
<td>100.0000</td>
</tr>
</tbody>
</table>

Based on results of the correspondence analysis at total value of $\chi^2 = 76.6831$ and degrees of freedom df = 12, the significance value of $p = 0.0001$ is achieved. Therefore, at the level of significance of $\alpha = 5\%$, we can say that there is a significant relationship between the age of respondents and fact of carrying the PIN code along with the payment card. More detailed results of the correspondence analysis are shown in Figure 3 in form of a correspondence map.
From more detailed results, it is clear that respondents aged 18-30 years have statistically significantly leaned toward the “definitely not” option. Respondents aged between 41 and 50 years were inclined to answer “no” while those aged 51-60 and over 60 years were inclined to answer “yes”. In a way, the latter results are not surprising. The fact that people from older categories tend to prefer carrying a PIN along with their credit cards reflects the aspect of losing confidence in recollecting their PIN. This however brings about a huge security risk and in case of theft it may result in subsequent misuse of the payment instrument.

As to the relationship between gender of respondents and answers to question No. 1 (Do you carry a PIN along with a credit card?), the level of achieved significance of the x² test (p = 0.8701) as well as that of geographical distribution of the respondents (p = 0.8555) clearly displays that both cases did not show a significant relationship. Thus, it is possible to state that both men and women preferred roughly equal answers to question No. 1 of the questionnaire while even not reflecting the difference in geographic distribution with respect to the choice of preferred answer.

As to education, the percentage of responses to the question Q1 (Do you carry a PIN along with a credit card?) are shown in Table 2.

**Table 2** Table of respondents’ relative answers to question Q1 in relation to the achieved education of respondents

<table>
<thead>
<tr>
<th></th>
<th>Definitely not</th>
<th>No</th>
<th>I do not know</th>
<th>Yes</th>
<th>Certainly yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic education</td>
<td>13.64082</td>
<td>6.57507</td>
<td>0.294406</td>
<td>3.827282</td>
<td>5.10304</td>
<td>29.4406</td>
</tr>
<tr>
<td>Secondary education</td>
<td>20.90285</td>
<td>9.61727</td>
<td>0.981354</td>
<td>5.397448</td>
<td>6.08440</td>
<td>42.9833</td>
</tr>
<tr>
<td>Higher education</td>
<td>17.86065</td>
<td>8.14524</td>
<td>0.098135</td>
<td>0.490677</td>
<td>0.98135</td>
<td>27.5761</td>
</tr>
<tr>
<td>Total</td>
<td>52.40432</td>
<td>24.33759</td>
<td>1.373896</td>
<td>9.715407</td>
<td>12.16879</td>
<td>100.0000</td>
</tr>
</tbody>
</table>

Source: own research
Q1 - Do you carry a PIN along with a credit card?

The above table shows that 13.64% of respondents with primary education, 20.90% of respondents with secondary education and 17.86% of those with university education chose the option of “definitely not” to the question “Do you carry a PIN along with a credit card?”. Together, 52.40% of all respondents chose this option. The option “no” was chosen by 6.57% of respondents with primary education, 9.62% with secondary education and 8.15% with university education. According to the analysis, the PIN code is carried along with the card (options “yes” and “certainly yes”) by 8.93% of respondents with basic education, 11.47% of those with secondary education and only 1.57% of university graduates.

Based on the results of the correspondence analysis at the total value of $\chi^2 = 71.1715$ and degrees of freedom df = 8, the significance value p = 0.0001 is achieved. Thus, at the level of significance of $\alpha = 5\%$, we can state that there is a significant relationship between the level of education achieved by the respondents and fact of carrying the PIN code along with the payment card. More detailed results of the correspondence analysis are shown in Figure 4 in form of a correspondence map.

![Correspondence map of dependence of respondents' answers to question Q1 (Do you carry a PIN along with a credit card?) and achieved education](Figure 4)

*Source: own research*

The correspondence map (Figure 4) shows that respondents with basic education tend to carry a PIN code along with a payment card, while respondents with higher education tend to answer “no” or “certainly not”.

The relative responses of the respondents to question No. 2 of the questionnaire (Did you change your PIN on your credit card?) are given in Table 3. The table shows that regardless of their age, 13.15% of the respondents did not change their payment card PIN. Out of these respondents, only 0.39254% were aged 18-30. In age categories of 31-40, and 41-50 years, the PIN code was certainly not changed in 2.06084% and 1.6683%, respectively. More than a 100% increase is seen in respondents over the age of 51. On the other hand, we can see that the payment card PIN code was certainly changed in 49.36212% of the respondents, while among them, the largest number of respondents were aged 18-30. With the increasing age, there is a decrease in the number of respondents who have surely changed their PIN, namely to 7.65456% at the age over 60.
Table 3 Table of respondents’ relative answers to question Q2 in relation to the age of respondents

<table>
<thead>
<tr>
<th>Age Group</th>
<th>Definitely not</th>
<th>no</th>
<th>I do not know</th>
<th>Yes</th>
<th>Certainly yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>18 - 30 years</td>
<td>0.39254</td>
<td>0.588813</td>
<td>0.392542</td>
<td>6.47694</td>
<td>12.36506</td>
<td>20.2159</td>
</tr>
<tr>
<td>31 - 40 years</td>
<td>2.06084</td>
<td>0.785083</td>
<td>0.785083</td>
<td>6.18253</td>
<td>10.99117</td>
<td>20.8047</td>
</tr>
<tr>
<td>41 - 50 years</td>
<td>1.66830</td>
<td>0.883219</td>
<td>0.883219</td>
<td>5.59372</td>
<td>9.81354</td>
<td>18.8420</td>
</tr>
<tr>
<td>51 - 60 years</td>
<td>4.90677</td>
<td>1.373896</td>
<td>0.686948</td>
<td>3.72915</td>
<td>8.53778</td>
<td>19.2345</td>
</tr>
<tr>
<td>More than 60 years</td>
<td>4.12169</td>
<td>2.158979</td>
<td>0.883219</td>
<td>6.08440</td>
<td>7.65456</td>
<td>20.9028</td>
</tr>
<tr>
<td>Total</td>
<td>13.15015</td>
<td>5.789990</td>
<td>3.631011</td>
<td>28.06673</td>
<td>49.36212</td>
<td>100.0000</td>
</tr>
</tbody>
</table>

Source: own research

Q2 - Did you change your PIN on your credit card?

Based on the results of the correspondence analysis at the total value of $\chi^2 = 90.7877$ and degrees of freedom $df = 16$, the significance value of $p = 0.0001$ is achieved. Thus, at the level of significance of $\alpha = 5\%$, we can say that there is a significant relationship between the age of respondents and change in payment card PIN code. More detailed results of the correspondence analysis are shown in Figure 3 in form of a correspondence map.

Figure 5 Correspondence map of dependence of respondents’ answers to question Q2 (Did you change your PIN on your credit card?) and age

Source: own research

From a more detailed analysis in form of a correspondence map (Figure 5), it is clear that respondents aged 18-50 years statistically significantly incline to answer “certainly yes”. Therefore, the respondents from these age groups have certainly changed their payment card PIN codes. On the other hand, respondents from the group aged 51-60, leaned toward the answer of “definitely not” while respondents aged over 60 years chose the option of “do not know” or “no”.
As to the level of achieved education, the table of percentage answers of respondents to question No. 2 of the questionnaire (Did you change your PIN on your credit card?), clearly displays that the payment card PIN code was definitely not changed by 5.49558% of respondents with basic education. Up to 7.26202% of respondents with secondary education chose the same answer. Thus, they definitely did not change the PIN code while only 0.39254% of respondents with university education chose this option. On the second pole of the Likert scale, we can see that the PIN code has certainly been changed by 19.33268% of respondents with secondary education and 17.95878% of university graduates. Altogether, the answer of “certainly yes” was opted for by 49.36212% of all respondents.

Table 4 Table of respondents’ relative answers to question Q2 in relation to achieved education of respondents

<table>
<thead>
<tr>
<th></th>
<th>Definitely not</th>
<th>No</th>
<th>I do not know</th>
<th>Yes</th>
<th>Certainly yes</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Basic education</td>
<td>5.49558</td>
<td>2.158979</td>
<td>1.079490</td>
<td>8.63592</td>
<td>12.07066</td>
<td>29.4406</td>
</tr>
<tr>
<td>Secondary education</td>
<td>7.26202</td>
<td>3.140334</td>
<td>1.668302</td>
<td>11.57998</td>
<td>19.33268</td>
<td>42.9833</td>
</tr>
<tr>
<td>Higher education</td>
<td>0.39254</td>
<td>0.490677</td>
<td>0.883219</td>
<td>7.85083</td>
<td>17.95878</td>
<td>27.5761</td>
</tr>
<tr>
<td>Total</td>
<td>13.15015</td>
<td>5.789990</td>
<td>3.631011</td>
<td>28.06673</td>
<td>49.36212</td>
<td>100.0000</td>
</tr>
</tbody>
</table>

Source: own research

Q2 - Did you change your PIN on your credit card?

Based on the results of the correspondence analysis at the total value of $\chi^2 = 72.4810$ and degrees of freedom df = 8, the significance value of $p = 0.0001$ is achieved. Thus, at the level of significance of $\alpha = 5\%$, we can say that there is a significant relationship between age of the respondents and change in payment card PIN code. More detailed results of the correspondence analysis are shown in Figure 3 in form of a correspondence map.

![Figure 6: Correspondence map of dependence of respondents’ answers to question Q2 (Did you change your PIN on your credit card?) and achieved education.](image-url)

Source: own research
From the more detailed results in form of a correspondence map (Fig. 6) it is obvious that the respondents with secondary education preferred answering “I do not know”, while those with higher education chose the option of “certainly yes” and those with basic education opted for “yes”.

Conclusions

Automatic ATMs are widely used thanks to their simplicity and extensive availability. In the coming years, ATM systems will no longer use a magnetic stripe (magstripe) access card and a fixed personal identification number (PIN) to authenticate. At present, clients use a chip and a PIN that sometimes has a magstripe if the chip fails as a backup for identification purposes. This method is not very safe and creates prerequisites for the increase in crime. For these reasons, a new, simple and secure access method is needed. In such a method, the user is generated a PIN, and this PIN is available on the ATM system through the Subscriber Identity Module (SIM) on the mobile phone of the user. Such information is reported to the Global System for Mobile Communications (GSM) module, which is inserted into the ATM’s functional framework. This security method is significantly better than the traditional methods currently in use because it is dynamic in view of the ability to change the user-defined PIN (UDPIN) in each transaction. The problem that occurred with the loss of the access card and the need for immediate deactivation is eliminated. The access card can be enhanced with additional security features without the need for a large number of modifications. After the implementation of the prototype of the access card where the security features were used, the results were verified by extensive testing and proved to be a simpler and better security measure.

The use of mobile phone devices is expanding rapidly and they become essential tools that offer competitive business advantages in today’s growing world of global computing environments. A mobile phone device is a suitable tool for a multifactor authentication that could provide powerful and easy to use authentication device to access any service securely such as an ATM terminal as well as would increase the level of protection for critical and sensitive information.

References


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Summary. The research paper discusses different issues of interpretation and qualification of illegal access to an information system (IS), taking into account international instruments and European Union legislation as well as the relevant case law of Lithuania. Analysis of criminal cases and legal regulation shows that such cases require an appropriate combination of the technical and legal sides of such criminal offences. In this context, it is also important that criminal liability for illegal access to an IS must be underpinned not only by the principles of technological neutrality and equivalent assessment but also must ensure respect for the *ultima ratio* (last resort) principle. It is this principle which in particular is the subject of considerable attention in the research paper in terms of over-criminalisation of illegal access to an IS. While solving the puzzle of technology and terminology alignment, the paper also explores the elements of illegal access to an IS. In the light of developments in Lithuanian case law, more emphasis is placed on the debatable infringement of security measures, as an element, and on possible interpretation of its content.

Keywords: cybercrime; hacking; illegal access; information system; security measures; *ultima ratio*; over-criminalisation


JEL Classifications: O33

1. Introduction

Ongoing development of information technologies (IT) and electronic communications creates preconditions for disseminating data without any physical space limitations and for the emergence of new ways of accessing IS and the data held in the IS. Cyberspace, which is characterised by continuous progress-driven developments, has been designed to function as a place where electronic data can be processed, IS can be accessed, communication and participation in virtual activities can take place, etc. ‘Information technologies are common not only in personal relationships, business, but also in state governance, military systems (which, historically, had a strong impact on the development of this area), science, etc.’ (Štitilis et al, 2016: p. 197). The development of the cyberspace, however, goes hand in hand with inherent threats particularly in terms of the criminal offences committed in that space. Cybercrime is considered as one of the main challenges and threats in cyberspace (Tvaronavičienė, 2018), as well as one of the negative consequences of IT development (Štitilis & Klišauskas, 2015: p. 45; Korauš et al. 2019). For example, illegal access to an IS, depending on the services provided by the IS, can open avenues for unlawful payment transactions (money transfers to other bank accounts, payments for purchases, the use of online banking to get fast credits, etc.), violations of the right to privacy, disclosure of commercial secrets, counterfeiting of electronic documents or data, illegal IS interference, etc. The impact of IT progress on the possibilities for committing criminal offences has led to qualitatively and quantitatively

It would not be wrong to state that the imposition of criminal liability for criminal offences against the safety of electronic data and information systems is influenced by international and European Union (EU) legal instruments aimed at fighting crimes in cyberspace. Among the most important instruments are the Council of Europe Convention on Cybercrime (Convention) and Directive 2013/40/EU of the European Parliament and of the Council of 12 August 2013 on attacks against information systems and replacing Council Framework Decision 2005/222/JHA (Directive 2013/40/EU). To bring more clarity, it should be noted that the Convention provides for a wider range of cybercrime than the provisions of Directive 2013/40/EU. The groups of crimes committed in cyberspace mentioned therein include: 1) Offences against the confidentiality, integrity and availability of computer data and systems; 2) Computer-related offences; 3) Content-related offences; 4) Offences related to infringements of copyright and related rights. Such a distinction makes it possible to refer to all of these crimes as cybercrimes perceived in their broadest sense. Meanwhile, Directive 2013/40/EU provides a narrower legal framework for defining a cybercrime in this respect: it only contains criminal offenses that directly infringe the security of electronic data and information systems and which can be considered as cybercrime perceived in the narrow sense. These differences indicate that the offenses set forth in Directive 2013/40/EU only partly match the offences mentioned in the Convention and, in general terms, are consistent with offences against the confidentiality, integrity and availability of computer data and systems (Chapter II, Section 1, Title 1 of the Convention).

One of the objectives of Directive 2013/40/EU is to harmonise the criminal law of the Member States of the EU in the area of attacks against information systems. In pursuing these goals, the Directive states that illegal access to information systems (Article 3), illegal system interference (Article 4), illegal data interference (Article 5), illegal interception (Article 6) and disposition of tools used for committing offenses (Article 7) are considered to be criminal offences. However, the search of the general approach to the constituent elements of criminal offences also involves a number of issues related to regulatory framework. For example, Directive 2013/40/EU does not intend to impose criminal liability in the case of offences committed unintentionally (for example, when a person did not know that access to an IS or data is illegal) or without guilt (in the case of ethical system testing); when the employer’s information systems are used for employee’s personal purposes, which is essentially a labour dispute; when acts committed are of minor relevance, etc. These are just some of the problems that may be encountered in implementing the provisions of the Directive 2013/40/EU. Other difficulties in applying the provisions usually appear in specific criminal cases concerning cybercrime and are often related to the interpretation of constituent elements of criminal offences. Therefore, it is relevant not only to provide a sufficiently clear description of criminal offences in the criminal law, but also to formulate a uniform interpretation of such acts, taking account of developments in technology.

The method selected for implementing the provisions of Convention and Directive 2013/40/EU in the national law will also predetermine the specifics of criminalisation of such offences, the directions of interpretation of the elements of corpus delicti, and, consequently, also the possibilities of incriminating the offender with cybercrime. The criminal offence of illegal access to an IS, which is the focus of analysis in this paper, would not be an exception in this regard. Creation of the legal grounds for criminal liability for illegal access to an IS may lead to both over-criminalisation of such acts and problems in interpreting their elements in individual criminal proceedings. In the light of the requirements of the ultima ratio principle, the research paper formulates the criteria, which would make it possible to substantiate the dangerousness of such offence so as to make a person criminally liable, and hence also prove its harmfulness to the values protected by criminal law. The overall assessment of the developing case law of Lithuanian courts in the cases of illegal access to IS has also revealed certain technology-related aspects of interpretation of the offence elements. From the perspective of criminal law, this analysis has shown that the correct interpretation of the offence elements and the balance between technological and legal aspects of this offence are the basis for the formation of a consistent case law, compatible with the principles of criminal law and open to technological developments.
Previously the issues of cybercrime were analysed by Jonathan Clough (Clough, 2010, 2011) and Ian Walden (Walden, 2007). Chris Reed (Reed, 2004, 2007) also analysed the problems of criminalising and interpreting the acts in cyberspace. Some of the aspects related to the criminalisation of unauthorised access and the interpretation of the features of such offenses have been addressed by Mary W. S. Wong (Wong, 2006) and Maria Kaiafa-Gbandi (Kaiafa-Gbandi, 2012). Andrew Ashworth (Ashworth, 2008) raised the issue of over-criminalisation relevant to the topic, whereas Paul Ohm (Ohm, 2010) and Bert-Jaap Koops (Koops, 2006) analysed the advantages and disadvantages of technology-neutral legal regulation.

This research paper is organised as follows. Section 2 provides a study of illegal access to an IS in the context of international and EU legal instruments and discusses the issue of over-criminalisation of this offence. It also brings forward an idea of what criteria could be applied for ascertaining the required degree of its dangerousness. Section 3 explores the specifics of criminalisation of illegal access to an IS in Lithuania and the recent changes resulting from the transposition of the provisions of Directive 2013/40/EU into the national law. Subsection 3.1 explores, in line with the case law developments, the criterion of ‘creating opportunities for the commission of other offences in the system’, which is relevant in dealing with the issue of over-criminalisation of illegal access to an IS. Sub-section 3.2 unfolds the content of infringement of IS security measures, as an offence element, and points to potential problems of interpretation of this element. Conclusions of this paper are provided in Section 4.

2. Criminalisation specifics of hacking and over-criminalisation issues

The ‘move’ of traditional criminal offences to cyberspace has also changed the possibilities for committing offences (for example, fraud, forgery, libel, offences related to child pornography, terrorism, etc.). Cyberspace has opened up avenues for offences that may be considered to be an exclusive result of the development of computer technologies (for example, illegal access to an IS, illegal system or data interference, etc.). Thus, it may be agreed that ‘the advent of computer technology has brought many kinds of opportunities and some of these, not surprisingly, are of a criminal nature’ (Bainbridge, 2004: p. 359; Benešová, Hušek, 2019). The establishment of criminal liability in such cases will depend on the legislator’s competence to appropriately define the elements of such criminal offences and on the creativity of those who apply law (the court) in linking a rule of criminal law with a specific deliberate cyber incident. The fact, that ‘legal regulations related to the Internet are the most dynamically developing legal field and should be created at the national and international level’ (Grubicka & Matuska, 2015: p. 194), is also important in this context. As regards cybercrime in the context of criminal law, it is important to note that we will inevitably have to figure out both the legal and the technological side of the offence when incriminating the offender with such an offence. For example, if it is presumed that the fact of illegal access to an IS has been ascertained in the proceedings and that access to electronic data has been gained, we will have to define what meaning is attributed to the IS or electronic data, what IS security measures mean and how they have been infringed (this problem is partly related to the implementation of the technological neutrality principle in formulating the rules of law (for more, see Koops, 2006; Downing, 2005: p. 705; Ohm, 2010; Reed, 2007: p. 269). That is, however, insufficient – it is also important to find out whether criminal law may be applied for the qualification of such criminal offence. It is likely that it is the mutual alignment of these two specific aspects – legal and technological – and the implementation of the requirements deriving from the principles of criminal liability that can pose quite a few problems.

As far as illegal access to an IS is concerned, resolution of the above-mentioned problems can be facilitated by international and EU legal acts – Convention and Directive 2013/40/EU. They set out not only minimum requirements for the elements of this criminal offence, the definitions of the terms but also, which is no less important, contain certain references to the need to consider the threat of illegal access to an IS. Article 3 of the Directive states that ‘Member States shall take the necessary measures to ensure that, when committed intentionally, the access without right, to the whole or to any part of an information system, is punishable as a criminal offence where committed by infringing a security measure, at least for cases which are not minor.’ Such concept of illegal access to an IS would make it possible to prosecute for such a criminal offence irrespective of whether the offender who has infringed the IS confidentiality has also committed other criminal offences in
the system. This criminal offence has also been defined in Article 2 of the Convention by providing that ‘each Party shall adopt such legislative and other measures as may be necessary to establish as criminal offences under its domestic law, when committed intentionally, the access to the whole or any part of a computer system without right. A Party may require that the offence be committed by infringing security measures, with the intent of obtaining computer data or other dishonest intent, or in relation to a computer system that is connected to another computer system.’ It may be stated that the imposition of criminal liability for illegal access to an IS, as an independent offence, should be linked with the measures to be taken at an ‘early stage’ (Explanatory Report to the Convention on Cybercrime, point 45) until no other criminal offences have been committed in the system. Thus, this offence is an example of punishing for a potential risk of damage as far as ‘the possibility of damage, rather than damage itself’ is concerned (Clough, 2011: p. 161). Indeed, illegal access to IS ‘may give access to confidential data (including passwords, information about the targeted system) and secrets, to the use of the system without payment or even encourage hackers to commit more dangerous forms of computer-related offences, like computer-related fraud or forgery’ (Explanatory Report to the Convention on Cybercrime, point 44). There are numerous examples in the case law of Lithuanian courts where offenders were incriminated with illegal access to IS after it was identified that they had illegally logged into the online banking system and carried out unlawful financial transactions in the system; obtained unlawful access to the Facebook account of another person and sent misleading messages to other users of this social network; illegally accessed another person’s email account and violated the person’s privacy by various subsequent actions; changed the assessment results of the student’s knowledge after gaining access to the electronic diary of studies. These are just some of the examples which show that illegal access to an IS can lead to other, no less significant violations of legal values.

On the other hand, it should be admitted that from the legal perspective there can also be less dangerous situations of illegal access to an IS. For example, when a detected single-time access to an IS has not caused any real damage to the security measures of the system and, according to the case-file data, it is obvious that the offender did not intend to engage in any illegal actions in this system; no supplementary tools have been used for the access; the IS security gaps have not been created by the person himself; access data have not been gained by purchasing or using malicious software, etc. It follows that some cases of illegal access to an IS will make it necessary to speak about the risk of over-criminalisation of this criminal offence. Any discussion of over-criminalisation, not excluding cybercrime, must start ‘from a conception of the mean, of the right amount of criminal law’ (Ashworth, 2008: pp. 407–425). The principle of criminal liability as a measure of last resort (ultima ratio), first of all, sets rational requirements for the legislator and the user of law to be followed when recognising certain acts as criminal – along with really dangerous conduct, a rather abstractly formulated rule is likely to include also the acts of doubtful dangerousness. For example, the requirements which derive from the ultima ratio principle have been linked in the jurisprudence of the Constitutional Court of Lithuania with, inter alia, the constitutional principles of proportionality and reasonableness: ‘When setting legal restrictions and liability for violations of law, one must pay heed to the requirement of reasonableness and the principle of proportionality, according to which the established legal measures should be necessary in a democratic society and suitable for achieving legitimate and universally important objectives (there must be a balance between the objectives and measures), they may not restrict the rights of the person more than it is necessary in order to achieve the said objectives’ (Ruling of 16 January 2006 of the Constitutional Court Ruling of the Republic of Lithuania). Just as important is the approach established in the case law of this Court that ‘<...> under the Constitution, the legislature may specify, by means of a criminal law, only those acts as crimes which are really dangerous and which inflict or can lead to considerable damage to the interests of persons, society and those of the state’ (Ruling of 10 June 2003 of the Constitutional Court Ruling of the Republic of Lithuania), ‘not only repressive but also preventive measures are applied when restricting and reducing crime’ (Ruling of 29 December 2004 of the Constitutional Court Ruling of the Republic of Lithuania), ‘it is not permitted to establish the punishments for criminal acts and their sizes which would be obviously inadequate to the criminal act and the purpose of the punishment’ (Ruling of 8 June 2009 of the Constitutional Court Ruling of the Republic of Lithuania). In the context of these provisions in terms of illegal access to an IS, support should be expressed to the idea that ‘efficient security measures could protect information systems much more efficiently than unrestrained criminalization’ (Kaiafa-Gbandi, 2012: p. 59–79).
The idea of criminal liability as *ultima ratio* is also in some aspects reflected in the above-mentioned Convention and Directive 2013/40/EU. For example, paragraph 11 of the Preamble of Directive 2013/40/EU states that ‘[t]his Directive provides for criminal penalties at least for cases which are not minor’. Paragraph 49 of the Explanatory Report to the Convention on Cybercrime also notes that ‘the broad approach of criminalisation in the first sentence of Article 2 is not undisputed. Opposition stems from situations where no dangers were created by the mere intrusion or where even acts of hacking have led to the detection of loopholes and weaknesses of the security of systems. This has led in a range of countries to a narrower approach requiring additional qualifying circumstances <…>.’ It is also relevant that the need to avoid over-criminalisation, particularly of minor cases, has been emphasised in paragraph 13 of the Preamble of Council Framework Decision 2005/222/JHA of 24 February 2005 on attacks against information systems (Decision 2005/222/JHA). Therefore, to prevent unjustified application of criminal liability, the elements of illegality of access and intent in the construction of *corpus delicti* of illegal access to an IS in national legislation are necessary, however, inadequate to render a person criminally liable. In accordance with the provisions of the Convention, Decision 2005/222/JHA and Directive 2013/40/EU, the ‘breadth’ of this criminal offence may be narrowed by additional circumstances that can indicate a higher dangerousness of an offence. For example, Article 2 of the Convention sets out several such alternatives, i.e. in order to incriminate illegal access to an IS, it may be required that this act is committed by infringing security measures, with the intent of obtaining computer data or other dishonest intent, or in relation to a computer system that is connected to another computer system. Decision 2005/222/JHA and Directive 2013/40/EU provide for fewer circumstances in this regard and, accordingly, narrower possibilities in constructing the *corpus delicti* of illegal access to an IS in the national law. Article 2 of Decision 2005/222/JHA notes that each Member State may decide that illegal access to an IS should be incriminated only where the offence is committed by infringing a security measure. A similar, although not identical, approach is laid down in Article 3 of Directive 2013/40/EU where it is stated that Member States shall take measures to ensure that illegal access to IS is punishable as a criminal offence where committed by infringing a security measure, at least for cases which are not minor. As can be seen, these circumstances allow limits to be set for criminalising illegal access to an IS and may be considered to be rational requirements in recognising this offence as criminal.

Thus, depending on the chosen concept of illegal access to an IS, different ways of combining the elements of this offence and different options for solving over-criminalisation of this offence may be chosen in national laws. The varying approach to illegal access to an IS not only shows difficulties in comparing this offence, but also indicates that certain issues of qualification (considering descriptions of the elements of this offence) are likely only in certain rather than in all states. For example, criminal liability may be provided for illegal access to data rather than an IS, if there has been illegal interference with security measures or a system. In other cases, illegal access to IS is criminalised by also referring to other circumstances evidencing the dangerousness of this offence along with the elements of unlawfulness and gaining of access. This distinction is important as it allows to decide whether it is, first of all, an interference with the confidentiality of electronic data or an IS that is pivotal in this criminal offence. Thus, in the first case, the focus is on the defendant’s interaction with electronic data rather than with an IS. In the second case, in contrast, the focus is on ascertaining that the access to an IS has been unauthorised (Clough, 2010: p. 72). The latter approach to the offence of illegal access to an IS has been implemented in the Lithuanian Criminal Code (CC) – its Article 1981 provides for criminal liability for illegal access to an IS by infringing the security measures of the system.

### 3. Lithuanian approach and case law interpreting illegal access to an IS

The Lithuanian CC currently contains a whole set of provisions applicable with regard to cybercrime. For example, the criminal offences which directly violate the security of electronic data and an IS have been criminalised separately, in Chapter XXX of the CC (It criminalises offences such as illegal data interference (Article 196), illegal system interference (Article 197), unlawful interception and use of electronic data (Article 198), illegal access to an information system (Article 1981), unlawful disposal of installations, software, passwords, login codes, codes and other data (Article 1982). These offences correspond to the offences against the confidentiality, integrity and availability of computer data and systems specified in the Convention,
as well as the criminal offences indicated in Articles 2–4 of Decision 2005/222/JHA and Articles 3–7 of Directive 2013/40/EU. Meanwhile traditional criminal offences, which have undergone changes as a result of the use of information and communication technologies (computer-related fraud, forgery, offences related to child pornography, libel, etc.), are qualified according to the same Articles of the CC as those providing for traditional criminal offences. For example, the case law of the Supreme Court of Lithuania invokes a broad interpretation of ‘a document’ in the criminal cases of this category, which allows applying Article 300 of the CC also in cases when an electronic document is forged: ‘The Law does not specify any requirements for the form of a document. A document may mean any record made in any form on paper, in the electronic space or in a computer medium, however, there are requirements set for the content of a document. A document should provide information about an event, action or person. A document means a record made in any form, which establishes, modifies or revokes a legally relevant fact (legal fact). It means a record the use whereof can lead to the effects of legal significance for a natural person, legal entity or the State’ (ruling of 11 February 2014 of the Criminal Cases Division of the Supreme Court of Lithuania, civil case No. 2K-57/2014). Such approach is predetermined by the fact that these CC provisions are drafted as technology neutral; likewise, the requirements deriving from the principle of equivalence are also relevant for such interpretation (Fedosiuk & Marcinauskaitė, 2013: p. 8).

Thus, criminal liability for the offence of illegal access to an IS is established in Article 198 of the CC in Lithuania and its definition has been narrowed in one of the ways referred to in Article 2 of the Convention, Article 2 of Decision 2005/222/JHA and Article 3 of Directive 2013/40/EU. That is, with the view of preventing the criminalisation of offences which are clearly harmless, incrimination of illegal access to an IS under Lithuanian national law requires proof not only of unauthorised access to an IS and intentional guilt, but also of the fact that such access has been gained by infringing security measures. This description of the criminal offence elements means that illegal access to an IS has been criminalised as an individual criminal offence without linking it with subsequent acts of the offender in the system. The most recent amendments of this Article of the CC (2015) are related to the implementation of provisions of Article 3 of Directive 2013/40/EU in the national law. It should be noted, however, that the implementation of the Directive did not radically reform illegal access to an IS: amendments have revised the subject-matter of the criminal offence – not only an IS but also part of it has been included in its corpus delicti, thus, access to an IS is considered criminal when access has been gained both to the whole IS and to its part; the penalty provided for this criminal offence has also been made more stringent.

The need to revise the subject-matter of this criminal offence has, in fact, derived not only as a result of provisions of Article 3 of Directive 2013/40/EU but also due to the definition issues of an IS and its functioning specifics. To implement the principle of technological neutrality, Article 2(a) of Directive 2013/40/EU gives an abstract definition of an IS: ‘a device or group of inter-connected or related devices, one or more of which, pursuant to a program, automatically processes computer data, as well as computer data stored, processed, retrieved or transmitted by that device or group of devices for the purposes of its or their operation, use, protection and maintenance.’ Such ‘technological neutrality’ of this concept, on the one hand, helps ensure the openness of the elements to the developments in cyberspace, and, on the other hand, causes difficulties in deciding what is an IS and what it is not. As can be seen, the concept of IS is constructed by reference to devices or groups of inter-connected devices that constitute such systems. It is obvious that an IS normally functions as a unit consisting of different combinations of components. The complexity and integration process of IS can be described as follow: ‘the small elements of the systems or small systems are integrated into larger systems which increases the system complexity and creates conditions for vulnerabilities to arise not only in domestic but also in countries interconnected systems’ (Limba, et al, 2017: p. 560). It follows from these considerations that illegal interference with the confidentiality of an IS is possible not only by directly impacting the entire system but also by targeting only its specific components (parts of IS) that perform specific functions. This can cause uncertainties in the area of criminal law – is it possible to state the fact of access to the entire IS if access has been gained only to any of its devices? In this regard it is important that the notions of confidentiality, availability and integrity apply not only to electronic data but also to other network resources, external devices or accessories. There is a multitude of system resources, which, if used illegally, can facilitate infringements of
IS security. It is also relevant that ‘each component of the information system has its own security requirements’ (Whitman & Mattord, 2009: p. 14). Therefore, in order to avoid potential misunderstandings in interpreting the elements of the subject-matter provided for in Article 1981 of the CC, the above-referred amendments have resolved the issue of incrimination of illegal access to an IS in case the situation as discussed is discovered in criminal proceedings (for example, an offender logs into an external device, some network infrastructure devices, etc.).

Imposition of criminal liability only for illegal access to an IS as such also implies other questions, for example, not only what, but also how many criminal offences have been committed by an offender. The mechanism of commission of cybercrime shows that an offender’s actions are normally not limited only to unauthorised access to an IS – intrusion into a system is also followed up by other criminal offences, which can infringe the confidentiality, integrity, availability of an IS or electronic data, or other values protected by criminal law. Attacks against an IS can be different, however, where an offender gains unauthorised access to an IS, such act of cybertrespass ‘can lead to unauthorized real or virtual action that enable information gatherers to enter premises or systems they have not been authorized to enter’ (Whitman & Mattord, 2009: p. 46). It is, therefore, obvious that the offender gets the opportunity to carry out subsequent criminal offences as a result of his initial unauthorised access actions. Thus, when assessing criminal offences from the perspective of criminal law in such cases, very frequent incrimination of illegal access to an IS in cybercrime cases should not be surprising – other criminal offences committed in that same system do not cover unauthorised access to IS according to the provisions of the Lithuanian CC.

For example, one of the stages of cyber fraud can be related to infringements of the confidentiality of the IS of a bank, i.e. in the case of the illegal use of the lawful user’s data, which are necessary for his authentication and authorisation and by which he logs in and is recognised in the electronic banking system (for example, in an electronic banking system, a user may be authenticated and get authorisation in one of the following ways – according to the user ID, permanent password and one of the codes indicated in the identification code card or according to the user ID and a one-off identification code generated by a code generator). Internet banking in this context can be defined as ‘providing banking products and services via computer network (the Internet)’ (Belás, et al, 2016: p. 412). Offenders usually obtain credit card data, online banking logins, and other sensitive financial information using different methods – phishing, pharming, using malicious software, buying stolen financial information, etc. (Bryan, et al, 2009: pp. 21-68). For example, Zang (2017: pp. 98–99) points out that unauthorized-information-related services (inter alia the retail of financial data such as bank account details) are considered as provisions of technical assistance to commit cybercrimes. ‘Criminals see the card industry as a lucrative business that can be exploited by the use of technology’ (Korauš, et al., 2017: p. 571; Korauš, et al, 2019).

Although the stage of accessing e-banking by means of illegally obtained sensitive data is often intermediary in case of fraud, it is normally necessary when the offender seeks illegal payment transactions in the e-banking system by subsequent actions. The possibility of treating such access after infringing the security measures of a banking system as illegal access to an IS has been pointed out, for example, in the ruling of 26 June 2012 of the Chamber of Judges of the Criminal Cases Division of the Supreme Court of Lithuania in criminal case No. 2K-375/2012. It has been noted in the ruling that the offender’s ‘illegal access to the internet banking system by using the identifying details of another person could be also qualified under Article 1981 of the CC as illegal access to an information system by infringing its security measures.’ Thus, according to the Lithuanian CC, depending on the mechanism chosen to commit cyber fraud, all four articles of the CC may be applied for qualifying fraud in the electronic banking system (Illegal Access to an Information System (Article 1981), Production of a Counterfeit Electronic Means of Payment, Forgery of a Genuine Electronic Means of Payment or Unlawful Possession of an Electronic Means of Payment or Data Thereof (Article 214), Unlawful Use of an Electronic Means of Payment or Data Thereof (Article 215), Swindling (Article 182).
3.1. Addressing the issues of over-criminalisation of illegal access to an IS in the Lithuanian case law

The idea of the *ultima ratio* principle is explored not only in the doctrine of criminal law but is also developed in the case law in Lithuania. It is interesting to note in this regard that recently efforts have been made to formulate specific criteria which would allow avoiding formal assessment of criminal offences and convictions for acts the dangerousness whereof is, in principle, doubtful in criminal cases concerning illegal access to an IS.

As mentioned, the method of illegal access to an IS, i.e. an infringement of the security measures of the system, is one of the criteria defining the scope of incrimination of illegal access to an IS. According to Article 3 of Directive 2013/40/EU, an infringement of a security measure is necessary for incriminating the elements of this criminal offence, however, as stated in that same Article, at least for cases which are not minor. Although the Directive itself does not clarify the content of a minor case, leaving this issue to the discretion of national law and case law, paragraph 11 of the Preamble of the Directive point to certain criteria, which are important for an assessment: ‘A case may be considered minor, for example, where the damage caused by the offence and/or the risk to public or private interests, such as to the integrity of a computer system or to computer data, or to the integrity, rights or other interests of a person, is insignificant or is of such a nature that the imposition of a criminal penalty within the legal threshold or the imposition of criminal liability is not necessary.’ The specification of these rather abstract provisions is, undoubtedly, within the remit of case law – it is clarified in each criminal case whether a detected illegal access to an IS is really dangerous and the criteria for substantiating the dangerousness of such offence are also explored.

In one such case, the Supreme Court of Lithuania had to decide whether an offender had been validly acquitted as the person who had not committed the offence of illegal access to an IS as provided for in Article 1981 of the CC. It was ascertained in this case that the person, using a computer and access to the internet, had twelve times illegally accessed the electronic banking system by infringing the security measures of that system. Using the illegally obtained data to log into the electronic banking system (the identification code of the e-banking user, the personal login password, the passwords given by the bank for accessing the e-banking), he misled the IS, which identified him as a lawful user of the system. That enabled him to initiate financial transactions illegally and acquire another person’s assets for his own benefit by deceit. The Supreme Court of Lithuania has stated in the ruling handed down in this case (ruling of 26 January 2016 in criminal case No. 2K-4-507/2016) that ‘the offence has to be qualified under Article 1981 of the CC if it is ascertained that an information system has been accessed by infringing the security measures of the system. In interpreting the element of infringement of security measures of an information system, it has been noted in the cassation rulings that: (1) the authentication verification procedure making it possible to identify a user in an information system may be considered to be one of the security measures of the system <…>, (2) illegal entering of the data to identifying a lawful user thereby misleading the system should be considered to be an infringement of the security measures of the system, and (3) unauthorised access to an information system (internet banking system) by infringing the restrictions (requirements), which have been set by authentication measures for logging into the information system, normally may not be held to be a minor case from the perspective of criminal law, in particular if that made it possible to commit other illegal actions in the system <…>’. This interpretation is important because the court has formulated one of the possible criteria for assessing the dangerousness of the offence of illegal access to an IS, i.e. an illegal access normally may not be held to be a minor case, if it has facilitated the commission of other criminal offences in the system (in the above-referred case, cyber fraud). Such follow-up offences committed by an offender after logging into an electronic banking system also show a more extensive scope of violations of the victim’s legitimate interests, thus, also the necessity to apply criminal liability. In the light of these considerations, the court has held that the judgment of acquittal in the case at issue was unfounded and that the illegal access to the IS had been sufficiently dangerous to be punished by the instruments of criminal law. As is known, one of the functions of criminal law is ‘to express the degree of wrongdoing, not simply the fact of wrongdoing’ (Ashworth, 2003: p. 37). It may be held that the above-discussed possibility of assessing the dangerousness of illegal access to an IS would be consistent with such approach to criminal law.
3.2. Issues of interpretation of infringement of IS security measures according to Lithuanian case law

The main problem in delimiting legal and illegal access to IS is mostly related to the possibilities of distinguishing between private and public spaces, hence, also with the boundaries facilitating such distinction in the cyberspace. According to Walden (2007: p. 163), ‘many of the problems discerning authorization in cyberspace arise, in part, from the manner in which the Internet challenges and disrupts traditional concepts of the public and private spheres’. The fundamental philosophy of communication in the electronic space is that ‘a resource whose URL is known should be accessible from any connected computer unless its controller has taken technical steps to make it inaccessible’ (Reed, 2004: 66). Such attitude to the separation of public and private spaces may indicate not only legal but also certain technical barriers, which partly define the boundaries of the private cyberspace. A method for identifying such boundaries is different from the one used in the physical space. For example, Lessig sets constraints on the actions allowed in the cyberspace by the architecture of that space based on a computer code. The author notes that ‘the software and hardware that make cyberspace what it is constitute a set of constraints on how you can behave’ (Lessig, 1999: p. 89). The content of such technological restrictions can be different in each case, but they set the conditions of authorised access to the private cyberspace. It follows that different restrictions set for accessing an IS show the measures taken to ensure the confidentiality of the system and express the attitude of its owner or lawful manager to the possibilities of and conditions for accessing the system: ‘These boundaries give notice to trespassers that they are encroaching on the organization’s cyberspace’ (Whitman & Mattord, 2009: p. 46). It should be noted that the application of different restrictions on the access to an IS is most of all predetermined by the requirements of system security as defined by a security policy (for example, who and in what conditions is given access to an IS). Accordingly, disregard of such restrictions points to unauthorised access to an IS, thus, also to the infringements of confidentiality of such system.

From the perspective of criminal law, one of the ways of disregarding IS security measures is relevant in this context – unauthorised access ‘bypassing code-based restrictions on access’ (Wong, 2006: p. 124). One of the major technological and terminological problems in this area may be expressed by the question – should it be stated that an infringement of security measures has been committed only when damage has been caused to security measures; or should this way of committing a criminal offence also be interpreted as circumvention of the restrictions (requirements) imposed by security measures. It is most evident that no damage is inflicted on IS security measures as such when an offender infringes the restrictions on accessing an IS set by authentication and authorisation measures (for example, logs into an email account, social networks, internet banking, online store using another person’s data). Admittedly, ‘sound principles of authentication and authorization can help organizations protect valuable information and systems. These control methods and technologies employ multiple layers or factors to protect against unauthorized access’ (Whitman & Mattord, 2009: p. 46). However, whether or not the circumvention of such security measures should be treated as infringement of security measures in terms of criminal law and whether the offence should be qualified as illegal access to an IS can be highly debatable. In particular, considering the risks of over-criminalisation of such offence, as mentioned above.

Although illegal access to an IS has always been linked with an infringement of system security measures in Article 198 of the Lithuanian CC, it is only in recent years that the case law on interpreting this element began taking shape. The recent developments in the case law in the criminal cases of this category indicate that infringement of security measures should be interpreted not only as the infliction of damage on security measures but also as the circumvention of the restrictions (requirements) imposed by such measures without any damage to the security measures as such. Infringement of security measures in such cases is linked with breaches of identity verification procedures, hence, also with IS fraud. This interpretation, although indirectly, may be inferred from the ruling of 9 October 2001 of the Supreme Court of Lithuania in criminal case No. 2K-682/2001 where it has been held that ‘all transactions with monetary funds in the electronic banking are managed on the basis of man-made computer programs. A customer communicates with the bank not directly but via the electronic system. The system has been designed so as to receive a command and carry out a transaction if correct identification codes of account holders have been entered. It is specifically the code that, according to principles of operation of the program, identifies the person as the account holder and verifies the authorisation
to carry out transactions with the money held in the account. If the code is entered and the command is given by the person without authorisation to carry out transactions with the money held in the account, he presents himself as another person who has such authorisation to the operational system or to the bank and thereby misleads the electronic system and also the bank. The latter, erroneously holding that the command given by such a person is legal, under the impact of error transfers the title to the assets, i.e. transfers the money to another account holder and later disburses the money. Although such interpretation has been formulated in the criminal proceedings of cyber fraud in relation to deceit, as one of the elements of this criminal offence, the court has obviously admitted that not only a natural person but also an IS can be misled. If such interpretation were applied to illegal access to an IS in criminal proceedings, it would be possible to state that, by logging into an IS by means of the data held by another person, the offender presents himself to the IS as its authorised user and in this way, by deceit, circumvents the security measures of the system. The emergence of this new type of deceit has been facilitated by the specifics inherent in the proof of identity itself on the electronic space: ‘In network technologies, physical proof (such as a driver’s license or other photo ID) cannot be employed, so you have to get something else from the user’ (Network and system security, 2010: p. 77).

It is also relevant that an authentication procedure, as one of the IS security measures, applies not only in electronic banking but also in other systems which provide various electronic services (online stores, email, social networks, internet auctions, etc.). Therefore, if it is identified that these systems have also been accessed without authorisation (through illegal use of the login data of a lawful user), the offender’s conduct should be considered as illegal access to an IS. For example, the Supreme Court of Lithuania has held in one of the cases heard in 2015 that there had been unauthorised access to an email account, which allowed the offender to read the correspondence of private persons. The court has reiterated in this case that ‘the authentication verification procedure making it possible to identify a user in the e-mail system may be considered one of the security measures of the system (as well as confidentiality). While illegal entering of the details of proof a lawful user’s identity thereby misleading the system should be considered to be an infringement of the security measures of the system, and <...> is equivalent to the method in which the offences of unlawful access to an IS is committed’ (ruling of 6 January 2015 of the Supreme Court of Lithuania in criminal case No. 2K-138/2015). However, as previously mentioned, in implementing the idea of ultima ratio in criminal law, it should also be assessed in such situations whether the offence committed is sufficiently dangerous.

4. Conclusions

Creation of the legal grounds for criminal liability for illegal access to an IS has not provided a final solution to the issue of over-criminalisation of this criminal act. This is particularly true in cases where this criminal offence is criminalised as dangerous in itself (per se), i.e. without linking it with further criminal actions of the offender in the system. The provisions of the Convention on Cybercrime and Directive 2013/40/EU offer one solution to this problem – to link the hacking offence with the element of infringement of a security measure. It should be admitted, however, that the presence of this circumstance does not always facilitate a sufficient degree of proof on the dangerousness of the criminal offence committed. The definition of illegal access of an IS in Article 3 of Directive 2013/40/EU treats this element as necessary, however, the provision as such indicates the need to identify whether such cases of illegal access are not minor cases.

This problem partly derives from the interpretation of the element – infringement of a security measure. The analysis shows that the above-referred element could be interpreted not only as the infliction of damage on security measures but also as the circumvention of the restrictions set by such measures or as deceit leading to no damage to the security measures as such. Such approach is relevant as it also allows speaking about other, no less dangerous cases of accessing an IS, which do not cause any direct damage to the functioning of security measures.

Whereas decisions on the issue of minor importance as far as illegal access to IS is concerned has been retained for the national case law, it is highly important to find appropriate criteria for substantiating the dangerousness of the offence of hacking. Therefore, where no direct damage to IS security measures is discovered in criminal proceedings, the apparent dangerousness of illegal access to an IS may be inferred from the fact that the
offender intended or has committed other criminal offences in the system after gaining the access; that the data necessary to access the IS has been obtained illegally (purchased, obtained using malicious software, etc.); that IS security gaps have been created and used at a later stage; that the IS has been accessed using additional means and instruments, etc.

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https://orcid.org/register

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Abstract. A set of criteria has been substantiated for evaluating the effectiveness of the implementation of the functions of the mechanism for ensuring the leadership effectiveness of the managerial staff of enterprises. The set gives a chance to make a comprehensive evaluation of the integral indicator of human resource management. This makes it possible to determine the effectiveness level of human resource management. The study carried out allowed to propose a functional and structural approach that includes the following functions: analysis and planning of personnel, recruitment and selection of personnel, attestation and evaluation of personnel, organization of labor relations, motivational support, creation of working conditions, information provision, development and training of personnel. Under uncertainty, its application makes it possible to evaluate the impact of the effectiveness of the human resource management on the level of productivity of the studied enterprises.

Keywords: secure and sustainable development, human resource management, life cycle, effectiveness, motivation, management


JEL Classifications: F52, O39

1. Introduction

The world economy has changed considerably in the last decade. The globalization brought issues of security. The transition from the industrial to the post-industrial (information) world, about which many analysts have spoken, has finally happened, and most importantly - the balance between the roles of economic agents has radically changed. In the post-industrial society, the leading role passes to the owner of intellectual property rights, in other words, the main approach of ensuring the effectiveness of the enterprise becomes personnel. Experts associate this transition from the “Detroit” production model to the “Hollywood” one. According to the “Detroit” model, the owner of an enterprise organizes jobs, production and hires workers to perform simple operations, for which he pays them small wages (compared with the main income received by the owner of production methods). The personnel depend on the employer (because they are able to make a living by using only production methods they have in the production process); workers are easily interchangeable; their role in the production process is to add value to the product.
As for the so called “Hollywood” model, it is not a process in the center of production, but a product whose main part of value is intangible assets. For its creation, a team is put together, the composition of which, as a rule, varies from product to product, and the structure may be non-formalized. Since the role of personnel in the creation of intangible assets is significant, each employee has the right to a final product, which is expressed in the payment of his labor due to the proper wage. According to the “Hollywood” model, the employee (managerial staff) has specific individual capacities that make it impossible for him to be replaced by other employees (Markoulli et al. 2017).

2. Literature Survey

During the last decade and today, researchers, analyzing the issues of human resource management, pay attention primary to the motivation of personnel (Kaźmierczyk, Chinalska 2018; Pritvorova et al. 2018; Plenkina, Osinovskaya, 2018; Ciobanu et al. 2019; Škuflić et al. 2018; Saleem et al. 2018), knowledge management (Kubak et al. 2018; Tvaronavičienė et al. 2018), performance management (Andronicanu et al. 2017), etc. Human resource management now has to be implemented with awareness of rapidly emerging wide range of threats (Tvaronavičienė 2018). Analoui (2017) believes that the key for the specialists in human resource management of enterprises is the following issues: the human factor of labor. It is foreseen that the requirements of psychology and physiology should be taken into account in the rational organization of employees’ work, improvement of selection processes, personnel evaluation, rationalization of the work regime, rest; the methodology of human resource management includes the improvement of organizational structures, functional subsystems of the management system, development of principles and methods for building HR systems based on system and morphological analysis, decomposition, goal structuring, expert-analytical, balance methods; the system of human resource management involves careful construction of the goals and functions of the management system, organizational structure, organizational design of the management system based on HR, record keeping, information, technical support; strategic human resource management is carried out on the basis of the formation of the mission, goals, criteria of the effectiveness of the management system, analysis of factors of the internal and external environment; HR planning, HR management technology and its development, HR behavior management, evaluation of the results of its activities, etc.

Korff et al. 2017 reveal in their work the two key components of effective human resource management. The first one is a rational model of labor relations based on an effective system of wages and is intended to increase discipline, productivity and quality of work at every workplace. The second one is a rational model of enterprise management that allows managers to plan the work of an enterprise, taking into account the rational use of all available resources, to correctly develop the management structure, the regulations on the divisions, job descriptions and internal document flow of enterprise (Liu et al. 2017).

The concept of organizational management, developed by the authors (Hilorme 2016; Hilorme, Shachanina 2017, Tetiana et al. 2018, is called “resource management concept”. It is based on the disclosure of human capabilities, the analysis of social and psychological problems, the evaluation of alternative approaches to organizational management. The scientist proposes to consider the following aspects of the organization’s activities that affect the effectiveness of its functioning: innovative, bureaucratic, technocratic and other managerial orientations, image behavioral norms, cultural behavior with customers, behavioral types, employee’s initiative, management of conflict, severe, unfavorable, favorable, optimal and other situations, risk minimization in decision-making, introduction of innovations.

Ones et al. 2017 offer an interesting approach to evaluate the evolution of HR practices and transforming it into HR management. If one splits the development of the company into five main stages (the life cycle of an enterprise), it becomes possible to illustrate the relationship between these stages, the company’s main production and structural characteristics, and the evolution of HR management into HR management.

Ensuring the effectiveness of HR management is the most important condition for improving the business effectiveness and ensuring enterprise sustainability. In the conditions of limited resources and time, it is necessary to identify the ways in which it is possible to achieve the greatest results in the shortest time on the
way to improving the business effectiveness, in other words, to outline the best ways to increase the business effectiveness of the managerial personnel of the organization.

3. Methods

Based on the concept of a functional approach, a generalized measure (integral indicator) of human resource management can be provided by describing the interrelationships between different indicators and parameters, bringing them to a single computing platform (Tetiana et al. 2018). By the indicator of the effectiveness of human resource management, we mean the quantitative level of personnel activity, which takes into account the social and economic state of enterprise’s activity. Indicator is the quantitative expression of a specific characteristic of the indicator of the effectiveness of human resource management, which provides an opportunity to evaluate progress, increase the efficiency and effectiveness of decision-making by simplifying and aggregating large volumes of information and presenting it in a concentrated form to decision makers (Hilorme et al. 2018). The analysis of the aforementioned indicators for the determination of indicators is a prerequisite for the calculation of an appropriate indicator of the effectiveness of HR management of the enterprise (Nakashydze et al. 2015).

There are many reasons for the crisis of HR management at the microeconomic level, the main ones can be: conflict of interests of those interested in the activities of enterprises; disadvantages in HR management; insufficient motivation; low level of qualification and training; bad working conditions; contradictions between the goals of the organization and the interests of certain groups of workers; outdated organizational structures and management style; lack of resources and information; shortcomings in the control of the personnel work; violation of ethics; underestimation or miscalculation of performance; the discrepancy between the type of organizational culture and the behavior of the organization’s new operating environment. The crisis of personnel determines the inconsistency of its activities with the new conditions that appeared during the development of the organization. The main “symptoms” of crisis of HR management at the enterprise are: low productivity; high turnover rate of personnel; shortage of skilled personnel; lack of a clear, rational distribution of functions among employees, duplication of work; redundant human resource; non-compliance of the qualification structure of the personnel with the needs of the enterprise; poor motivation of staff; absence of employees initiative; a tense emotional atmosphere in the team, associated with the critical mass of demotivating factors in the enterprise and a large number of conflict situations. In a crisis situation, enterprises began to look for ways to minimize negative impacts, by resorting to operational measures to reduce costs, revise budgets, and temporarily discourage investment and recruit new workers (Brewster 2017).

On the basis of the systematization of theoretical studies, the author established that for the stable functioning of enterprises, more attention should be paid to the mechanism of HR management, since it is the human resource of the enterprise in the market economy that is the main factor of successful entrepreneurial activity, which requires significant investments. In this regard, the key issue of improving the competitiveness of the enterprise at any stage of the life cycle is the effective management of enterprise and personnel, as well as the search for new forms and methods of its organization.

4. Results

In the modern environment, it is increasingly difficult to provide a constantly rising cost of labor and to seek not only the fulfillment of official duties, but also to stimulate the activity of personnel, providing a significant increase in labor productivity. The new economy requires proactive managerial staff, which seeks to increase its competence and innovation activities, focuses on maximum achievements in labor and takes responsibility for the activities of the company as a whole. On the theoretical basis, the author determined that the main directions of activity in the field of effective HR management of the enterprise or its components are: the definition of the need in personnel (the planning of quantitative and qualitative needs in the personnel, the choice of methods for calculating the number of needs in personnel); selection of personnel (analysis of sources of personnel selection, establishment of relations with external organizations, business assessment of personnel at the time of selection); placement of personnel (current periodic assessment of personnel, purposeful movement of personnel); personnel
development (adaptation, training, professional and career advancement, employee redundancy); maintaining a comfortable social and psychological climate (regulating the relationship between the leader and the team, working relationships, reducing the level of conflict in the team); motivation for behavior (adequate payment, creating a creative atmosphere, supporting a career, raising the “corporate spirit”); management of personnel safety (creation of normal working conditions, protection of labor, implementation of training programs aimed at creating safe actions for employees, providing social infrastructure); legal and informational support of HR management process (legal regulation of labor relations, accounting and personnel statistics, communication).

In the course of the research, the author found that most of the competing enterprises are technically equipped approximately alike, they use similar techniques and methods of marketing and production organization, but the competitive advantages depend on the qualitative characteristics of the personnel and the tools used in the formation of the HR management system. Therefore, adaptive, flexible and mobile HR management system is one of the main factors of the enterprise’s competitiveness in modern conditions.

The personnel is a valuable and significant strategic resource of the organization, and its formation and use are factors of competitive advantages. The predominant orientation towards managerial staff requires the creation of conditions for the expansion of knowledge, competencies and self-improvement, increasing the creative, innovative activity of employees and job satisfaction (Collings et al. 2018). Effectiveness of the personnel, as well as the other factors of ensuring the effectiveness of the company, can be influenced, since the business effectiveness of the organization as a whole significantly depends on the effectiveness of the managerial staff; and one of the main tasks is to determine the directions of its increase. These directions, in particular, include: promotion; providing an acceptable level of education; acquiring practical experience; advanced training of management personnel; carrying out periodic certification.

The increase of the effectiveness level of the managerial staff is not limited only by the directions considered, it is also affected by the improvement of the production structure of the organization, rational organization of production and labor, including all personnel, optimization of organizational structure, forms and methods of management, communication processes, etc (Delery et al. 2017). The modern managerial concept should take into account the features of a market economy, which can be distinguished by comparing in general the systemic factors of a political, economic and social nature in the developed countries (Jabbour et al. 2016; Masum et al. 2016; Zhou et al. 2017. This analysis does not claim to be comprehensive and profound, its purpose is to show the limited use of models produced in the countries with developed markets, the presence of similar problems and solutions to them, taking into account differences in conditions and systems that are at different stages of development. The above comparison shows that the world countries are on the way of creating a civil society as an active force, and the enterprise’s HR management as part of this society should be seen as an important element of social development (Zhou et al. 2017). It should be said that this goal is quite complex and requires solving a number of problems: updating the domestic theory and practice of modern HR management ideas and methods of scientific schools of all their previous adaptation; raising the level of organizational culture and quality of working life; implementation of a systematic approach in the HR management, departure from the simplified “staff” understanding of personnel; improvement of effectiveness and competitiveness of the enterprise at the expense of full use and development of HR potential - both individual and group; raising the level of self-assessment and self-esteem of personnel, implementation of methods of development management, aimed at actualizing the needs of people in self-realization and professional growth. Thus, one can assume that the main directions of increasing the productivity of managerial staff are: the formation of a stable quality of managerial staff; determination of criteria and indicators of the efficiency of their work; organization of constant accounting and control over the results of managerial and production personnel; increase in training costs; learning flexibility and speed of sales of goods by cashiers; increase of standards of production and quality of service; deepening of specialization, not connected with the implementation of new technology; reduction of unproductive loss of working time; ensuring a fairly high material and moral interest of employees in the results; formation of a new social and psychological climate in a team aimed at creating conditions for productive labor; formation of a poly-criterial system of activation of the personnel of the enterprise. Increasing the effectiveness level of enterprises is possible through the construction of an effective mechanism for ensuring the effectiveness of HR management.
Thus, according to the determined expert assessments, nine functions of HR management were selected that maximally characterize the HR management of the studied enterprises. Table 1 presents the functions of human resource management and the corresponding indicators used to model business processes of human resource management.

**Table 1. Indicators of evaluation of human resource management functions**

<table>
<thead>
<tr>
<th>№</th>
<th>Functions</th>
<th>Indicator</th>
<th>Indicator mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Personnel analysis and planning</td>
<td>$I_{app}$</td>
<td>$z1 - z4$</td>
</tr>
<tr>
<td>2</td>
<td>Personnel recruitment</td>
<td>$I_{pp}$</td>
<td>$z5 - z7$</td>
</tr>
<tr>
<td>3</td>
<td>Personnel selection</td>
<td>$I_{sep}$</td>
<td>$z8 - z11$</td>
</tr>
<tr>
<td>4</td>
<td>Personnel certification and assessment</td>
<td>$I_{aq}$</td>
<td>$z12 - z15$</td>
</tr>
<tr>
<td>5</td>
<td>Organization of labor relations</td>
<td>$I_{orp}$</td>
<td>$z16 - z18$</td>
</tr>
<tr>
<td>6</td>
<td>Personnel motivation</td>
<td>$I_{im}$</td>
<td>$z19 - z23$</td>
</tr>
<tr>
<td>7</td>
<td>Creation of working conditions</td>
<td>$I_{rep}$</td>
<td>$z24 - z25$</td>
</tr>
<tr>
<td>8</td>
<td>Information support</td>
<td>$I_{isp}$</td>
<td>$z26 - z27$</td>
</tr>
<tr>
<td>9</td>
<td>Personnel development and training</td>
<td>$I_{rpp}$</td>
<td>$z28 - z30$</td>
</tr>
</tbody>
</table>

Indicators ($z1 - z30$) determine the directions of the effectiveness of HR management, namely the personnel effectiveness in terms of increasing productivity level (Table 2).

**Table 2. Indicators and indices of human resource management functions**

<table>
<thead>
<tr>
<th>Indicator</th>
<th>Mark</th>
<th>Indices</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>$I_{app}$</td>
<td>$z1$</td>
<td>Wages fund</td>
<td>Thousands of US dollars</td>
</tr>
<tr>
<td></td>
<td>$z2$</td>
<td>Expenses of wages with accrual to the hryvnia of commodity and sold products</td>
<td>Thousands of US dollars</td>
</tr>
<tr>
<td></td>
<td>$z3$</td>
<td>Yearly output per worker</td>
<td>Thousands of US dollars/person</td>
</tr>
<tr>
<td></td>
<td>$z4$</td>
<td>Expenses of wages per hryvnia of sold products</td>
<td>Thousands of US dollars</td>
</tr>
<tr>
<td>$I_{pp}$</td>
<td>$z5$</td>
<td>Number of employees to provide the work</td>
<td>people</td>
</tr>
<tr>
<td></td>
<td>$z6$</td>
<td>Average wage category of performed work to the average personnel wage category</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>$z7$</td>
<td>Turnover from personnel reception and dismissal</td>
<td>%</td>
</tr>
<tr>
<td>$I_{orp}$</td>
<td>$z8$</td>
<td>Provision of enterprise personnel</td>
<td>people</td>
</tr>
<tr>
<td></td>
<td>$z9$</td>
<td>Increase in the number of personnel by educational level</td>
<td>people</td>
</tr>
<tr>
<td></td>
<td>$z10$</td>
<td>The coefficient of personnel variability</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>$z11$</td>
<td>Loss of working time</td>
<td>hour</td>
</tr>
<tr>
<td>$I_{ork}$</td>
<td>$z12$</td>
<td>The coefficient of quality of products on the fact of consumer complaints</td>
<td>%</td>
</tr>
<tr>
<td></td>
<td>$z13$</td>
<td>Productivity</td>
<td>Thousands of US dollars</td>
</tr>
<tr>
<td></td>
<td>$z14$</td>
<td>Professional qualification level of personnel</td>
<td>people</td>
</tr>
<tr>
<td></td>
<td>$z15$</td>
<td>Increase the coverage of work with standards and norms</td>
<td>%</td>
</tr>
<tr>
<td>$I_{on}$</td>
<td>$z16$</td>
<td>Increase in the number of personnel by educational level</td>
<td>people</td>
</tr>
<tr>
<td></td>
<td>$z17$</td>
<td>Labor costs of personnel</td>
<td>Thousands of US dollars</td>
</tr>
<tr>
<td></td>
<td>$z18$</td>
<td>Social expenditures</td>
<td>Thousands of US dollars</td>
</tr>
<tr>
<td>$I_{on}$</td>
<td>$z19$</td>
<td>An increase in the share of profits, surcharges and allowances in the total wages fund of personnel</td>
<td>Thousands of US dollars</td>
</tr>
<tr>
<td></td>
<td>$z20$</td>
<td>Growth of the basic and additional payment, incentives and compensatory payments in the wages fund of personnel</td>
<td>Thousands of US dollars</td>
</tr>
<tr>
<td></td>
<td>$z21$</td>
<td>The average monthly salary</td>
<td>US dollars/people</td>
</tr>
<tr>
<td></td>
<td>$z22$</td>
<td>The coefficient of productively used working time</td>
<td>people/hour</td>
</tr>
<tr>
<td></td>
<td>$z23$</td>
<td>Incentive and compensation payments</td>
<td>Thousands of US dollars</td>
</tr>
</tbody>
</table>
Based on the calculation of the integral indicator of the effectiveness of HR management of enterprises and the established scale of evaluation of the effectiveness level of personnel, the state of the mechanism for ensuring the effectiveness of HR management has been determined. The above-mentioned scale for evaluating the effectiveness of HR management is given in Table 3.

Table 3. The scale for evaluating the level of the integral indicator of the effectiveness of HR management of enterprises

<table>
<thead>
<tr>
<th>Levels (range of values)</th>
<th>Features of the level of integral indicator of the effectiveness of HR management (group characteristics)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>High</strong> [0.7—1]</td>
<td>Minor adjustments are needed as well as investments to improve individual processes, additional study of the indicators of other groups will make it possible to determine in which one it is needed, and assign responsible managers. An enterprise operates stably, the opportunities for effective development exist, it does not require the development and implementation of additional measures for motivation and information provision.</td>
</tr>
<tr>
<td><strong>Medium</strong> [0.5—0.69]</td>
<td>The state of an enterprise is relatively stable, it has values close to the threshold, indicating the need to develop measures (organizational, motivational and informational) in order to avoid deterioration of the situation at the enterprise.</td>
</tr>
<tr>
<td><strong>Low</strong> [0.3—0.49]</td>
<td>An enterprise has a low level of effectiveness of HR management, which largely does not meet the conditions for ensuring the effectiveness of personnel activities. The situation requires corrective action in the field: development of normative and methodical personnel documentation; the implementation of measures aimed at establishing a clear link between wages and results of work; the implementation of technology for professional orientation management and adaptation (possible creation of mentoring system); the implementation of the method of business assessment and attestation of personnel for employees and its improvement for managerial personnel. It is advisable to improve the mechanism of ensuring the effectiveness of personnel activities, the implementation of which should ensure the effectiveness of an enterprise.</td>
</tr>
<tr>
<td><strong>Weak (limited)</strong> [0—0.29]</td>
<td>The state of an enterprise is extremely unstable, development is complicated. The situation requires a comprehensive development of measures and significant corrective actions: improvement of the system of non-material stimulation; raising the level of the organization of work; raising the professional qualification level of employees and creating a system for identifying learning needs (developing criteria); study of causes of personnel turnover; stimulation of initiative and creative development of the personnel; increasing the effectiveness of management of working time, active actions to increase the level of labor discipline and working conditions; improvement of the organizational structure in the field of personnel management. It is advisable to take measures to identify the optimal way of HR management to achieve the optimal level of effectiveness of the enterprise's personnel in the coming years.</td>
</tr>
</tbody>
</table>

On the basis of the data obtained, we can conclude: in order to ensure the effectiveness of HR management, it is necessary to promptly make optimal decisions in the field of organizational, motivational and informational support of personnel, to develop and implement measures for the effective operation of employees of the enterprise, to guarantee increase of productivity and labor productivity, and also to improve the system of the personnel development. Separately, one should pay attention to the cards of motivators. Managerial activity requires the development of new progressive methods and mechanisms for ensuring the effectiveness of HR management. Rational managerial decisions made by the managerial bodies of different levels, have a decisive influence on improving the social and economic state of business at the enterprise. The main condition for the correctness of decisions is an exhaustive awareness. Ensuring the effectiveness of HR management is a complex process, the implementation of which must be based, first of all, on reliable and comprehensive information at all levels of management. In this connection, the information support of the HR management system and an enterprise as a whole, whose effectiveness determines the ultimate performance and productivity, plays a special role. Under the prevailing conditions, an important direction in the functioning of information provision is the constant search for effective ways of improving the activities of the enterprise and its personnel based on continuous processing of information flows in order to ensure rational business (Xing et al. 2016). Effective management of
the components of information provision creates a basis for maximally effective use of information available to enterprises and personnel in order to achieve its strategy and current goals, the formation of a personnel supply mechanism and the acquisition of competitive advantages in a dynamic market environment. The calculation of the statistical integral indicator of the effectiveness of HR management is proposed to be used in order to evaluate the activity of the personnel of an enterprise. This methodical approach makes it possible to take into account all functions of HR management and thus reflects the relationship between the three inseparable areas of ensuring the effectiveness of the enterprise’s personnel: organizational, informational and motivational one. Enterprises must have access to the necessary information in order to turn it into knowledge that will be used to achieve the goals set, to control the sources of its receipt, to search for the necessary data in an array of received information, to adapt to the needs of users the profiles of news and other demanded information, actions, aimed at performing specific tasks (compiling reports, carrying out research, comparing different results, etc. (Viswesvaran, Ones, 2017; Koev 2018a). Taking into account the dynamism of the organizations, there is a growing possibility of making of suboptimal managerial decisions due to the lack of time that could endanger the very existence of an enterprise. This is especially important at the stage of choosing a strategy. A simple reproduction of known solutions, even the most advertised ones, tends to take an enterprise off into a “catching-up” mode. Therefore, the provision of competitive advantages of an enterprise is primarily due to the formation in the management of the idea of new possibilities of modern technology, which requires the use of intellectual elements in an integrated information system. Based on research, the author proposed the creation and use of the information support system by enterprises as an intellectual center. This is one of the prerequisites that will ensure effective managerial decisions and the development of managerial innovations (Koev 2018b). Thus, managers of modern industrial enterprises need effective tools to ensure the successful development of both the entire enterprise and its individual subsystems, especially in terms of diagnostics, assessment, build-up and use of potential for development of managerial personnel and acquisition of new competencies. The information support system is practical, simple and convenient in operation and does not require any specialist knowledge in the field of psychology of the individual and the group, sociology and other disciplines, since it is a “thinking” system capable of self-learning and adapting to any production situation (Wehrmeyer 2017).

5. Discussion

Thus, the priority and effectiveness of management depends on the availability and level of use of professional qualification, creative potential and organizational capacity of the enterprise’s management. However, one of the disadvantages of human intelligence is that it is not adapted to the accumulation of a huge amount of information, the implementation of grandiose computations in the analysis of complex production, labor or financial processes at the enterprise. The information support system will ensure the creation and development of intellectual centers of an enterprise with a cross-cutting information environment for the accumulation and exchange of knowledge between managers who, in cooperation with virtual intelligence agents, will select a set of diverse textual and analytical information on the state of the market, the activities of competitors, contractors, opportunities for improvement of document circulation, performance of tasks by subdivisions and achieved the final results of activity of enterprises in general.

Taking into account the considerable number of tasks of the managerial personnel of an enterprise aimed at defining its mission, values, policy, formation of the structure and management system, representation in negotiations with public authorities and main contractors, as well as performance of functional duties, the complexity of controlling the activities of each divisions of an enterprise and making managerial decisions by middle and lower level managers, it is advisable to identify users of the information support system, among which should be managers of the upper, middle and lower levels of managerial decision-making. In order to ensure the development of managerial personnel, the implementation of managerial innovations and the effective making managerial decisions at the enterprise, the information support system has three main tasks: development of the intellectual center; provision of activity of intellectual agents; simplifying the process of document circulation and informing management. The personnel is the determinant of the successful functioning of any organization, and therefore, the main factor in the formation and ensuring its competitiveness. The result of implementation of the mechanism of ensuring the effectiveness of HR management of enterprises is the achievements of the
objectives of the enterprise, structural changes on it, increase the level of productivity of managerial personnel and gaining competitive advantages.

The effective activity of an enterprise depends not only on the high level of competitiveness, sufficient property potential, but also on the competence of managerial personnel and the effectiveness of its internal organization. The effectiveness of staffing is manifested in the highly productive use and development of material means of production, meeting the needs and expectations of customers. In order to achieve such results, an enterprise must have certain goals and objectives, be appropriately staffed with the appropriate number of workers who have the necessary capacity for which the necessary conditions are created that contribute to improving the efficiency of labor. Until today, practice requires from the personnel the results of vocational education not only in the form of acquired knowledge, but also their practical readiness and ability to solve problems, both in typical and non-standard situations of professional life.

Conclusions

In contemporary conditions, characterized by emerging unsecurity, the contribution to personnel becomes a long-term factor of competitiveness and resilience of an enterprise. The effectiveness of the personnel component of the success of an enterprise depends on the chosen strategy of personnel development. The modern mechanism of ensuring the effectiveness of HR management should be aimed at increasing the competitiveness of an enterprise, its long-term development, the maximum profit level and the increase in productivity. In today’s conditions, most experts believe that the formula of success is human resources, and therefore their value is constantly increasing day by day. Accordingly, the mechanism of ensuring the effectiveness of HR management is constantly changing, replacing the stereotypes. Continuous improvement of the processes of effective HR management is necessary based on implementation of scientific methods, advanced technologies of personnel work, standardization and unification of personnel documentation, application of technical means. Innovative approaches to evaluating the effectiveness of human resources management, depending on the method of achieving the economic effect of production activity, should be implemented at the enterprises. Thus, the proposed mechanism of ensuring the effectiveness of the personnel of enterprises makes it possible to: increase the productivity of personnel; improve the quality and timeliness of the work performed; ensure participation in development and advanced training programs (employee interest in the company); reduce the outflow of personnel; ensure the organization of innovation activities and increase the level of effectiveness of an enterprise. As we can see, with the help of the proposed methodical approach to the evaluation of the effectiveness of the management of the enterprises, it is possible to determine the directions of solving administrative problems and improve the mechanism of ensuring the effectiveness of the personnel activities that will increase the level of labor productivity and competitiveness of an enterprise.

References


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THE MODERATING ROLE OF ENVIRONMENTAL DISASTER IN RELATION TO MICROFINANCE’S NON-FINANCIAL SERVICES AND WOMEN’S MICRO-ENTERPRISE SUSTAINABILITY

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Abstract. This comparative study explores the contribution of non-financial services, namely, micro training and social capital towards women micro enterprise sustainability in Pakistan and Malaysia, specifically focusing on women, the vulnerable section of the society. Because of gender discrimination, women micro enterprise sustainability is relatively low, and thus, has lower contribution to economy in Pakistan and Malaysia (20% to 25%). The moderating role of environmental disaster is considered in this cross-sectional research. The responses were gathered from females working micro enterprises through survey questionnaire while data was analyzed through SmartPLS 3. Results revealed that environmental disaster has significant impact on women micro enterprise sustainability in Pakistan and Malaysia. Micro training also is evident to have statistically significant impact on women micro enterprise sustainability in both countries. Interestingly, social capital has significant impact on women enterprise sustainability in Malaysia while non-significant in Pakistan. Lastly, environmental disaster has significant moderating role between micro training and women micro enterprise sustainability in Pakistan and Malaysia. This study is a pioneer to investigate women micro enterprise sustainability in cross-cultural manner while including environmental disaster’s moderating role. Thus, this study assists the governments of Pakistan and Malaysia along with the practitioners to enhance understanding and implement strategies to boost women micro enterprise sustainability.

Keywords: social capital; micro training; women micro-enterprise sustainability; environmental disaster; comparative analysis


JEL Classifications: J16; B55; G21

Introduction

There is no doubt that environmental disasters would impact the wide range of companies and societies. Alas, scale and strength of this impact remains unclear, especially when we consider the most vulnerable targets, such as micro enterprises, women, especially, poor segment (e.g. Njaramba et al. 2018a; 2018b; Belas et al. 2018). Hence, women enterprise sustainability is a major theme behind underpinning this quantitative study. The concept derives from empowerment approach that identifies values and individual’s resourcefulness to meet their needs (Harley et al. 2018). This study intakes women enterprise sustainability from the context of self-sustainability, which reflects their individual ability for catering their needs through independent efforts. According to Hameed, Mohammad and Shahar (2018a), in poor community, often higher self-sustainability is
evident among individuals for survival. Moving in the same vein for explaining the women micro enterprise sustainability, the notion of self-sustainability is explained from vast literature, which view it as “self-sufficiency” (Becker, Kovach, & Gronseth, 2004; Postmus, 2013; Scott, London & Gross, 2007), “self-efficacy” (Campione, Morgan & Jerrell, 2004; Dickerson & Taylor, 2000) and “financial independence” for fulfilling one’s financial needs (Yunus & Jolis, 2003). Nevertheless, these different terminologies reflect the ability of the individual by carrying out work-related activities by his/her own so that desired financial gains are attained while decision making is independent. The self-sustainability of women through micro enterprises is examined in this study by focusing on non-financial services perspective.

Financial services perspective related to micro enterprises has been explored to larger extent while little evidence available regarding non-financial services to examine women micro enterprises sustainability (Akanji, 2006; Meyer, 2018). Interestingly, the previous empirical studies are largely focused on specific economy, especially developed economy whilst there is no conclusive evidence to examine the relationship between research variables from cross-cultural comparative aspect. In other words, this study delimits the literature of region-specific knowledge by offering cross-cultural perspective to gain wider generalizability. Hence, in this regards, Pakistan and Malaysia are considered cases, because both have large similarities such as, the role of women entrepreneurial activities is largely limited in the male dominated society (Mahmood, 2011; Musa et al. 2016). Additionally, comparison through Hofstede model reflect that masculinity is equal in both Pakistan and Malaysia while long-term orientation and individualism is closely matched (Hofstede, 2018). The work of Kabeer (2012) showed that 70% women are most vulnerable community in the world, hence, the sustainability is also lower in them in contrast to males. In Malaysia, only 0.8% reduction in 49.3% poverty is evident since 1975 (Islam et al. 2017). On the other hand, 40% of the women in Pakistan are living in poverty while 30% of them are deprived of social and economic support (Rehman, Moazzam & Ansari, 2015). Hence, both countries have higher level of poverty, reflecting lower level of self-sustainability in Pakistan and Malaysia. Number of reasons have been identified as cause behind low level of women’s self-sustainability in Malaysia and Pakistan however, the most prominent remains “gender discrimination issues” (Faizan & Haque, 2016; Yasmeen, 2015) by treating and promoting men more in comparison to women in different fields and aspects of life such as, education, sports, etc.

The contribution of women towards gross domestic products (GDP) is lower in comparison to developed economies. For instance, in the United States, women’s contribution is approximately 50% while in Malaysia it is accounted to 34-40% while in Pakistan, it is between 25 to 30% (Bosma, 2010; Nil, Hamid & Woon, 2011; Hameed, Mohammad & Shahar, 2018b). Thus, this indicates that lower empowered women in Pakistan and Malaysia is due to lower level of self-sustainability in comparison to the US. Due to this, lack of training opportunities and social capital is relatively lower for these women managed enterprises (Kithae, Niyaga & Kimani, 2013; Kot et al., 2016). In other words, the approach for microfinance institutions to improve is lower, which also indicate that the role of these microfinance institutions is relatively lower in improving the social conditions. The primary goal of microfinance institutes is to reduce the poverty level and to empower their beneficiaries through numerous services such as access to credit facilities, savings, training, insurance, and social network (Al-Shami et al. 2016). Mayoux (2005) argued that through facilitating women’s micro-enterprises, the self-sustainability of women enhances through microfinance institutions. The level of income increases through micro-enterprises and reduce the issues of gender discrimination to some extent (Mayoux, 2005). Hence, micro-enterprises play vital role in improving women’s self-sustainability.

Nevertheless, an environmental disaster is another vital factor that affect women’s self-sustainability in adverse manner (Blakie et al. 2004). “It includes different vulnerability factors which determine the degree to which someone’s life and livelihood are put at risk by a discrete and identifiable event in nature. These environmental disasters include flood, heavy rainfall, shortage of water and any other environmental factors, etc” (Blakie et al. 2004; p. 12). Thus, all the aforementioned factors affect the relationship between the non-financial services offered by microfinance institutions (training, and social capital) and women’s self-sustainability. Although, other financial services are also affected by environmental disasters, but the focus of this study is on non-financial services, therefore, only training and social capital are considered. The constructive contribution of micro-finance institutions towards women enterprise sustainability is limited due to these environmental
disasters. Hence, environmental disasters are taken as moderating variable to assess the contribution of non-financial services towards women-owned and run micro-enterprises.

This study’s prime objective is to investigate the role of non-financial services of microfinance institutions in relation to women’s self-sustainability in comparative manner by examining in Malaysia and Pakistan. Following are the two sub-objectives:

1. To investigate the role of microfinance institution’s non-financial services (micro training and social capital) in the success rate of women’s micro-enterprises.

2. To investigate the moderating role of environmental disaster between a microfinance institution’s non-financial services (micro training and social capital) and the success of women’s micro-enterprise (Figure 1).

![Figure 1](current research theoretical framework representing the micro finance non-financial services in relation to women micro enterprise sustainability with environmental disaster as moderating variable.)

This is pioneer in expanding the knowledge through focusing on non-financial services of microfinance institutions as a major facilitator of women’s micro enterprise sustainability. Previous studies are available regarding the relationship between microfinance and women empowerment or higher emphasise on the financial services of micro finance institutions. Nevertheless, at hand literature has not explored the non-financial services of microfinance institutions affecting women self-sustainability through micro enterprises. Additionally, the major contribution of this research is use of environmental disasters (i.e. moderator) as a limiting factor (especially in developing countries like Malaysia and Pakistan) regarding the constructive contribution of microfinance institutions’ non-financial services towards women’s self-sustainability. Previous research studies have not formally documented environmental disasters as a threat towards women micro enterprise’ sustainability. Prior studies have had recommended environmental disaster as moderator for future studies (Gaiha & Thapa, 2006; Hameed et al. 2018a; Harley et al. 2018). Therefore, this study builds on it by considering it as a moderator. In addition to that, this study undertakes comparative approach to examine the relationship between research variables by considering two similar alike emerging economies to have wider generalizability. Furthermore, the Pakistan Microfinance (PMR) Report (2017) revealed that negative environmental factors are destroying the women’s micro enterprises, reflecting limited positive contribution of microfinance institutions. Hence, indicating that women’s low self-sustainability is due to these environmental factors. The study expands on highlighting the limitation of the Mayoux’s Feminist Empowerment Theory as it is not applicable in all environments. According to this theory, microfinance services enhance women advancement (Mayoux, 2005). While, the earlier report showed that microfinance services are not beneficial. However, the report largely considered financial services while there is a need to assess the theory through non-financial services, which is the contribution towards knowledge in the area. Moreover, the governments of considered economies would benefit as the policy makers could use the suggestions to improve the non-financial services of microfinance institutions in improving the women’s self-sustainability.
Literature Review

2.1 The Underpinning Theories

2.1.1 Mayoux’s Feminist Empowerment Theory:

In the context of microfinance, women empowerment serves as a base for the women’s self-sustainability (Harley et al. 2018). In the same vein, the women empowerment issue is addressed through Mayoux’s feminist empowerment theory to a large extent (Mayoux, 1999). Since, Pakistan as well as Malaysia are emerging economies thus, this theory is based on the degree of attention emerging countries have paid to women empowerment from a lens of social and economic viewpoint. Nevertheless, this theory’s ultimate objective is creation of self-sustainability among women. Gender discrimination in terms of jobs, wealth and income are the common issues faced by women in various parts of the emerging world (Mayoux, 2005). Additionally, the intrusion on their basic human rights such as access to nutrition, respect, health care, education and independence in decision-making (Mayoux, 2005). According to this theory, “women empowerment can be achieved by providing access to credit facilities through microfinance institutions” (Mayoux, 2005). Both, financial capital assistance and non-financial services such as micro training and social capital could be pivotal in attaining women empowerment, which is generating income related activities in micro-enterprises (Mayoux, 2005). Nevertheless, skills and social capital are lacking in emerging economies like Pakistan and Malaysia (IBRU, 2009). “Moreover, micro-insurance policies cover the loss in micro-enterprises if any, in the event of the occurrence of natural disasters or any other vulnerability factor” (Mayoux, 2005).

Poverty alleviation, financial self-sustainability and feminist empowerment are three core paradigms of Feminist empowerment theory, as shown in Figure 2 (Mayoux, 1998). Incorporating microfinance for empowering women, all the considered aspects in paradigm are formed. Theory offers a methodical structure for empowering women through microfinance services such as micro-credit, micro-saving, micro-insurance and any other financial as well as non-financial services. However, in this study, only non-financial services are considered to examine the impact on the women’s micro enterprise sustainability.

This theory provides a link between microfinance institutions and women’s self-sustainability thus reducing their poverty level and gender discrimination against them. It enhances the success of women-owned and run micro-enterprises through various services offered by microfinance institutions (micro training and social capital).
Above figure reflects that women self-sustainability is a resultant of the microfinance institutions’ services. The decision-making power enhance due to accessibility towards facilities and credit attainment (Figure 2). Due to accessibility to facilities, women by their own decide the procedure and time for repaying loans. Additionally, the economic and social status improve as well as the income generate further due to investment in micro-enterprises. Hence, income flow under women’s own control and therefore, they develop the ways to decrease gender discrimination in the emerging economies. The microfinance process assists women in the development of free social network that eventually increases the employment rate among women as well as improve their social, legal and political outlook.

2.1.2 A Relational Theory of Risk

Bohlom & Corvellec (2011) explained that “an object at risk, a risk object and a relationship of risk are three main components of a relational theory of risk” that is undertaken in this study to explain the environmental disaster perspective. “An object at risk is an object having some value which is at stake. However, a risk object is any entity which threatens the object at risk. Finally, the relationship of the object at risk and a risk object is called a relationship of risk” (Bohlom & Corvellec, 2011). The equation of theory is given below:

\[
\text{[A Risk object]} \quad \leftrightarrow \quad \text{(Relationship of risk)} \quad \rightarrow \quad \text{[Object at risk]}
\]
“Risk objects are similar to hazards in the sense that it denotes something that is acknowledged as dangerous” (Bohlom & Corvellec, 2011), that includes, environmental factors such as heavy rainfall, shortage of water, flood and any other environmental disaster. “Environmental vulnerability also consists of hazards such as natural calamities, climate changes and any other environmental negatives” (Birkmann, 2006; McEntire et al. 2010). Therefore, a risk object in this study is an environmental disaster. “An object at risk is based on the object having some value which is at stake due to the presence of a risk object (i.e. it is prone to risk)” (Bohlom & Corvellec, 2011). Bourdieu (2003) explained that, “in modern societies, value is referred to as worth, life, nature, principles and so on by considering it in monetary terms”. Hence, economic and social status is both considered as an object at risk. Additionally, success of women’s micro-enterprises is object at risk. In other words, environmental disasters (risk object) may harm the success of women’s micro-enterprises sustainability (object at risk).

Finally, “the relationship of risk implies to the association that an observer establishes between the object at risk and the risk object. This relationship is a causal relationship in which a risk object may modify the object at risk” (Bohlom & Corvellec, 2011). According to Bohlom & Corvellec (2011), the linkage must form in a manner that the risk object threatening the object at risk should be investigated in terms of how and why it happens. In this research, the causal relationship between environmental disaster and the success or otherwise of women’s micro-enterprise is exerted. In addition to that, an invaluable relationship exist between the non-financial services offered by microfinance institutions and the success of women’s micro-enterprises their self-sustainability. In this regard, this invaluable relationship is also treated as an “object at risk,” and environmental disaster (a risk object) may limit (modify) this relationship. Therefore, in this study, an environmental disaster is treated as a “risk object”. The success of women’s micro-enterprises and its sustainability is treated as an “object at risk”.

In present context, the aforementioned theory’s equation is stated below:

\[
\text{Environmental Disaster} \quad \text{Relationship of Risk} \quad \text{Women Micro-Enterprise Success}
\]

\[
\text{Environmental Disaster} \quad \text{Relationship of Risk} \quad \text{Women’s Micro-Enterprise Sustainability}
\]

\[
\text{Environmental Disaster} \quad \text{Relationship of Risk} \quad \text{Relationship of Micro-finance non-financial services and Micro-Enterprise success}
\]

Empowerment is a key for women’s self-sustainability in micro-enterprises. According to Stromquist (2015), non-government organizations (NGOs) and micro-finance institutions are vital for empowering women, especially in emerging economies. Distinctive types of skills and knowledge reflects empowerment (Stromquist, 2015). Women is enabled through women empowerment to become economically independent, positive self-esteem and self-reliance that allows them to overcome social and economic challenges while participate in various developmental activities (Kapila, Singla & Gupta, 2016). Hence, it indicates that nation’s economy boosts to certain extent due to escalated women self-sustainability. On the other hand, rapid growth is evident among the micro-finance in the world (Burżacka & Gąsiorowska, 2016; Dichter, 2007; Garikipati, 2008), where risk and venture capital financing are evident (Burżacka & Gąsiorowska, 2016). Interestingly, approximately in 60 countries, microfinance is operating effectively (Bateman, 2010). Professor Muhammad Younus set micro-finance institution in Bangladesh that led to the concept of self-employment through micro-enterprises, which advanced the economic empowerment, improved living standards, prosperity and skill development (Bateman, 2010).

In Malaysia, the microfinance institution is Amanah Ikhtiar Malaysia (AIM) while Agha Khan Rural Support Program (AKRSP) and Orangi Pilot Project (OPP) in Pakistan, which offers microfinance services (Hameed, Imran, Śusarczyk & Haque, 2019; Pokhriyal, Rani & Uniyal, 2014). Afterward, many other microfinance institutions began to provide various microfinance services. These institutions have been significant in self-sustainability development through the provision of various services such as credit, saving, insurance, training, social capital, and entrepreneurial education. In this study, non-financial microfinance services include micro training and social capital.
Akanji (2006) explained microfinance institutions offer micro training, which is vital service to improve expertise and skills of women entrepreneurs. The businesses face serious challenge that lack expertise and skills. Micro credit and micro savings consider micro training equally important (Akanji, 2006). Although, financial resources’ adequate utilization is key for the success of micro-enterprise, but the results rely on micro training. The success of micro-enterprise is negatively affected in the absence of micro training (Nsengimana, Tengeh & Iwu, 2017). The adequate training is required for the women entrepreneurs to be significant in contributing towards country’s economic growth (Meyer, 2018; Ślusarczyk & Broniszewska, 2014). The well-being, level of income and self-sustainability are significantly influenced by micro training and micro-enterprises, which also is pivotal for the improvement of success of women owned firms (Sulphey & Alkahtani, 2016). Micro-enterprises are positively influenced by micro training (Cheston & Kuhn, 2002). Whilst above discussion revealed that the success rate of women’s micro-enterprises relies on micro training. However, there is no evidence from the distinctive emerging economies about this relationship. Therefore, the null hypothesis is as following:

H1: Micro training has no statistically significant impact on the women’s micro-enterprise sustainability in distinctive emerging economies.

Another microfinance institution’s non-financial service is social capital that is linked to the formation of network of people. “Social capital is defined as ‘the connections among individuals – social networks and the norms of reciprocity and trustworthiness that arise from them’” (Putnam, 2000). Individuals or groups are given the services by microfinance institutions in order to improve their social connections while self-help group (SHE) is also the way of improving the social outlook, offered by microfinance institutions. This networking proves efficient in improving the chances of individuals to attained credit while the formed groups also support one another in the development (PMR, 2017). “The microfinance institution then provides credit to the group. This activity develops and engenders social capital among SHE groups, which in turn, helps them to run their businesses through shared knowledge and experience” (PMR, 2017). Number of societies have used social capital concept for increasing developmental activities (Wansamo, 2007). A network of individuals serves grounds for social capital formation, which increase sustainable development in society and enhance economic growth (Mafukata, Dhlandhlara & Kancheya, 2015). “In a strong network of relations, people support each other to expedite income generating activities like micro-enterprises. An SHE group is one of the ways of raising initial capital for business because members support and spur each other” (Wansamo, 2007). Hence, SHE group tends to enhance the success rate of women’s micro-enterprises and their sustainability. Mafukata et al. (2015) argued that the individual as well as collective group tasks are effectively accomplished by the collaboration and active participation in the developed network. The success and stability of women’ micro-enterprise is due to social relations. Nevertheless, there are no evidence regarding the relationship from distinctive emerging economies. Thus, proposed null hypothesis is as following:

H2: Social capital has no statistically significant impact on the women’s micro-enterprise sustainability in distinctive emerging economies.

Nevertheless, existing literature at hand revealed that there are mixed views as few supports while other contradicts the benefits of non-financial microfinance institutions in regard to women micro-enterprise sustainability. According to Harley et al. (2018) it is likely that microfinance services might produce positive results and accomplish strategic objectives, but all types of services would always bring desired results. The discussions above also revealed that to larger extent, the positive significant impact of microfinance institutions on women’s self-sustainability and their micro-enterprises’ sustainability. However, only fewer studies attained to the conclusion of either a no/less/negative impact of microfinance in this regard. Number of studies viewed lack of financial capital as a reason for negative effect of microfinance on success rate of women’s micro-enterprises (Atmadja, Su & Sharma, 2016). Nevertheless, studies also revealed that lack of social capital and training adversely affect the women’s micro-enterprises rate of success (Buckley, 1997; Mosley & Hulme, 2009). The inconsistency in findings could be resolved through introduction of moderating variable. “A moderator is a variable which affects the strength of the relationship between independent and dependent variables” (Baron & Kenny, 1986). Hence, moderating variable is used in this study to resolve earlier studies’ inconsistency. Environmental disaster is moderating variable undertaken in this study to assess the relation
between microfinance institution’s non-financial services (i.e. micro training and social capital) and the success of women’s micro-enterprises. It was suggested by previous studies (Banerjee & Jackson, 2017; Hameed et al. 2018a). These previous works had proposed that economic, environmental, political and social vulnerability should be considered as moderators to assess the relationship between microfinance services and women-owned and run micro enterprises. Environmental disasters include windstorms, water shortage, heavy rains, floods and so on that affects adversely and disturb the operations of women’s micro-enterprise sustainability. Often, individuals use their savings and credits to recover from disasters, which they perhaps borrow from other in shape loan and need to repay in case they have no sufficient savings. Hence, welfare of people declines due to natural disasters (Banerjee & Jackson, 2017) and it affects women’s self-sustainability directly as well as indirectly through the success rate or otherwise of women’s micro-enterprise. Hence, null hypotheses are proposed as following:

**H3:** Environmental disaster does not have a statistically significant impact on the women’s micro-enterprise sustainability in distinctive emerging economies.

**H4:** Environmental disaster does not moderate the relationship between the micro training and women’s micro-enterprise sustainability in distinctive emerging economies.

**H5:** Environmental disaster does not moderate the relationship between the social capital and women’s micro-enterprise sustainability in distinctive emerging economies.

**Research Methodology**

In this study, cross-sectional research design is used while quantitative methods are employed to statistically attain the research objectives via hypothetico-deductive approach. The survey questionnaire was formed through literature at hand and circulated manually to female clients of microfinance institutions in Pakistan and Malaysia but were limited to only clients who had direct involvement in micro-enterprises by using the services offered by microfinance institutions. The 5-point Likert scale was used for second section’s questions (1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, and 5=Strongly Agree). Comrey & Lee’s (1992) statistical formula was used to determine sample size. As per the series of Comrey & Lee (1992), over 200 sample size is satisfactory while 300 is good enough for drawing conclusion. Thus, in this research over 300 was targeted. The sample size is 304 (152 each in Pakistan and Malaysia), which is a good sample size for drawing conclusion. In this study, area cluster sampling technique was used as there was no sampling framework, and this technique does not require sampling framework (Comrey & Lee, 1992). Additionally, this technique is effective reaching large number of respondents in geographic manner. Considering Pakistan and Malaysia as two densely populated regions, this technique is more feasible and appropriate to reach women using microfinance services. The first step in this sampling technique was categorizing population in terms of states. Pakistan has five states while Malaysia had 13 states respectively. Three from Pakistan while 7 from Malaysia was randomly selected so that at least over 50% in terms of total states are considered. The equation for each cluster was based on \[ nz = (Nz/N) * n \].

**Note:** nz = required sample size for each cluster, Nz = total population of each cluster, N = total population size in all clusters, n = total sample size

The Head office of Pakistan Microfinance Review in Pakistan while Amanah Ikthiar Malaysia (AIM), Yayasan Usaha Maju (YUM) and The Economic Fund for National Entrepreneurs Group (TEKUN) in Malaysia were requested for females in each considered cluster. The total number of female clients in selected clusters was approximately over 3.1 million in both countries. The split of three states in Pakistan and seven states in Malaysia, which was randomly done was further explored by finding the female clients in these regions. However, the total population of these selected clusters is 3 million (15.5 + 1.60). Now, the sample size for each cluster was calculated as follows;

Three states in Pakistan: \[ nz = (1550,000/3100,000) * 300 = 150 \]

Three states in Malaysia: \[ nz = (1600,000/3100,000) * 300 = 154 \]

Total Sample required = over 300
Hence, 500 survey questionnaires were distributed in each country while ensuring that equal splits are maintained. Total 304 (152 in each country) completed questionnaires were received, reflecting 30.4% response rate. These 152 were the females who had availed microfinance services, especially social capital and micro training in managing their micro-enterprises. Therefore, in the sample of the current study, only women who have enjoyed all these microfinance institutions services were selected.

### Table 1: Response from respondents

<table>
<thead>
<tr>
<th>Response</th>
<th>Frequency/Rate</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total questionnaires distributed</td>
<td>1,000</td>
</tr>
<tr>
<td>Total questionnaires returned</td>
<td>367</td>
</tr>
<tr>
<td>Total usable questionnaires</td>
<td>304</td>
</tr>
<tr>
<td>Total questionnaires excluded</td>
<td>63</td>
</tr>
<tr>
<td>Total response rate</td>
<td>36.70%</td>
</tr>
<tr>
<td>Total response rate of the usable questionnaire</td>
<td>30.40%</td>
</tr>
</tbody>
</table>

Naala’s (2016) measures were adapted for social capital, while micro training constructs were taken from Bernard, Kevin & Khin (2016). Harley et al. (2018) measures were considered for self-sustainability of women through micro enterprises and the study of Mata-Lima et al. (2013) was used to construct the environmental disasters impact on research variables. SmartPLS structural equation modeling (SEM) is used for quantitative analysis. The validity and reliability of the instruments were checked through statistical tests. The ethical considerations were maintained during the entire research by keeping no disclosure of personal information of respondents to anyone.

### Results and Analysis

Overall, majority of the females participated in this study from Pakistan lies in the age bracket between (35-44) (34%) while from Malaysia 38% between (45-54) age bracket. In Pakistan, majority having bachelor’s degree (28.2%) while in Malaysia majority have master’s (31.2%). In Pakistan, majority have the experience of 5-8 years (36%) while in Malaysia 40.2% have experience of over 10 years.

### Measurement Model Validation

The assessment of measurement model is analysed through Smart-PLS 3.2.7 (Ringle et al. 2015). In order to conclude validation of measurement model, reliability, convergent and discriminant validity are examined. In both countries, the reliability of individual items is examined through factor loading, which are greater than 0.70 threshold value. The Cronbach alpha (α), composite reliability (CR), and average variance extracted (AVE) are found acceptable as α ≤ 0.70, CR ≤ 0.70 and AVE ≤ 0.50 for each construct in both economies (Table 2). Thus, this fulfil the criterion of Hair, Hult, Ringle & Sarstedt (2014), reflecting the measurement model is valid and acceptable.

### Table 2: Finding of the measurement model (first order, reflective)

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Pakistan</th>
<th>Malaysia</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>A</td>
<td>CR</td>
</tr>
<tr>
<td>Environmental Disaster</td>
<td>0.809</td>
<td>0.874</td>
</tr>
<tr>
<td>Micro Training</td>
<td>0.794</td>
<td>0.879</td>
</tr>
<tr>
<td>Social Capital</td>
<td>0.783</td>
<td>0.871</td>
</tr>
<tr>
<td>Women Micro Enterprise Sustainability</td>
<td>0.761</td>
<td>0.848</td>
</tr>
</tbody>
</table>
The model external consistency is considered to determine discriminant validity through Fornell-Larcker’s criterion and cross loading. As per Fornell & Larcker (1981), latent variables’ AVE greater than the square root average variance extracted, indicate valid results. Below the results in both countries are evident to be greater than 0.50, reflecting that all constructs have external validity (Table 3).

Table 3: Discriminant Validity (Fornell-Larcker criterion)

<table>
<thead>
<tr>
<th>Constructs</th>
<th>Environmental Disaster</th>
<th>Micro Training</th>
<th>Social Capital</th>
<th>Women Micro Enterprise Sustainability</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Pakistan</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Disaster</td>
<td>0.797</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micro Training</td>
<td>0.719</td>
<td>0.842</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Capital</td>
<td>0.552</td>
<td>0.581</td>
<td>0.832</td>
<td></td>
</tr>
<tr>
<td>Women Micro Enterprise Sustainability</td>
<td>0.779</td>
<td>0.781</td>
<td>0.582</td>
<td>0.763</td>
</tr>
<tr>
<td><strong>Malaysia</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Environmental Disaster</td>
<td>0.787</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Micro Training</td>
<td>0.728</td>
<td>0.83</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Social Capital</td>
<td>0.552</td>
<td>0.607</td>
<td>0.823</td>
<td></td>
</tr>
<tr>
<td>Women Micro Enterprise Sustainability</td>
<td>0.777</td>
<td>0.776</td>
<td>0.583</td>
<td>0.762</td>
</tr>
</tbody>
</table>

According to Henseler, Ringle & Sinkovics (2009), the criterion for assessing the external validity is to examine the obtained value less than 1, hence, lower the value would indicate higher discriminant validity. Below table revealed that the model has acceptable discriminant validity (Table 4).

Figure 3: Constructs’ discriminant validity in Pakistan
Structural Model Assessment

Using same SmartPLS 3, structural model was accessed by following the previous studies’ recommendations (Hair & Lukas, 2014; Hair et al. 2012; Henseler et al. 2009). First, the direct relationship between variables are analyzed while later moderator is introduced to assess the relationship between research variables. After examining the impact of micro training and social capital on women’s micro-enterprise sustainability, the environmental disaster is included to assess the moderating effect. In addition to that, the size effect ($f^2$) and predictive relevance ($Q^2$) was examined to measure the size as well model quality.
Table 5: Findings of structural model

<table>
<thead>
<tr>
<th>Pakistan</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis</td>
<td>B</td>
<td>SD</td>
<td>T Value</td>
<td>Decision</td>
<td>$\eta^2$</td>
</tr>
<tr>
<td>Environmental Disaster -&gt; Women Micro Enterprise Sustainability</td>
<td>0.412</td>
<td>0.074</td>
<td>5.539</td>
<td>0.000</td>
<td>0.279</td>
</tr>
<tr>
<td>Micro Training -&gt; Women Micro Enterprise Sustainability</td>
<td>0.371</td>
<td>0.07</td>
<td>5.265</td>
<td>0.000</td>
<td>0.199</td>
</tr>
<tr>
<td>Social Capital -&gt; Women Micro Enterprise Sustainability</td>
<td>0.088</td>
<td>0.058</td>
<td>1.514</td>
<td>0.130</td>
<td>0.017</td>
</tr>
<tr>
<td>Micro training*Environmental Disaster -&gt; Women Micro Enterprise Sustainability</td>
<td>0.087</td>
<td>0.038</td>
<td>2.273</td>
<td>0.023</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Malaysia</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypothesis</td>
<td>B</td>
<td>SD</td>
<td>T Value</td>
<td>Decision</td>
<td>$\eta^2$</td>
</tr>
<tr>
<td>Environmental Disaster -&gt; Women Micro Enterprise Sustainability</td>
<td>0.418</td>
<td>0.051</td>
<td>8.265</td>
<td>0.000</td>
<td>0.274</td>
</tr>
<tr>
<td>Micro Training -&gt; Women Micro Enterprise Sustainability</td>
<td>0.368</td>
<td>0.049</td>
<td>7.457</td>
<td>0.000</td>
<td>0.142</td>
</tr>
<tr>
<td>Social Capital -&gt; Women Micro Enterprise Sustainability</td>
<td>0.085</td>
<td>0.043</td>
<td>1.931</td>
<td>0.057</td>
<td>0.015</td>
</tr>
<tr>
<td>Micro training*Environmental Disaster -&gt; Women Micro Enterprise Sustainability</td>
<td>0.072</td>
<td>0.028</td>
<td>2.583</td>
<td>0.010</td>
<td></td>
</tr>
</tbody>
</table>

Note: ***p<0.1, **p<0.05, ns= nonsignificant (p>.05) (Two Tail)

Figure 5: Pakistan
Table 5 contains the results of direct and moderate relationship. Threshold value is t-value, which is 1.96 to determine the significance. Additionally, p-value of 0.05 is also used. The results of direct effect are measured through a t-value of greater than 1.96 and a p-value below 0.05 for not rejecting hypotheses. The predictive accuracy of model is measured through $R^2$ by considering 0.25 (weak), 0.50 (moderate), and 0.70 (strong) respectively (Hair et al. 2012). In present study, ($R^2$) reflects strong variation in Pakistan and Malaysia (0.713 and 0.69) indicating 71.3% in Pakistan while 69% in Malaysia (Table 5).

The results showed that environmental disaster has a statistically significant impact on women’s micro-enterprise sustainability in Pakistan ($t$-value=5.39 > 1.96; $p < \alpha$ =0.000 < 0.05; Table 5) and Malaysia ($t$-value=8.265 > 1.96; $p < \alpha$ =0.000 < 0.05; Table 5). Thus, there is strong evidence against null hypotheses. In other words, environmental disaster significantly affects women micro-enterprise sustainability in distinctive merging economies. In addition to that, In Pakistan, environmental disaster causes 0.41 variation in micro-enterprise sustainability while 0.46 in Malaysia (Table 5). Moreover, micro training has a statistically significant impact on the women micro-enterprise sustainability in Pakistan ($t$-value=5.265 > 1.96; $p < \alpha$ =0.000 < 0.05; Table 5) as well as in Malaysia ($t$-value=7.457 > 1.96; $p < \alpha$ =0.000 < 0.05; Table 5). Therefore, in this regard, null hypothesis is not rejected. The variation caused by micro training in women micro-enterprise sustainability is 0.371 in Pakistan while 0.368 in Malaysia (Table 5). Interestingly, the statistical test revealed that social capital does not have a significant impact on the women micro-enterprise sustainability in Pakistan ($t$-value=1.514 < 1.96; $p < \alpha$ =0.130 > 0.05; Table 5) and Malaysia ($t$-value=1.931 < 1.96; $p < \alpha$ =0.000 > 0.057; Table 5). Thus, there is no strong evidence against null hypothesis, as a result, this study fails to reject null hypothesis. Since, social capital is evident to have no statistically significant impact on the women’s micro-enterprise sustainability, therefore, the moderating role cannot be assessed. In other words, there is no significant relationship, hence no moderation could be established. The environmental disaster is examined as a moderator between micro training and women’s micro-enterprise sustainability and results revealed that environmental disaster significantly moderates the relationship between considered research variables ($t$-value=2.58 > 1.96; $p < \alpha$ =0.010 < 0.05; Table 5). There is evidence against null hypothesis, therefore, it is rejected. Furthermore, there is 0.072 moderation caused by environmental disaster between research variables. In other words, environmental disaster moderates the relationship between micro training and women’s micro-enterprise sustainability.
According to Cohen et al. (2013), “the values of $f^2$ are considered as small (0.02), medium (0.15) and large (0.35) respectively”. In this study, the size effect of micro training (0.199; 0.142) as well as environmental disaster (0.279; 0.274) is moderate in Pakistan and Malaysia while social capital has a weak effect in both countries; Pakistan (0.017) and Malaysia (0.015) (Table 5).

Findings and Discussion

Results of this study showed that non-financial services; ‘micro training’ has a statistically significant impact on women’s micro-enterprise sustainability. Since, the t-value is 5.265 in Pakistan while 7.457 in Malaysia, which are significant and the positive β-value 0.371 and 0.368 reflecting positive variation caused by micro training (predictor). Hence, micro training increases women self-sustainability through their micro-enterprises. In other words, micro training contributes towards women’s self-sustainability through micro-enterprises. This study contradicts the work of Hameed et al. (2018a) while confirms the previous empirical studies (Akanji, 2006; Cheston & Kuhn 2002; Sulphey & Alkahtani, 2016). Moreover, the environmental disaster is evident to have a significant moderate role between micro training and women’s micro-enterprise training as t-value is 2.272 in Pakistan and 2.583 in Malaysia while the positive β-value 0.087 in Pakistan and 0.072 in Malaysia, reflecting positive moderation caused by environmental disaster. The reason for higher variation in Pakistan is due to inconsistent environmental factors such as disaster, water shortage and prevalence of windstorms in Southern regions while flooding and rainy season in Malaysia cause destruction to women owned micro-enterprises in Malaysia. Hence, the environmental issues create difficult situation regarding the loan repayment as well as attainment of training from microfinance institutions.

On the other hand, sometimes microfinance institutions do not provide the complete package of their services to their clients. For instance, they provide financial capital to women but do not provide human capital such as training to the women on how to run micro-enterprises established with microcredit. As explained by Garikipati (2008) that microfinance through social capital and micro training helps the women empowerment. Thus, to large extent work of Simpson, Tuck & Bellamy (2004) is indirectly supported that in the absence of training and social capital development opportunities, the business suffers losses. However, this study found no statistically significant relationship between social capital and women’s micro-enterprises sustainability because t-value is 1.514 in Pakistan and 1.931 in Malaysia, hence, this study opposes the work of Kithae et al. (2013) and IBRU (2009). Nevertheless, work of Atmajda et al. (2016) is supported considering micro training while opposes same study considering social capital.

Thus, micro training is a strong predictor, but social capital is not significant predictor, and hence micro training is consistent with the Mayoux’s feminist empowerment theory (Mayoux, 2005). Whilst inconsistent with same theory of Mayoux (2005) in context of social capital. Asserted theory in the framework of empowerment indicates that microfinance facilitate women’s micro-enterprises that leads to women’s self-sustainability. This study found a significant positive relationship between the success of women’s micro-enterprises sustainability and environmental disaster with t-value 5.539 in Pakistan and 8.265 in Malaysia. Nevertheless, significant positive relationship between microfinance institutions and the success of micro-enterprises, thus, confirms the previous studies (Atmadja et al. 2016; Bernard et al. 2016; Buckley, 1997; Harley et al. 2018; Mosley & Hulme, 2009).

Previous studies are largely commenced in Africa and Bangladesh (Swain & Floro, 2014; Hossain, 2007) while examining environmental factor’s vulnerability on success of women-owned micro-enterprise. On the other hand, large studies focused on financial services of microfinance institutions on environmental vulnerability (Gaiha & Thapa, 2006; Swain & Floro, 2014). However, the impact of non-financial microfinance services impact on women-owned micro-enterprise sustainability and the moderating role of environmental disaster are not documented within one construct. Therefore, this study fills the gap by exploring the research variables in distinctive emerging economies of Pakistan and Malaysia.
Conclusion

It is concluded that in contrasting economies context, the environmental disaster has a significant impact on the women’s micro-enterprise sustainability. Moreover, the micro training has a statistically significant impact on women’s micro-enterprise sustainability while insignificant impact of social capital on women’s micro-enterprise sustainability. Interestingly, the environmental disaster has a significant moderating role between micro training and women’s micro-enterprise sustainability. Micro training (microfinance institution’s service) has a pivotal role in strengthening women’s self-sustainability while social capital (microfinance institution’s service) has no constructive role in developing the relationship between considered variables in both countries; Pakistan and Malaysia. These services facilitate the success of women’s micro-enterprise that leads to increase income through enhancing their self-sustainability level. Lastly, environmental disasters have a significant influence on women’s self-sustainability through micro-enterprises owned by women. Environmental disasters limit the positive contribution of microfinance institutions towards women’s micro-enterprises and their self-sustainability.

The impact of environmental disaster on the women’s micro-enterprise sustainability, especially the moderating role environmental disaster between micro training and women’s micro-enterprise sustainability. These are major contribution towards the existing literature, as these dimensions were not explored previously. This finding signifies that an environmental disaster is the most crucial limiting problem in women-owned micro-enterprise sustainability in emerging economies; Pakistan and Malaysia.

Secondly, the present theoretical framework considered only non-financial services while previously the focus was limited largely to financial services. Hence, this study is unique in offering the insight about less explored dimension. Additionally, the regional context is explored by including comparative analysis, which delimits the knowledge from region-specific.

Thirdly, Mayoux’s Feminist Empowerment Theory’s limitations are identified by the present findings of this study. Aforementioned theory claimed that women empowerment enhances due to microfinance institutions. On the other hand, present findings proved that in hazardous areas, the microfinance institutions are unable to empower the women as supported by the Relational Theory of Risk. Therefore, Mayoux’s Feminist Empowerment Theory is not the right fit in hazardous situation such as, environmental disasters. Thus, this study offers a new distinctive dimension to existing theories.

The findings serve practical implications such as the results of this study explored the weak areas requiring improvement in the women-owned and managed micro-enterprises and their sustainability. Furthermore, it leads to foster entrepreneurial practices, in order to sustain business activities in highly vulnerable low-income households in Pakistan and Malaysia. At large, the current research findings could be applied to other emerging economies to assess the women’s micro-enterprise sustainability. Particularly, the policymakers can benefit from the present results by improving the areas to promote sustainability and economic stability through social capital and micro training while finding ways to improve the relocation of the women-enterprises to less environmentally vulnerable areas in Pakistan and Malaysia.

Additionally, microfinance institutions benefit from this study for attaining their ultimate objective of enhancing sustainability among women-owned enterprise. The use of social capital and micro training programme would be highly effective for improving the opportunity in creating micro-enterprises. The educating of women is vital for these institutions. Hence, they should encourage the women to participate in workshops and social networking so that their micro-enterprises attain sustainability.

The Central bank of Pakistan and Malaysia should work in close collaboration with the government in empowering womenfolk. The schemes should be designed to ensure that in times of environmental disasters, there is enough backing for these vulnerable women entrepreneurs. The use of microfinance non-financial services workshops should be made compulsory for women entrepreneurs so that they have complete awareness
about strategic steps in such situations. Furthermore, governments should facilitate a safe area for women to run their own businesses. Additionally, government should also offer micro-enterprises the credit scheme as reliance alone on the microfinance institutions services are not sufficient. Hence, the strategic framework should be developed to reduce the environmental disaster’s impact on women’s micro-enterprises so that there is higher women’s self-sustainability through invariable support.

References


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ASSESSMENT OF INFORMATION TECHNOLOGIES INFLUENCE ON FINANCIAL SECURITY OF ECONOMY

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Abstract. The behavior of agents to ensure financial security on the basis of game theory was analyzed, the winning strategy taking into account risk and uncertainty was determined. Using Data Mining the useful functions of this technology were identified to ensure financial security: suspicious transactions determination, credit risks analysis, client account reliability analysis, financial indicators predicting and risks control. A comparison was made of the assessment of the effectiveness of various data mining algorithms on the nature of financial transactions and decision-making procedures in the financial security system. It was proved that the development of information technology has created a whole range of vulnerabilities in the financial system, in particular, has transformed the form of money in modern conditions - the emergence of a cryptocurrency. The influence of the formation and development of cryptocurrency on financial security at all levels of the economy: micro and macro was analyzed.

Keywords: financial security, game theory, hawala system, prisoner’s dilemma, Data Mining, cryptocurrency, Bitcoin

http://doi.org/10.9770/jssi.2019.8.3(7)

JEL Classifications: F52, O39

1. Introduction

Economic security belongs to the fundamental conditions of existence of a country that cares about ensuring the normal life of its people in the environment of international and internal conflicts. Now traditional war has been replaced by various forms of hidden, outwardly civilized, but, in fact, very cynical confrontation, among which the use of an arsenal of financial instruments plays a leading role. And conflicts that have an economic background can develop into specific armed confrontations, called irregular or hybrid wars.

At the same time, we can not effectively analyze and predict the processes of formation of public debt, exchange rate, the financial crisis, and the like with the help of well-known theories. Therefore, in the context of the globalization of the economy and increasing its vulnerability to crisis phenomena, the formation and implementation of the concept of financial security of a country are of paramount importance.
2. Literature Survey

Correct identification of topical security issues is possible only with an adequate assessment of the real and potential threats to human well-being. It is important both to be in a state of readiness to respond to existing threats and not to create systems to respond to non-existent threats (Tvaronavičienė, M. (2018); Mikhaylov, A. S.; Mikhaylova, A. A.; Savchina, O. V. (2018); Mamedov, O.; Tumanyan, Y.; Ishchenko-Padukova, O. & Movechan, I. (2018)). A significant part of the threats is caused by the conflict of interests of various members of society (Chen, K. C., Cheng, Q., Lin, Y. C., Lin, Y. C., & Xiao, X. (2016)).

The management of economic systems in conflict-free situations and in situations of acute conflicts should be significantly different. The theory of financial management in conflict-free situations is currently quite well developed, although it has some debatable moments. We are talking about such areas of financial science as financial management, budget management, tax management, etc. (Sun, W., & Xu, Y. (2016); Osipov, G. V.; Glotov, V. I. & Karepova, S. G. (2018); Vandina, O.; Mkrtychan, Z.; Denisov, I.; Vechkinzova, Y. (2018)).

Managers, armed only with knowledge, which have a positive effect in conflict-free, non-crisis conditions, tend to act in critical situations, proceeding from the patterns known to them. Such a course of conduct naturally leads to financial losses or even to the liquidation of a business unit through bankruptcy (Chemla, Y., & Richard, C. (2017)). It is important to realize that the overall objectives of a business unit remain the same, both in conflict-free and conflict situations.

However, the main factors of achievement and obstacles to the realization of goals, depending on the situation, may differ significantly. Problems of financial security outside the sphere of relations between different people simply do not exist (Lyons, A. C., Grable, J. E., & Joo, S. H. (2018)). However, subjectively determined threats have two main forms of manifestation: violence (physical impact) and deception (information impact). Financial threats often manifest themselves as attempts by some people to appropriate or destroy the resources of others through actions that are provided in a kind of legal and (or) economically sound financial transaction. The financial danger is characterized by the fact that the conflict is disguised as cooperation, while the exploitation is presented as a fair distribution of resources (Singh, S., & Singh, N. (2016, December). Therefore, financial security is the result of a proper response to those threats to financial sustainability, primarily related to deception and disinformation.

According to the game theory, if players can evaluate the possibility of betrayal by others, experience influences their behavior. According to statistics, inexperienced players are usually too peaceful or aggressive (Scharpf, F. W. (2018)). If they act like this forever, they will lose because of unnecessary aggressiveness or altruism. Getting more experience, they realistically estimate the likelihood of betrayal and achieve the best results (Tetiana, H., Karpenko, L., Fedoruk, O., Shevchenko, I., & Drobyazko, S. (2018)). Early frauds have a greater effect on inexperienced players than later ones on experienced ones. This explains the significant role of early experience for young people and their particular vulnerability to unmotivated aggression, after which they sometimes become too aggressive themselves. Collaboration in early games, strengthening confidence, reduces the likelihood of betrayal in the group. Self-sacrifice may in some situations strengthen the morale of the group. If the group is small, positive behavior is more likely to reciprocate, which encourages participants to further cooperation. At the same time, a good attitude without a cause is an indulgence that can impair moral qualities. These processes contribute to the study of mutual altruism, group and family selection and ethics.

3. Methods

Among the many regularities identified by mathematical modeling of economic situations, from the standpoint of financial security, there are three the most interesting (Aumann, R. J. (2017)). Firstly, with a long-term confrontation (multiple interaction) of more than two participants, a compromise turns out to be a profitable strategy. The participant of the game, who received benefits due to the deception of opponents in a single interaction, loses in further interactions, at least, loses what he received at the beginning of the game. Secondly,
even if the parties do not enter into communication (non-cooperative game), their behavior is mutually agreed, that is, even opponents uneven in resources depend on each other to a greater extent, the more their expenses for managing conflict actions. Thirdly, in case of conflict interaction, the largest share of resources produced by two parties is received by the one that produces less and spends more on conflict redistribution. But, having won, it gets less than it could get from cooperation, since the cost of managing the conflict reduces the productivity and competitiveness of all parties and the total amount of available goods.

The need for a hierarchical construction of a system for studying financial security problems is due to the complexity of processing and using large amounts of information with limited time resources. It is necessary to determine the priority objects or subjects of the financial security formation, approaches to its study, research methods, public regulatory institutions and indicators of the level of financial security. Taking into account the existing theoretical developments and actual problems of practice, we offer a scheme for choosing the priorities of the relevant study (Tetiana, H., Chorna M., Karpenko L., Milyavskiy M. & Drobyazko S. (2018)).

4. Results

Turning to the theory of games, it is worth noting that the optimal decision of the player depends on his opinion on the possible actions of others. Therefore, to develop concepts, the result must be studied how individual players make decisions, not knowing what other players do. A repeated game is defined as a game in which a group of participants expects to interact with each other many times under similar circumstances. Such a situation is modeled with the help of the mathematical apparatus of the “prisoners’ dilemma”, which can be limitedly or unlimitedly repeated. A limited number of repetitions would make cooperation impossible, because players are not sure about the payouts or possible actions of others. As for the prisoners’ repeated dilemma, the Tit-for-Tat (TFT) policy - to be “good” at the initial interaction with an unknown person with whom you expect to have regular future relationships, and then simply repeat the steps of other players - in many cases it may be the best long-term strategy. This showed that mutual altruism, from which others gain an advantage, provided that the operation continues for an indefinite or unknown period of time and that the rate in the game is rather low, is a stable solution to the prisoner’s dilemma. The TFT strategy will be profitable if individuals hope to often cooperate in the future.

The Matrix (Table 1) illustrates a one-time game in the prisoner’s dilemma.

<table>
<thead>
<tr>
<th></th>
<th>C</th>
<th>D</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>(1, 1)</td>
<td>(b, a)</td>
</tr>
<tr>
<td>D</td>
<td>(a, b)</td>
<td>(0, 0)</td>
</tr>
</tbody>
</table>

Players 1 and 2 can choose between cooperation (C) or deception (D). If both choose to cheat, the win will be 0 for each. If they decide to cooperate, the gain will be 1 for each. It is also possible that one of the players chooses cooperation, while the other - deception. In such a situation, the player who cheats takes a better position than the player who cooperates. Namely: a> 1, b <0, provided that a + b <2. In this one-time prisoner problem, there is only one equilibrium point, which is achieved when both players cheat. This is the most stable strategy, since none of the players wants to experience a complete collapse from the fact that his/her actions can be foreseen.

The rational actor R is the player who chooses the best possible strategy to response, while the mechanical TFT actor is the player who uses a certain strategy that is not necessarily the best. The fact that the player’s R opponent is a TFT player creates strong incentives for player R to cooperate, since consistent cooperation on the part of R results in a gain of 1 per round for each player. In addition, it is not rational for player R to cheat in round t, and then cooperate in round t + 1, since this gives him/her a gain of a + b (assuming that TFT cooperated in round t). Cooperation will be rational for R if he/she is convinced that he/she plays with TFT.
For a player who is deemed to be a TFT, it’s better to confirm these expectations. The TFT player chooses cooperation from the start, and then repeats the opponent’s actions of the previous round. This is done in order to persuade the opponent to cooperate. The TFT player, by cooperating, has the opportunity to gain a reputation. By this he/she encourages other players to cooperate. In other words, in order to play this game well, you need not to defeat your opponent, but to persuade him/her to cooperate, of course, provided that the players really want the game to end with mutual cooperation. Cooperation can be facilitated in different ways. One of them is punishment for the player if he/she does not cooperate (Nakashydez, L., & Gil’orme, T. (2015)).

First, let’s consider the situation where only one side is uncertain. Two players (hawala agent and customer) play in a repeated prisoner’s dilemma. Player 1 (hawala agent) is rational (R) and this is common practice. Player 2 (customer) is also rational, but this is not a common practice, therefore player 2 will be called MR (maybe rational). R determines the probability (p) that player 2 is rational and the probability (p-1) that player 2 is a mechanical TFT player.

As shown above, both players can cooperate (C) or deceive (D). This is their initial possible actions (Hilorme, T., Nazarenko Inna, Okulicz-Kozaryn, W., Getman, O. & Drobyazko, S. (2018)). When players decide to play, they will not have complete information, because, due to the rationality possibility of player 2, there is uncertainty about the gain. Considering the results and advantages of this game, we can conclude that a> 1> 0> b, but if both players prefer a, it will be difficult to ensure cooperation. Here it seems possible to assume that, apparently, religion or similar cultural characteristics force the players to respect a certain result of the game - 1 for each, when both choose cooperation. The use of the mathematical apparatus shows that if there are optimization costs, TFT types will survive in competition with rational actors, provided that the number of rounds in the prisoner’s problem will be large enough. This result is based on the assumption that being rational is expensive, while being TFT does not incur significant expenses. An explanation using a prisoner’s dilemma may help to explain why value transfer systems originate from developing countries. With the development and complexity of the economy, the motivation for using hawala-like systems may decrease. However, this is only one side of the theory. Some informal cost transferring systems have proven to work despite economic development. Another IVTS feature is their high ability to adapt to changes, such as economic crises, unrest and war.

Despite its informal nature, the hawala system has direct and indirect consequences in the macroeconomic sphere due to financial and tax factors. One such consequence is the potential impact of hawala on the monetary accounts of the countries of both parties to the transaction. Since these transactions are not reflected in official statistics, the transfer of funds from one country to another is not counted as an increase in the foreign assets of the recipient country or as an increase in the obligations of the sending country. As a result, money changes the owner, and the official indicator of the money supply remains unchanged. However, transactions within hawala may affect the composition of the money supply in the recipient country. In the field of money transfers, such transactions are usually carried out with cash, although hawaladars can also use the banking system. Persons from developing countries that transfer money abroad through the hawala system for investment or other purposes usually belong to wealthy groups. They provide local hawaladars with cash by withdrawing money from their bank account. As a result, transactions in the hawala system, as a rule, increase the amount of cash in circulation. In addition, the system of illegal transfers causes fiscal implications, because the transactions through hawala is not taxed. Negative impact on budget revenues has both illegal and legitimate activities, if this activity involves the participation of the hawala system. There are estimates that around 5,000 hawala brokerage points are operating in the world (Sherraden, M. S., & Ansong, D. (2016)).

Since we live in the era of information, it is difficult to overestimate the importance of data that is regularly collected in the management of production, in banking, in solving scientific tasks. Powerful computer systems that manage huge databases have become an essential attribute of life for large corporations and even small companies. However, the availability of data alone is still insufficient to improve performance. You need to be able to transform “raw data” into useful information for making important decisions. This is the main purpose of data mining technology - electronic data intelligence.
Data mining is a modern concept for analyzing data that may at first be inaccurate, heterogeneous, contain gaps, and also have huge volumes. The need for regular analysis of such data has arisen as a result of the spread of information technologies that allow for a detailed logging of the processes of production, trade and finance (Sriramoju, S. B. (2017)). Literally, data mining translates as mining or digging data. An alternative term, quite common, is data intelligence.

In fact, in terms of the composition of the tasks, data mining practically does not differ from the standard set of tools that have been used for more than half a century in the field of statistical data analysis, the search for patterns and training based on precedents. The main difference lies in the efficiency of the algorithms and the technological effectiveness of their use. The overwhelming majority of classical procedures have a quadratic or even cubic, depending on the number of objects, execution time. When the number of objects that exceeds several tens of thousands, they work unacceptably long even on the most modern computers. Specialized data mining algorithms are capable of performing the same tasks in linear or even logarithmic time without significant loss of accuracy. Finding hidden patterns in the data, relationships between different variables, modeling and studying complex systems based on the history of their behavior - these are the subject and tasks of data mining. Data mining results - empirical models, classification rules, clusters discovered, etc. (Ristoski, P., & Paulheim, H. (2016)).

They can then be integrated into existing decision support systems and used to predict future situations. From the point of view of financial security, such data mining functions are useful: suspicious transactions determination, credit risks analysis, client account reliability analysis, financial indicators predicting and risks control. Currently, most of the world’s leading software manufacturers offer their products and solutions in the field of data mining. As a rule, these are systems in which various mathematical algorithms for data analysis were implemented. They have an advanced graphical interface, rich visualization and manipulation of data, provide access to various data sources, and the like. The following groups of data mining systems can be distinguished. The need for automated data mining has become particularly apparent through vast arrays of historical and new information.

It is difficult to even approximately estimate the amount of daily data accumulated by various companies, government and scientific organizations. Another reason for the growing popularity of data mining is the objectivity of the results obtained. A person-analyst, in contrast to the machine, possess always an inherent subjectivism. A person, to one degree or another, is a hostage of ideas that have already taken shape. Sometimes it is useful, but often causes great harm. And finally, data mining is cheaper. It turns out that it is more profitable to invest money in a data mining solution than to constantly retain a significant staff of highly qualified and expensive professional statisticians. Data mining does not completely exclude the role of man, but considerably simplifies the process of finding knowledge, making it accessible to a wide range of analysts who are not experts in statistics, mathematics, or programming (Apps, E., & Ono, K. (2017)).

Subject-oriented analytical systems. These systems solve a narrow class of specialized tasks.

Statistical packages. These are powerful mathematical systems designed for the statistical processing of data of any nature. They include numerous statistical analysis tools and have developed graphic tools.

Neural network packets. This is a wide class of various systems that are hierarchical network structures, at the nodes of which there are so-called neurons. Networks are trained by examples and, in many cases, give good prediction results. The main disadvantage of neural networks is the difficulty of interpreting the results. A trained neural network is a black box which work is impossible to understand and control.

Packages that implement the decision tree algorithms. This method is used only for solving classification problems. This is its serious limitation. The result of the method is a hierarchical tree structure of classification rules of the type “If ... Then ...”. The advantage of the method is the ability to separate data into a large number of classes.
Evolutionary programming. This is an approach in which several genetic lines of programs are formed in the system that compete with each other in the accuracy of expression of the dependence studied. Rating systems based on similar cases. These systems find among the past situations close analogues of the current one and choose the course of action that was right for them.

Limited search. These algorithms compute the frequency of combinations of simple logical events in data classes.

Currently, there are conflicting estimates of the effectiveness of various data mining algorithms. In general, it can be argued that the success of various studies and the quality of the decisions made will depend on the correctness of combining the functions of a computer and a person. An expert armed with the means of fast processing of information will ultimately get better results than a specialist relies only on his own intelligence.

5. Discussion

Not only computer technology changes modern information and analytical processes in the field of economics and finance. For example, American economists have developed a criterion for estimating from space the economic growth of countries in the absence or incompleteness of official statistics (Buczak, A. L., & Guven, E. (2016)). Researchers chose the intensity of the night illumination of cities as the measure of progress or regression of the country. According to the authors of this method, it is the evening consumption of goods and services that requires artificial lighting. And the more goods and services available to citizens are, the greater is its GDP.

For example, using the prisoner’s dilemma, which is repetitive, we can model pricing policies in oligopolistic markets. Usually, oligopolists cooperate with each other to avoid losses from the “price war”.

A similar dilemma situation occurs when two competing organizations decide on advertising costs. The effectiveness of the advertising campaign of each organization decreases with increasing advertising costs from a competitor. If both organizations decide at the same time to increase advertising costs, their market shares and, possibly, revenues remain unchanged, while profits decline. From rational positions, the limit of the size of advertising budgets is the amount of profit, determined without taking into account advertising expenses. However, organizations may work at a loss for some time in order to weaken a competitor. They can also make an agreement to reduce advertising costs. But the incentive to break it always exists.

At the same time, information technologies can change not only the nature of financial transactions and decision-making procedures. A number of technologies have significantly transformed the form of money in modern conditions. For most of history, mankind has used monetary systems based on commodity money. Paper money appeared about 1000 years ago and dominates today. Cryptocurrency is a new, experimental type of money that operates in a distributed and decentralized system of secure exchange and transfer of digital banknotes based on cryptography (Li, X., & Wang, C. A. (2017)). Banknotes of such a system can be exchanged for paper money at the market rate. The first cryptocurrency was Bitcoin, the operation of which began in January 2009. Later, with the use of Bitcoin innovations was created a number of other cryptocurrency. However, some specific parameters of the algorithms laid in their work differed from Bitcoin.

In the first Bitcoin reports, considerable attention was paid to the active use of this system by the online black market site, the Silk Road website. In such a way the erroneous assumption about the anonymity of transactions in the Bitcoin system was spread. In the system there is a public register of all transactions carried out in its history. Although the real names of participants are not included in transactions in the blockchain, Bitcoin addresses are user aliases.

If a bitcoin address is identified in a certain way with a specific individual, then all transactions in the blockchain using this address can be easily linked with this individual. Although the transactions in Bitcoin are not completely anonymous, the very presence of a cryptocurrency significantly changes the nature of law
enforcement to restrict illegal transactions. In the course of operations with traditional money, electronic payments are made through financial intermediaries; therefore, the country, by regulating their work, can limit certain operations. In the Bitcoin system, penalties for illegal transactions may take place later, but they cannot be limited in advance by adjusting the actions of the intermediary. This can seriously affect lawmaking and law enforcement in the area of financial regulation.

In addition, the emergence of a cryptocurrency provides a new meaning to the problem of exchange rate uncertainty. Since Bitcoin is not secured by any assets, the value of this currency depends solely on its usefulness as a means of exchange (Delmolino, K., Arnett, M., Kosba, A., Miller, A., & Shi, E. (2016, February)). Most likely, bitcoins will always be inherent in the volatility of the course more than paper money, because there is no central bank in their system of operation, and the bitcoin money supply does not respond to changes in demand. According to the “businessviews.com.ua” site, bitcoins are the limited currency for their emission, and the maximum possible amount of emitted bitcoins is 21,000,000. As of May 30, 2017, it issued about 76% of amount (https://coinmarketcap.com). When the total currency base of the system reaches 21,000,000, then any type of emission will be completely stopped (to avoid inflation), after which the system will enter the third final phase - stabilization.

The formation of a cryptocurrency rate depends on demand, so the cost of Bitcoin is not stable (Figure 1).

![Figure 1. Dynamics of the dollar rate to bitcoin 2012-2018](https://coinmarketcap.com)

*Source: developed by the author according to the source https://coinmarketcap.com*

Analyzing this diagram, we can say that in recent years, the rate fluctuations occur very sharply. Compared to 2012, the bitcoin course increased from USD 5.2 in 2018 to USD 6881.85 per bitcoin. As a result, the cost of the cryptocurrency exceeded the cost of an ounce of gold (1339.3 USD as of 02.2018). The main reason for this was the growth of speculative interest in this digital currency. It should be noted one feature that has been observed in recent years. After an unplanned drop in quotations, there is another jump in the Bitcoin rate and it not only reaches the point from which the next recession began, but improves the former indicator of the value of the cryptocurrency and it beats its own new record. Therefore, those who were able to buy on time and sell this cryptocurrency on time could make a lot of money from small amounts.

On January 16, 2018 the cryptocurrency market (including Bitcoin by 30%) collapsed. The price of Bitcoin fell to 10 thousand dollars (and on December 17, 2017 it reached about 20 thousand dollars). Of the top 100 currencies, 99 fell by an average of 20% (Hayes, A. S. (2017)). Such a sharp fluctuation of the rate is associated either with a ban on cryptocurrency exchanges or with a future ban on withdrawal of cryptocurrency into ordinary money. However, cryptocurrency is not limited to one Bitcoin, which is the most popular in the world, and offers the most developed network infrastructure (Table 2).
Table 2. Capitalization and the rate of the top 10 cryptocurrencies on September 20, 2018

<table>
<thead>
<tr>
<th>Item №</th>
<th>Cryptocurrency name</th>
<th>Price, USD</th>
<th>Price, BTC</th>
<th>Market capitalization, USD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Bitcoin, BTC</td>
<td>8496.19</td>
<td>1</td>
<td>143,844,203,115</td>
</tr>
<tr>
<td>2</td>
<td>Ethereum, ETH</td>
<td>584.2</td>
<td>0.069</td>
<td>57,851,642,770</td>
</tr>
<tr>
<td>3</td>
<td>Ripple, XRP</td>
<td>0.858</td>
<td>0.0001</td>
<td>33,601,434,036</td>
</tr>
<tr>
<td>4</td>
<td>Bitcoin Cash, BCH</td>
<td>1058.17</td>
<td>0.125</td>
<td>18,077,855,642</td>
</tr>
<tr>
<td>5</td>
<td>Litecoin, LTC</td>
<td>149.55</td>
<td>0.0177</td>
<td>8,400,042,028</td>
</tr>
<tr>
<td>6</td>
<td>EOS, EOS</td>
<td>9.85</td>
<td>0.0012</td>
<td>7,925,277,827</td>
</tr>
<tr>
<td>7</td>
<td>Cardano, ADA</td>
<td>0.285</td>
<td>0.0003</td>
<td>7,406,456,605</td>
</tr>
<tr>
<td>8</td>
<td>Stellar, XLM</td>
<td>0.369</td>
<td>0.0004</td>
<td>6,869,296,477</td>
</tr>
<tr>
<td>9</td>
<td>IOTA, MIOTA</td>
<td>1.93</td>
<td>0.0022</td>
<td>5,353,069,576</td>
</tr>
<tr>
<td>10</td>
<td>NEO, NEO</td>
<td>75.10</td>
<td>0.0088</td>
<td>4,881,721,000</td>
</tr>
</tbody>
</table>

Source: developed by the author according to the source https://coinmarketcap.com

The market capitalization of Bitcoin as of September 20, 2018 is 38.56% of the total market capitalization, the second in terms of capitalization is the cryptocurrency Ethereum - 15.53%, and the third is Ripple, which is 9.10%. The total market capitalization is USD 373,008,072,802. (https://coinmarketcap.com).

Statistics have shown that investors, technophiles and gamers have the biggest interest in Bitcoin, and travelers have the least interest (Fry, J., & Cheah, E. T. (2016)).

Conclusions

The global transition to the information age has changed the era of industrialism, which is ambiguous in its consequences and contains a pronounced crisis component. Therefore, it cannot be viewed unambiguously as a transition to a more prosperous state of society. Modern society has no other set of possible ways of its development, except for those that are caused by the rapid and irreversible development of the newest information technologies with the corresponding transformation of the main areas of human activity, such as economics, politics and culture. The global and informational nature of changes is manifested in the creation of a unified communicative space. In the socio-economic sphere, it is expressed in the construction of a network or information society.

In the context of globalization, the mutual influence of traditional societies with their archaic mechanisms of socio-economic relations and societies that have switched to the post-industrial stage of development occurs. An example of the penetration of archaic financial and credit mechanisms of the era of the emergence of world trade into the modern economic system is the international system of illegal money transfers called hawala.

In the international arena, the cryptocurrency has supporters and those who are neutral towards it. Some consider it a development of the technological process and the “currency of the future”, others react negatively to such innovations. Given the endurance of the digital currency and the steady growth in popularity in the global financial arena, some countries are considering the issue of its control and regulation, while others do not recognize the legal status of a cryptocurrency.

Characterized by a high level of complexity, modern information technologies impose extremely high demands on the quality of the corresponding developments. However, in practice, even in developed countries, they do not always achieve an adequate level of quality in this area. And the results of mistakes can be expressed in very significant amounts of money. Given this, the development of information technology has created a whole range of financial system vulnerabilities.
References


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MODELING OF ENERGY-SAVING PROCESSES IN THE CONTEXT OF ENERGY SAFETY AND SECURITY

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Abstract. The national security strategies in terms of the energy independence of the EU member states were analyzed. It is proved that it is diversification of energy sources that will ensure the reduction of the energy intensity of the gross domestic product of the country. Only the development of energy-saving technologies based on the use of alternative energy sources will improve environmental safety as a component of energy. The evidences of an effective energy system of the country, which is able to protect national security from external and internal threats, were considered. It is clarified that it is advisable to determine the specifics of the implementation of energy saving processes taking into account the temporal determination of the number of potential consumers. This circumstance mediates the dependence of the population on the number of energy generating and energy distribution organizations that serve it. The model of the dynamics of the number of potential consumers who know about energy-saving products allows reflecting the success of the communication activities of organizations in modern energy markets.

Keywords: energy saving; national security; agent; potential consumer; sustainable development


JEL Classifications: F52, O39

1. Introduction

The key driving forces and instruments of EU energy security are the completion of building an internal integrated energy market, diversification of energy sources, enhancement of cooperation between countries in the transportation and storage of natural gas, energy efficiency improvement, reducing of harmful emissions into the atmosphere.

The EU implements a systematic and consistent policy of ensuring energy security, an important role in the implementation of which is assigned to the diversification of the energy market as a crucial component of energy security. The EU actively supports activities aimed at promotion of diversification (both of energy types and sources), improving the functioning of European energy markets and assisting their cross-border integration.

The energy security is an important component of national security, and its support is a priority, given the growing global competition for control over energy resources. There are a large number of scientific works on energy security, reflecting the complexity, importance and urgent need to take into account the objective changes that occur in the field of economic and energy security (Ardalan, F.; Almasi, N. A.; Atasheneh, M. (2017); Androniceanu, A., Popescu, C.R. (2017); Rogalev, A., Komarov, I. Kindra, V., Zlyvk, O. (2018), Strielkowski, W., Lisin, E., Astachova, E. (2017); Humbatova, S. I. O.; Garayev, A.I.O.; Tanriverdiev, S.M.O.;
The energy system, in order to ensure an adequate level of energy security, should be, as a rule, characterized by: the diversification of the complex of primary energy sources and types of fuel used with the possibility of their mutual replacement if necessary; the diversification of energy suppliers without excessive dependence on such energy supplies for imports, which may entail the risk of disruptions / violations uncontrolled by the country; the diversification of energy supply routes for imports without over-reliance on specific “supply corridors”; the tendency to reduce the energy intensity of GDP, that is, the amount of energy needed to produce a unit of a national product; the reliable physical energy infrastructure; the stable and affordable energy prices; the commercially viable technology improvement plans for the energy infrastructure.

2. Literature Survey

The energy security strategies can be divided into:
- strategies that are directly related to diversification: increase in the number of types of primary energy resources and fuel that make up the complex of energy sources that are used (Hilorme, T., Nazarenko Inna, Okulicz-Kozaryn, W., Getman, O. & Drobyazko, S. (2018)); increase in the number of suppliers of resources and fuel (Nakashydze, L., & Gil’orme, T. (2015)); development of storage facilities for energy resources and fuel and the formation of their strategic reserves (Buzar, S. (2016));

Recently, there has been observed a moderate recovery in pre-crisis energy consumption in the world. This happens against the background of a rapid change in the institutional structure of energy markets with a predominance of the concept of liberalization, the development of transport infrastructure, countries’ transition to energy-saving technologies, as well as against the background of the increasing role and importance of energy supply diversification policies (Sovacool, B. K., Heffron, R. J., McCauley, D., & Goldthau, A. (2016)).

The International Energy Agency (IEA), which central mission since its incorporation is to ensure energy security, has one of its main activities - to ensure the ability to respond collectively in the event of a significant disruption of oil supplies through short-term energy emergency response measures (Doherty, R. (2017)). The long-term aspect of energy security is also included in the incorporation objectives of the IEA, which suggests encouraging the use of alternative energy sources to reduce dependence on oil imports. The IEA works to improve energy security in the long term prospect, promoting energy policies that encourage diversification of both energy types and sources of supply, as well as more efficient functioning and integration of energy markets (Juncos, A. E. (2017)). In general, according to the IEA definition, the following main components of energy security can be identified: acceptable / competitive energy supply (at price factor); reliable / uninterrupted supply of energy (according to the state of the energy infrastructure); available / existing energy supply (according to the physical availability of energy resources). The national security strategy of the United Kingdom among the main risks determines, inter alia, disruptions in oil and gas supply and price instability, which have arisen as a result of war, accidents, actions of political factors or manipulation of suppliers. The UK’s energy security system is a system that is able to meet the needs of people and organizations in providing energy services, such as heating, lighting, electricity and transportation, in a reliable and affordable way, both now and in the future. And the energy security itself is to provide access to the necessary energy services (physical security) at prices that are not overly unstable (price security) (Chandler, W. (2018)).

The National Energy Security Strategy of Spain sets forth a definition of energy security, which refers to government activities aimed at ensuring the stability of energy supply in an economically and environmentally sustainable manner through external procurement and using its own resources while respecting international obligations. And the main task in the field of energy security of Spain is to diversify energy sources, ensure
the safety of transportation and supply of energy resources, as well as support energy efficiency and reduce the negative impact on the environment (Sperling, J. (2018)).

Considering the conceptual approaches of the EU to the definition of energy security and its components, it should be noted that energy security is the cornerstone of the European energy strategy, the fundamental objectives of which are the security of energy supplies, stability and competitiveness.

In this context, security of energy supply is considered as the most important aspect, since it is associated with a deep interdependence between markets and the economy, often based on political or geopolitical considerations. In the EU, supply security is defined as the state of energy supply, in which the basic future energy needs must be met through the use of domestic energy resources and strategic reserves in an acceptable economic environment and using diversified and stably accessible external sources of energy (Cohen, A. (2017)).

Thus, in the EU, the starting point for understanding the concept of energy security is to ensure the security of the energy supply chain. The problem of ensuring energy supply is primarily associated with the ability to meet the demand of EU member states for energy and energy resources. That is, the security of energy supply (energy resources) occupies a central place in the definition of energy security.

The energy policy has always been and is currently decisive for any country due to the fact that it is through implementation that the conditions necessary for the functioning of any industry are created. Recently, there is a noticeable intensification of the efforts of the EU member states to develop and implement a common energy policy, in particular, considerable attention is paid to the implementation of the energy market diversification policy (Tetiana, H., Chorna M., Karpenko L., Milyavskiy M. & Drobyazko S. (2018)).

The energy security in the EU has traditionally been associated with ensuring access to the supply of oil and fossil fuel. However, over time, the problem of ensuring energy security began to be considered in a broader sense, taking into account many new aspects and factors that could potentially influence the level of energy security. This broader approach covers supply and demand issues, security of supply, energy availability, geopolitical security issues, considerations of political and economic risk factors, as well as technological and environmental factors. However, the concept of energy security cannot fully cover all possible risks and vulnerabilities, although it should provide a basis for their identification, measurement and management. Modern studies of energy security are based on the identification and study of the links between energy systems and important social values and energy security is defined as part of the generally accepted concept of national (economic) security (Von Moltke, A., McKee, C., Morgan, T., & Töpfer, K. (2017)).

The energy security is defined as the ability of energy industries to provide relevant services at a reasonable price in a competitive, fully liberalized European energy market (Bouzarovski, S., & Tirado Herrero, S. (2017); conservations).

Regarding energy security in terms of the availability of energy, the concept of energy security takes into account the relevant safety (reliability) and diversification of energy sources and energy services. Ensuring the availability of energy provides for an adequate and uninterrupted supply and minimization of dependence on energy resources of foreign origin. Related aspects of the availability of energy are the diversification of energy supply and the prevention of physical damage to critical energy infrastructure (power plants, pipelines, distribution networks) so that the services provided would be uninterrupted (Gariup, M. (2017)).

At the same time, in general, diversification covers three main aspects (Tocci, N. (2017)): diversification of energy sources (energy resources); diversification of energy suppliers; diversification of locations of individual energy facilities on a spatial (geographical, territorial) principle. Diversification of energy sources requires the use of a combination of different energy sources, types of energy resources, fuel cycles (relying not only on nuclear energy or natural gas, but also on other types of energy resources, such as coal, oil, wind, biomass, geothermal energy sources, etc.). Diversification of energy suppliers involves the use of several points of
energy production, so that one company or energy supplier cannot fully control the energy market. Spatial (geographical, territorial) diversification implies spatial distribution of locations of individual energy facilities in such a way that their functioning cannot be disrupted / destabilized as a result of a single event, malfunction or failure.

3. Methods

Ensuring the diversity of energy sources by investing in many alternatives serves the interests of both consumers and producers, because it guarantees the independence of the energy supply chain from any single energy source.

The geographical distribution of locations of individual energy facilities not only increases their overall safety and reliability of operation, but also makes the entire energy distribution network safer and more resistant to accidental failures and power system failures or deliberate actions. Geographic diversification contributes to the creation of several conditional goals that can not be violated at the same time, and thus prevents the possibility of a general collapse of the energy system (Kaunert, C. (2018)).

Diversification of sources and routes of energy supply is a determining factor in ensuring energy security, and its implementation is aimed at: reducing risks and minimizing the consequences of accidents at energy infrastructure facilities; development of competitive relations between exporters through the formation of a single liberalized energy market; reducing political influence of monopoly or large supplying and / or transit countries.

Since security of supply is only one of the many aspects covered by the EU’s energy policy, identifying energy security with security of energy supply (energy resources) can be viewed as a very simplified approach that has certain limitations. However, it should be noted that the security of supply is given the most attention due to the fact that it is in fact the basis for ensuring all other elements of energy security. Only continuous access to energy resources can guarantee energy security from the national level to the level of households, which means its sustainability and competitiveness. Since energy security can be ensured with the help of national instruments, and security of supply is based at least on regional cooperation, the diversification of energy suppliers (energy resources) depends on many external factors (Zemlickiene, V., Mačiulis, A., Tvronavičienė, M. (2017); Tetiana, H., Karpenko, L., Fedoruk, O., Shevchenko, I., & Drobyazko, S. (2018)).

The EU’s energy security is understood as a process of reducing dependence on external energy suppliers (energy resources) by development of own energy production, diversification of the domestic energy portfolio and diversification of energy supplies (energy resources) from external sources, creation of sufficient strategic energy reserves, energy efficiency improvement, decarbonization as a means of coping with climate change and environmental pollution minimization. A necessary condition for the existence of any country of the modern world is the use of energy. Energy is extremely important for the economy and has a great influence on its other industries, since their normal functioning depends on it. Energy is the basis of almost all spheres of life in the modern world and plays a crucial role not only in the economic development of the country, but also serves as a basis in ensuring the sustainable development of society.

All the processes of extraction and processing of fuel, production, transportation and distribution of energy resources covers one of the most important interbranch complexes - fuel and energy (FEC) (Gil’orme, T., Ryzhyk, Y., & Yaresko, A. (2016)). The social and economic development of the country is inseparably linked with the level of development of all sectors of the FEC, improving the energy balance with the obligatory account of the achievements of scientific and technological progress. Comprehensive intensification of production sets new tasks for the fuel and energy complex, increases its role in accelerating economic growth rates and increasing labor productivity. The fuel and energy complex is a large inter-sectoral territorial system, an integral part of a single national economic complex of the country; basic complex of the entire heavy industry. The ultimate goal of its operation is the reliable provision of the entire economic complex and the needs of the population in
fuel and electricity. The fuel and energy complex is a complex system - a set of industries, processes, material devices for the extraction of energy resources, their conversion, transportation, distribution and consumption of both primary fuel and energy resources and transformed types of energy carriers.

4. Results

The fuel and energy complex is the most important structural component of the economy, one of the key factors for ensuring the vital activity of the productive forces and the population. Reliable, stable, sufficient, cost-effective, environmentally friendly provision of the country’s economy with energy resources is the key to its energy security and, consequently, sustainable development. Therefore, ensuring energy security becomes a priority in the economic and public policies of countries.

Economic phenomena and processes are interconnected, finding dependencies and relationships between them through the construction of statistical models and their quantitative description allows a deeper understanding of existing patterns. Energy saving is one of the main problems for the EU. Considering the importance of the problem of energy saving on a global scale, various measures are being taken in the EU to reduce the amount of energy consumed in both industrial and social spheres. High consumption of fuel and energy resources in the EU and, as a result, a high level of energy intensity of GDP determine the need for a statistical assessment of the relationship between the consumption of energy resources and economic factors that have a significant impact on the level of its formation. The continuous rise in prices for fuel and energy resources (FER), the reserves of which can be exhausted in the near historical perspective, as well as significant environmental pollution by emissions from their combustion, leads people to understand the need for more rational and economical consumption, as well as the transition to the use of alternative energy sources, which include secondary energy resources (SER) and renewable energy sources (RES). The use of renewable forms of energy, in particular solar and wind energy, has gained tangible scales and a steady upward trend. The state policy in the field of introducing innovative technologies in the energy sector and energy consumption is implemented through targeted investment, a system of benefits and “Green” tariffs on the resources produced.

High capital spending creates uncertainty for investments in renewable energy sources, creating a barrier to their development. The policy of using renewable energy sources is changing, and it also increases the lack of trust for investors. Therefore, a predictable and stable policy should be maintained for long periods to ensure continuity of investment in renewable energy technologies. It is extremely important that the design of modern systems takes into account not only the direct economic indicators and the instant effect, but the comprehensive result of the introduction of technologies, taking into account the environmental component, the trends of depletion of certain resources. In recent years, alternative energy has become the subject of keen interest and heated discussions. The reason for this can be called both climate change and the fact that average world temperatures continue to grow every year, and according to numerous findings of scientists in the field of geology, the exhaustion of traditional energy resources in the form of oil, gas and coal in nature. The fossil resources that we use as fuel belong to non-renewable sources of energy, eventually leading to complete depletion. During the processing and combustion of hydrocarbons, a large amount of greenhouse gases is emitted, which adversely affect the climate of the entire planet. The desire to find forms of energy that will reduce dependence on fossil fuels, coal, and other polluting processes has naturally grown. Scientific thought and progress do not stand still, and today there are clear prospects for the widespread use of alternative energy sources by humans. Due to improved technology and production, the cost of most forms of alternative energy has decreased, while efficiency has increased.

The technologies that make it possible to convert thermal energy into electrical energy include: magnetohydrodynamic energy conversion; use of the fast neutron breeder energy; use of the thermonuclear reaction energy; thermoelectric technology; thermophotovoltaic technology; thermionic technology; zirconium technology. Unconventional fuels include: hydrogen and hydrogen energy; methane from coal deposits and landfills, synthesis gas, energy of gases of geothermal waters, energy of biol treatment plants.
Secondary energy resources can be divided into three groups: combustible - this is the chemical energy of the waste of technological processes of chemical and thermochemical processing of raw materials; thermal - is the heat of waste gases from fuel combustion, the heat of water and air, which are used to cool process units, the heat of products and waste products (for example, metallurgy); excessive pressure - is the potential energy of gases, liquids, and loose bodies that leave process units with overpressure (pressure).

The large-scale use of innovative energy generation technologies leads to an increase in the energy efficiency of the energy supply systems of buildings. That is, a significant reduction in the use of traditional organic energy sources is possible due to the development of new technological and technical solutions. The problems of energy saving are solved by engineering means, which are aimed at converting the energy of alternative sources (energy of solar radiation, heat of the environment, energy of wind flow), increasing the indicators of thermal resistance, redistributing energy flows, etc. Taking into account the analysis performed, it is advisable to use the methodology of economic modeling in the distribution of energy-saving technologies based on the temporal determination of the number of potential consumers. This methodology is an integral part of the proposed methodology for determining the environmental conditions for the formation of the thermal regime of a structure based on calculated economic models (Hilorme T. et al. (2018)).

Taking into account the temporality, the method of economic assessment and the procedure of consumer support for the basic circuit design of an integrated energy supply system should contain formal analytical dependencies on the definition and assessment of the economic efficiency of a set of energy saving measures based on the use of alternative energy sources.

\[ Q(n) = \lambda \cdot N(n) \]  

where \( N(n) \) – total count of population (the amount of population associated with each city), persons.

Equation (1) determines the model on the basis of which optimization of the enterprise’s work can be carried out with the introduction of energy-saving technology.

That is, significant is the modeling of the delivery and installation of energy-saving technologies in the final consumers. Given the formula (1), the value of \( Q(n) \) will be considered the number of consumers interested in energy-saving products.

But it should be understood that, taking the present time as the initial moment of time \( t = 0 \), the share \( \gamma_0 \) of the total number of interested consumers (potential product buyers), which reflects the number of already informed about the availability and benefits of energy-saving products of the enterprise, at \( t = 0 \), in absolute values, has the value \( \gamma_0 Q(n) \).

The increase in this indicator is possible due to the exchange of information between members of a specific target segment of the energy market and through advertising campaigns aimed primarily at uninformed potential consumers.

The model of the dynamics of the number of potential consumers \( X(t) \), who know about energy-saving products, has the form:

\[ \frac{dX(t)}{dt} = k_1 X(t)(Q(n) - X(t)) + k_2 (Q(n) - X(t)) \]  

where \( k_1 \) – index of proportionality, which determines the efficiency of the exchange between informed and uninformed members of the target segment of the energy market;

\( k_2 \) – index of proportionality, which determines the effectiveness of the advertising campaign of energy generating and energy distribution organizations.
The model of the dynamics of the share of potential consumers $\gamma(t)$, who know about the product, has the form:

$$\frac{d\gamma(t)}{dt} = k_1 \gamma(t)(1 - \gamma(t)) + k_2 (1 - \gamma(t)).$$  \hspace{1cm} (3)

The initial conditions for equation (3) are equality:

$$\gamma(t) = \gamma_0.$$ \hspace{1cm} (5)

The dynamics of the share of potential consumers is represented by the function:

$$\gamma(t) = \frac{Ce^{(k_1 + k_2)\gamma} - k_2}{k_1 + Ce^{(k_1 + k_2)\gamma}},$$ \hspace{1cm} (6)

where: $C$ – arbitrary constant, determined on the basis of (5) and given by the expression:

$$C = \frac{k_1 \gamma_0 + k_2}{1 - \gamma_0}.$$ \hspace{1cm} (7)

Function (6), together with expression (7), determine the model on the basis of which the organization of events can be optimized during an advertising campaign in order to promote energy-saving technologies in the regional market.

In particular, under the conditions of $k_1 = 0.05$, $k_2 = 0.1$, $\gamma_0 = 0.1$, after 9 months, informed consumers will account 70% of the total number.

Thus, in order that informed consumers account 80% under the conditions of $k_1 = 0.05$, $\gamma_0 = 0.1$ for 9 months, it is necessary to organize an advertising campaign, the effectiveness of which is characterized by the value of $k_2 = 0.14$.

5. Discussion

The competitiveness of such facilities is ensured by the synchronization and redistribution of energy costs and greater productivity of generating energy flows. The energy and economic security of the functioning of business entities and large industry associations is ensured precisely through the use of the achievements of progressive innovative technologies in the field of electric power industry. The social and economic efficiency of introducing innovative energy and information technologies is to save social labor and save important resources.

In this case, in our opinion, it is possible to conduct an economic assessment of the effects of the implementation of the model for determining potential consumers of energy-saving technologies in such directions as:

1. Environmental effects – allow reducing carbon emissions.
2. Effects of reducing operating and working costs of energy companies - reducing losses in the distribution of electricity by optimization of the performance of power plants and the balance of the power system.
3. Reducing the cost of industrial consumers.
4. Effects of improving the quality of business customer service based on interactive communication with consumers.
5. Increased efficiency and quality of power supply.
6. Effects of increasing the share of renewable energy and distributed generation.
At the same time, the expected effects from the implementation of the model for identifying potential consumers of energy-saving technologies depend on the group of stakeholders: energy companies (electricity wholesalers, energy service retailers, electricity transmission companies, distribution network companies), end-users (industrial, commercial, public), regulatory authorities (government regulators, wholesale electricity market operator, reliability regulators), the state and society as a whole.

Thus, end users can expect such effects from the implementation of this model: the ability to control energy consumption, increase the overall level of service, increase the reliability of energy supply, access to information on energy supply in real time, the ability to participate in demand management, optimize the distribution of generation and the like. Whereas, for energy organizations, the expected effects are as follows: reduction of electricity losses, transparent accounting and billing system, optimization of asset management, maintenance and monitoring in real time, etc.

Conclusions

The proposed model can be applied to optimize the operation of energy generating and energy distribution organizations operating in a regional market with significant turbulent changes in the energy expectations of economic agents. Transportation costs have a secondary impact on economic efficiency in this case, however, great importance should be given to the calculation of logistics costs.

The economic efficiency of innovative renewable energy sources implementation is largely determined by research, in particular, it is necessary to carefully establish the purchasing ability of potential consumers, the degree of their intentions to establish new energy-saving technologies.

The methodology of economic modeling for the distribution of energy-saving technologies is improved, taking into account the temporal determination of the number of potential consumers. It is an integral part of the proposed methodology for determining the environmental conditions for the formation of the thermal regime of a structure based on calculated economic models.

In general, it can be said that the diversification of energy supplies is one of the defining elements of ensuring security of supplies, namely, it can be stated that the diversification of energy supplies is: a component of energy policy aimed at improving energy security in the long term prospect; one of the key areas of energy security; a characteristic of the energy security condition (the condition is considered to be satisfactory if the supply of energy resources is diversified); one of the ways to ensure the protection in the energy sector from existing and potential threats of internal and external nature; one of the foundations of the European energy strategy; a component of energy security, which covers reduce in dependence on suppliers through import diversification; one of the main directions to reduce energy dependence; an instrument to achieve standards for uninterrupted power supply; one of the key driving forces of energy security; a fundamental factor of energy security and independence of the EU as one of the largest energy importers in the world; one of the main ways to ensure the security of supply; a means of reducing risks and minimizing the consequences of accidents at energy infrastructure facilities; a means of developing competitive relations between exporters.

Thus, energy security can be provided on the basis of strategies that are directly related to diversification (strategies for increasing the number of types of primary energy resources and fuel that make up a complex of energy sources; strategies for increasing the number of suppliers of energy and fuel (especially for imports); strategies for developing energy and fuel repositories and forming their strategic reserves) and / or other strategies that are indirectly related to diversification (strategies for improving energy efficiency; conservation strategies; strategies for using endogenous energy sources).

Thus, energy security is defined as one of the most important components of national security, a necessary condition for ensuring the sustainable development of the state. It implies the achievement of a technically reliable, stable, cost-effective and environmentally safe provision of the economy and social sphere of the country with energy resources.
Despite the fact that at present there is no effective instrument that would be able to completely solve the problem of changing the development path towards rational environmental management, it is the concept of sustainable development that deserves the most attention, since it offers realistic approaches and instruments to overcome the threat. But, the longer the economic crisis is, the more serious its social and environmental consequences can be. Thus, in the context of global economic crisis increasing, issues of sustainable development of economic and socio-ecological systems do not lose their relevance, but, on the contrary, acquire a special strategic character on the scale of economic entities, regions, state and, in general, on a global scale.

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Abstract. Organizations have to face both the opportunities that the technologies provide and the challenges that they create in the local or global market as the consumer behavior in the electronic environment is different from the behavior in an actual shop, therefore it is important to not only understand the changing needs of the customers, the factors that influence their behavior but also to choose suitable strategies while trying to satisfy these needs taking in consideration security issues. For this reason, an important purpose of this study is to indicate the factors that determine the behavior of an e-shop customer by conducting a pilot study in Lithuania. The research identified the key factors of consumer behavior in an e-shop. To establish factors determining the online shop customer preferences, five factor groups were identified on the basis of empirical research: product (service) characteristics, delivery, methods of payment, service quality and web page functionality characteristics. The results of the structured consumer survey showed that the factors that positively influence the decision to buy goods online are lower cost, less time consumption, an ability to make an order at any time of the day, and a larger range of products. The key factors that negatively affect the online shopping are product quality, delivery costs, security aspects, delivery time, and complicated online shopping process. The main problem areas faced by online shoppers were delays in product delivery, product quality, insufficient choice of payment methods, difficult return procedures, too little information about the product. After performing the correlation regression analysis of the structured survey, the following relationships are established: the frequency of online shopping is significantly correlated with the product’s compliance with expectations, which indicates that the customers who were satisfied with the quality of online products, more often shop on the Internet.

Keywords: behavior; consumer behaviour; e-commerce; behavior influencing factors; multiple criteria assessment


JEL Classifications: M1, M15, M16

1. Introduction

In the context of global digitalization, various changes take place not only in organizational management structures and processes, but also in fundamental sciences, as the development and application of information technologies create preconditions not only for the emergence and exploitation of the opportunities in the global market but also create certain challenges in order to understand the rapidly changing needs of the users and factors influencing the dynamics of these needs. Scientists differ in their assessment of the specifics of user preferences in the electronic environment, the satisfaction of users’ needs and their behavior and the related issues of increasing e-commerce efficiency. Taking into account the fact that the increasing use of the Internet in various fields has greatly expanded the possibilities and speed of access and use of information and, at the same time, has stimulated consumer engagement in a wide range of online activities (such as sharing their opinions on the product/service, providing feedback, comments, recommendations). Research on such issues becomes
an important starting point for shaping and making informed decisions regarding meeting the changing needs of consumers and increasing the efficiency of the operation of the electronic environment: what kind of website to create, what functions to implement, what products and how to submit, what methods of payment to offer, what sort of delivery solutions to choose to reduce risk, how to enhance consumers trust and security feeling, and so on. To solve these kinds of problems it is important to comprehensively assess the factors determining the behavior of the e-shop user.

A number of research studies of consumer behavior, its components and models have been made in the scientific literature. These models are divided into classical and contemporary models integrating the specifics of the web space. Some of the most popular classical models in the scientific literature are Nicosia, Engel, Howarth – Sheth, which were created under more traditional trading conditions (Engel, Kollat David, & Blackwell, 1968; Howard & Sheth, 1969; Thompson, Ravindran, & Nicosia, 2015). Contemporary models of consumer behavior include black boxes, Solomon, Berkowitz and other models (Berkowitz, Kerin, Hartley, & Rudelius, 2000; Berkowitz, Kerin 1992; Solomon, Bamossy, Askegaard & Hoog, 2016). The specifics of consumer behavior models in the electronic environment are analyzed by a large number of researchers (Banaytė, Tarutė, & Taujanskytė, 2014; Cheung, Zhu, Kwong, Chan & Limayem, 2003; Turban, Strauss, & Lai, 2016; Dębkowska, 2017). However, considering the aspects of consumer behavior studied, the constraints on consumer e-commerce, e-products, e-commerce models in the online environment, there is still a lack of an integrated approach and research to identify the key factors of consumer behavior in e-commerce, especially in terms of the dynamism aspects of the electronic environment.

The study of this type of problem is aimed at identifying factors influencing consumer behavior in the electronic environment, and to identify what kind of security aspects are within this set of factors in the course of a pilot study in Lithuania. To achieve the purpose of the research, such methods as scientific literature analysis, multiple criteria assessment and expert evaluation, structured e-commerce consumer survey, statistical analysis and correlation regression analysis were used.

2. Theoretical aspects of consumer behavior assessment

The digital content and its influence on consumers’ lives is powerful (Powers, Advincula, Austin, Graiko, & Snyder, 2012; Limba, Kiškis, Gulevičiūtė, Stasiuikynas, Plėta & Žuozapavičiūtė, 2018; Korauš, Gombör, Kelemen, &Backa, 2019; Benešová & Hušek 2019). Many scientists (Aghaei, Nematbakhsh, & Farsani, 2012; Chaffey & Ellis-Chadwick, 2012; Choudhury, 2014; Hassanzadeh & Keyvanpour, 2011; Sun & Wang, 2012; Aghaei et al., 2012; Chaffey & Ellis-Chadwick, 2012; Choudhury, 2014; Hassanzadeh & Keyvanpour, 2011; Sun & Wang, 2012) analyse the development of virtual environment via the web development stages. It should be noted that several developments during the development had changed: abilities of information transmission, acceptance and processing (from a static information display in stage 1.0 to reading – writing – execution - a parallel processing in stage 4.0), an axis of technologies (from a company to human-computer symbiosis), models of interaction (from stage 1.0 client-server to server-server in stage 4.0), use of information (from development of taxonomies in stage 1.0 to insightful decisions made in stage 4.0 on the basis of information) and technologies used (from static information portals used in stage 1.0 to the opportunities of the Internet of things in stage 4.0). There are different interpretations of cyberspace in the scientific literature (Aghaei et al., 2012; Choudhury, 2014; Powers et al., 2012; Taylor & Strutton, 2010; Tiago & Tiago, 2012) starting from a system creating preconditions for people to perceive, communicate and cooperate and finish with the social experience associated with interaction of individuals, exchange of ideas, information sharing, granting of social support, media creation, games, involvement in various discussions and activities using the global network.

Consumer needs and experiences are one of the key elements in decision making processes related to selection of more efficient communication channels and tools for delivering message and achievement of the target audience. Scientists define consumer needs as a desire related to a value that is typical to product or service category in functional and emotional level at a certain time or in a certain situation when a product or service must
be able to maximize personal consumer benefits, to provide solutions for aesthetic and ergonomic challenges faced by the consumer. Consumer needs can be divided into physical, social and psychological by designating more specific demand groups: family, pleasure, safety, entertainment, shape, sharing, cognition, self-realization (Barnes, Bauer, Neumann, Huber, 2014; Cao et al., 2013; Deci & Ryan, 2000; Dhir, Chen, & Nieminen, 2015; Hall & Zwarun, 2012; Jacobsson & Wilson, 2014; Lester, 2013; Milyavskaya & Koestner, 2011; Reinecke, Vorderer, & Knop, 2014; San & Yazdanifard, 2014; Taormina & Gao, 2013). In the presence of certain restrictions in the electronic environment (for example, data protection aspects or potential users are not able to physically touch the product and therefore not always able to assess the quality of the product), it is essential to understand the customer’s needs and factors that positively and negatively affect his or her determination to purchase the product, what is directly related with organizational performance. Therefore, both business practitioners and researchers seek to explore and understand the specifics of consumer behavior in cyberspace as a dynamic environment in order to make informed decisions under uncertainty and reduce the risks of various degrees and types. Many researches have stated the behavior of customers and what affects purchase intention online (Ahmed et al. 2017; Barnett, Kwon, & Stefanone, 2014; Davidaviciene, Pabedinskaite & Davidavicius, 2017; Davidavičienė, Sabaitytė & Davidavicius, 2017; Lantos, 2010; Molinillo, Liévano-Cabanillas, & Anaya-Sánchez, 2018; Nobar, & Rostamzadeh, 2018; Raphael, Goldstein, & Fink, 2017; Saprikis, Markos, Zarmpou, & Vlachopoulou, 2018; Vo et al. 2017).

Evaluating the innovative products and services of the e-markets, and introducing them into the market, both classical models and additional opportunities created by digitization, such as brand building created by consumers through feedback or personal recommendations on websites, social networks or blogs, have to be taken into account. In order to identify the key factors of consumer behavior in the Internet, an important task is to analyze the classical and contemporary consumer behavioral models proposed by researchers, their peculiarities and factors influencing consumer behavior (1 Table). Analyzing the specifics of consumer behavior in e-commerce, scientific literature examines models of such scientists as Cheung et al. (2003), Laudon & Traver (2016), Turban et al. (2016). Cheung is one of the researchers who studies the behavior of virtual users. The model describes the categories that affect the virtual user. Cheung combines not only human qualities, but also e-shop, product, demographic, social and environmental criteria and features. The application of the Cheung model can be seen in most online stores, it is quite up-to-date and includes all the main criteria. Nevertheless, there are some shortcomings in this model (Cheung et al., 2003). Laudon and Traver’s model is the evolution of the black box, adapting the standard user behavior model to the virtual user behavior model. Additional variables appear as such: company capacity, website opportunities and attendance rates. A positive relationship between using the Internet and online shopping, which means that the more virtual users use the Internet the more they shop online, were observed (Laudon & Traver 2016). Turban’s model delivers a more detailed model of virtual user behavior than Laudon & Traver (2016) – he also relied on the Black Box model but has significantly expanded it. This model generates a lot of details used in e-commerce: logistics, billing, design, website comprehension, e-mail, call center, FAQ. There is also an agent not described in any model, whose influence on customer selection and purchase is difficult to measure, but its weight is quite high and proven. A very detailed description of personal factors (age, gender, ethnicity, education, etc.), which are very important determinants of the user’s choice of product or service, is also there. The Turban model can be compared to Cheung model, which is very similar, paying attention to the finest details and factors. For empirical study Turban model, which outlines the model of virtual user behavior in the most comprehensive way will be taken as base by examining the key points, advantages and disadvantages of e-commerce solutions in consumer behavioral research (Turban et al., 2016). Due to drastic technological changes and new opportunities, previous studies in this field may be limited in their application and new research should be conducted in order to identify new challenges and trends.
<table>
<thead>
<tr>
<th>Name of the model</th>
<th>Model description</th>
<th>Specifics of the model</th>
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<tbody>
<tr>
<td>Nicosia model</td>
<td>The model consists of four parts: communication, information search, purchasing process, feedback from the user. At the communication stage, the organization communicates with the customer by emphasizing on the best product (service) characteristics, price, delivery advantages. At the stage of the information search, the customer is already familiar with the organization’s product (service) and seeks to receive relevant information analyzing it by comparing analogues and eventually makes a decision. If the decision is positive, it moves to the third part of the purchase - feedback, in which the organization receives data about the purchase, and the consumer acquires the experience of buying.</td>
<td>Nicosia decision model is more related with new product purchases rather than constant purchasing.</td>
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<td>Howarth – Sheth model</td>
<td>The essence of the model is repetitive purchases. In Howarth-Sheth’s model the customer is driven by three types of factors: signs, symbols, and social information. Extended problem solving (strong motivation) consumer behavior is understood as the active involvement of the customer in the solution of the problem and the avoidance of risks associated with the acquisition of the product. Limited problem solving (weak motivation) customer behaviour describes the passive involvement of the customer. This model consists of six interrelated components: information and experience, product type identification, provision, confidentiality, attitude and purchase action.</td>
<td>The strength of the model is the effort to identify the links between the various components. The model is more promising only after evaluating the actions of the customer’s recognition of the demand, influenced by the environment, personal characteristics and information accumulated in memory.</td>
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<tr>
<td>Engel model</td>
<td>The model concentrates on the user and distinguishes four essential components: initial stimuli, information rearrangement, decision making process, and decision variables. Focus is on the customer’s decision-making process.</td>
<td>The benefit of the Engel model is the focus on the customer’s decision-making process and an easy implementation of this model, as it avoids complex links between the various components.</td>
</tr>
<tr>
<td>Black box model</td>
<td>The model emphasizes the factors that determine the buyer’s willingness to shop. In it, the marketing (product, price, location, promotion) and other (economic, technological, political, cultural) incentives fall into the customer’s black box - his consciousness and cause a certain reaction. All incentives processed in the buyer’s black box - his mind, changes into the choice (of product, name, distributor, time, quantity). The goal of market analysts is to understand what processes are taking place in the black box and how the incentive becomes a response. The black box itself consists of two parts. The first is the characteristics of the customer, influencing his perception (cultural, social, personal and psychological factors) and the customer’s response to incentives. The second is the buyer’s decision-making process, which influences the behavior of the buyer.</td>
<td>The black box model does not emphasize repetitive purchases, loyalty; more emphasis is put on one-time purchases and the one-time selection process.</td>
</tr>
<tr>
<td>Solomon model</td>
<td>The model highlights the social and psychological factors that determine the consumer’s decision to buy, in addition to that it emphasizes the importance of the purchase situation.</td>
<td>The model puts less emphasis on the purchase process itself, paying more attention to the purchase situation, where the reasons for purchase, time, environment are already evaluated.</td>
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<tr>
<td>Berkowitz model</td>
<td>In the model, with a group of equivalents (psychological, sociocultural and situational factors) the influence of marketing tools is also distinguished. The tools of the marketing complex (price, product, promotion and location) significantly determine consumer behavior and their determination to purchase the product (service).</td>
<td>The model can be considered to be one of the most precise and most complete descriptions of the consumer’s desire to buy. This model has expanded the contribution of psychological, socio-cultural and situational factors to the customer’s decision. Also, this model shows the buyer’s analysis after purchase, which is already triggering loyalty and the possibility of a recurring purchase.</td>
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*Source:* created by the Authors based on Berkowitz et al., 1992; Engel et al., 1968; Howard & Sheth, 1969; Kotler & Keller, 2011; Solomon et al., 2016; Thompson et al., 2015
Having analyzed consumer behavior models, it can be assumed that the models emphasize different aspects of valuation. All models are geared towards personal factors, with the least emphasis on loyalty and re-purchasing. Some models emphasize marketing incentives, others – environmental factors (Table 2). Traditional and virtual user behavior models also have many similarities, as the main object of all models is the user and it is trying to portray the essential stimuli that determine his choice to buy. Because the information in the virtual space is significantly more extensive, respectively, there is more stimuli that can attract more attention from the user, therefore the models are also more comprehensive and focused on case studies.

Table 2. Evaluated aspects in consumer behavior models to be considered

<table>
<thead>
<tr>
<th>Model</th>
<th>Personal factors</th>
<th>Environmental factors</th>
<th>Marketing incentives</th>
<th>Product qualities</th>
<th>Loyalty</th>
<th>Purchase situation</th>
<th>Purchase process</th>
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<td>Nicosia</td>
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<td>Howarth</td>
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<td>Turban</td>
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Source: created by the Authors based on Berkowitz et al., 1992; Engel et al., 1968; Howard & Sheth, 1969; Kotler & Keller, 2011; Solomon et al., 2016; Thompson et al., 2015

Recent research focuses on the aspect of social commerce when reducing the impact of this limiting factor on the sales process. By combining commercial and social factors, social technologies are being developed on e-commerce web sites (Davidavičienė, Pabedinskaitė, & Davidavičius, 2017; Raudeliūnienė, Davidavičienė, Tvaronavičienė, & Jonuška, 2018). Social commerce has made it possible to increase mutual communication and collaboration, made it possible to communicate in the online environment (Lu et al., 2016). It should be noted that when organizations began to invest in social media, it became increasingly important to identify the specifics of the sales process in the cyberspace as a primary sales channel. There is a tendency that potential consumers agree to pay higher prices for products that are more valuable and more effective in resolving their problems. Studies conducted by Zheng, Yu and Jin (2017) have shown that the attitude of consumers towards the product (service) offered in the context of value depends on the content and intensity of the organization’s communication and dissemination of information in social media. Effective communication in the social media between the organization and the user and sharing experience among the users creates the preconditions for changing the consumer’s attitude about the quality of the product (service) and the value created, which is directly related to the customer’s quick decision to purchase the product (Zheng et al. 2017).

Summarizing the results of the research literature, the Turban model (Turban et al., 2016) and its components were chosen for further research, since it describes in detail the model of virtual customer behavior with addition of the loyalty aspect. To establish the factors determining the consumer preferences and the essential consumer requirements for an electronic store, based on empirical research (Cheung et al., 2013; Davidavičienė, Pabedinskaitė & Davidavičius, 2017; Raphaeli et al., 2017; Raudeliūnienė, Davidavičienė, Tvaronavičienė & Jonuška, 2018; Saprikis et al., 2018; Tiago & Tiago 2012; Zheng, Yu & Jin, 2017), a group of such factors as the product (service) characteristics (assortment, price, description, grouping, comparison, comments, guarantees, promotions, product guide, photos), delivery (delivery speed, price, methods, time, product tracking), payment methods, service quality (consultation, registration, call center, order status management, insurance, warranty, reliability, return connection) and web site functionalities (design, product search, filtering, comments, etc.) were identified.
3. Research methodology

In May and June 2017, a structured survey was carried out on the Internet (involving 4,105 respondents) and an expert evaluation (6 e-business specialists attended) in order to assess the peculiarities of the behavior of Lithuanian consumers in electronic commerce. The structured survey comprised demographic questions related to the respondents (gender, age, education, income), the frequency of buying online, the experience of buying in a foreign online store, the factors influencing the process of the decision to buy online, the advantages and the problem areas when buying online.

A multiple criteria assessment method was chosen to perform the expert evaluation in order to assess the complexity of factors influencing the consumer’s decision-making process, the result of a more objective and qualitative assessment. These assessment methods combine the combination of qualitative and quantitative approaches – expert judgment and the use of mathematical analysis methods (Ginevičius & Ostapenko, 2015; Zavadskas, Turskis, Vilutienė, & Lepkova, 2017). The expert assessment was attended by 6 experts with more than 10 years of experience in electronic business and having electronic store management competencies. The experts were asked to specify a list of functionalities (product characteristics, service quality, website functionality, methods of payment, delivery of the product) of the e-shop based on empirical research and determine the significance of the factors in the light of the customer preferences in the electronic environment of Lithuania. After performing the expert evaluation, the expert opinion consistency coefficient was calculated, which showed that expert opinions are harmonized.

4. Research results and discussion

4,105 respondents participated in the structured survey, including 2,653 women and 1,452 men. The age of respondents was distributed in the following way: 43% of respondents were 25-35 years of age, 25% of 16-24 years, 17.8% of 36-45 years old, and 9.8% - 46-55 years and 4.4% over 56 years old. 49% of respondents had university education, 31% had higher non-university education, 15% had secondary education, 5% had basic education. 52% of respondents had an average monthly income of 800 to 1500 EUR, 27% from 401 to 799 EUR, 11% more than 1500 EUR and 10% less than 400 EUR. When assessing the frequency of respondents’ online shopping, 66.63% of respondents shop each month, 29.65% every three months and 3.72% - every 6 months or less. The results of the survey showed that 34.4% of Lithuanian virtual consumers purchase from foreign online stores.

Correlation analysis between purchases in foreign internet shops according to the demographic characteristics of respondents revealed that the purchases between different respondents had a significant difference in demographic characteristics (p <0.05). The results of the survey showed that foreign internet shops have more male customers who bought there, they are younger than 35 years of age, have higher university education with a monthly income over 800 EUR.
Based on the correlation analysis and the comparison of the frequency of online shopping by the demographic characteristics of the respondents, the results of the survey showed that women are more likely to buy on the Internet than men, according to their age – those under 45 years, who have a higher education with a monthly income higher than 800 EUR.

The study examined factors that have a positive and negative influence on online shopping decisions and problem areas when shopping online. Respondents indicated that the factors that positively influenced the decision to purchase goods on the Internet were lower prices (38%), less time consumption (27%), the possibility of ordering at any time of the day (18%), and a larger range of goods (17%). The main factors that negatively affect online shopping are the quality of the product (it is difficult to evaluate the product quality online) (34%), delivery price (27%), security aspects (personal data and material resources) (20%), delivery time (17%), complicated purchase process (2%). The main problem areas encountered by buyers on the Internet were a delayed delivery of goods (38%), product quality (the product received was of poor quality or did not meet the buyer’s expectations) (16%), insufficient choice of payment methods (16%), complicated return procedure (15%), lack of information about the product (15%). Examining the security aspects of shopping online, it turned out that consumers positively evaluate online help when ordering a product, consulting on product quality, delivery and other issues. A correlation analysis and an online help service in the course of ordering according to the demographic characteristics of the respondents showed that the use of this service is more frequent for women, for persons who are 25 to 55 years of age and those who receive up to 800 EUR per month of income.
The structured survey also looked at whether the online order was in line with consumer expectations. The obtained results showed that 91% of users got the items ordered online in line with expectations, 6% had no opinion and 3% of users responded that the items purchased online did not meet their expectations. A correlation analysis showed that the online order was more likely to meet the expectations of men; persons who were 36-55 years of age, with a higher education degree and those with a monthly income of over 800 EUR.

Summarizing the results of a structured survey, it was determined that: the virtual user of Lithuania is educated, of younger age and has higher income; the frequency of online shopping significantly correlates with the purchase in foreign stores \( r = 0.185, p = 0.000 < 0.05 \) and the correspondence of the product with expectations \( r = 0.074, p = 0.000 < 0.05 \). This suggests that the consumers buy more often on the Internet as they were satisfied with the product they purchased online.

The second phase of the study aimed at identifying key factors influencing consumer behavior in areas such as product characteristics, service quality, web page functionality, payment methods, product delivery and determining the significance of these factors for the consumer’s determination to purchase the product online. Experts have estimated that most consumer preferences are affected by product (service) characteristics (0.3), web page functionality (0.23), product delivery (0.2), service aspects (0.17) and least affecting is the payment method (0.1) (Figure 2a).

![Diagram of consumer preferences](source)

**Figure 2.** (a) Distribution of consumer preferences by groups (expert assessment) on a scale \([0, 1]\); (b) Distribution of consumer preferences in the product (service) characteristics group; (c) Distribution of user preferences in the web page functionality group; (d) Distribution of consumer preferences in the product delivery group

*Source: created by the Authors*
In product (service) characteristics group the main factors influencing the consumer’s decision to buy in online store are product price (0.18), sales promotion (0.15), and the least important factors are grouping of goods (0.04) and comments (0.02) (Figure 2b).

The most significant user preferences in the web page functionality group are related to customer experience (recommendations, reviews, evaluation, commentary) (0.2), product searching (0.18) and website design (0.16), and the least significant factor is accompanying goods (0.03). In evaluating this group, experts emphasized the combination of simplicity and functionality, i.e. the simpler the website design with the details to attract the user and the more accurate product search on the website, the less tense the user is when shopping (Figure 2c).

The most significant consumer preferences in the product delivery group are delivery speed (0.21) and delivery price (0.2), while delivery and pick-up service (0.12) is the less important factor. In this group, the experts emphasized the aspect of clarity, the free delivery message should be transmitted very clearly, and if the transport is paid, it must be described in detail so that the consumer does not have to doubt the additional shipping charges. There is a noticeable need for users for different delivery ways and real-time tracking of item shipments in a dynamic environment where user dislocation is constantly changing. Therefore, with the possibility to change the delivery time and delivery location becomes an important aspect (Figure 2d).

In the service aspects group, the most important factors affecting the customer’s decision to buy online are reliability (call center, consultation, feedback) (0.6) and management of order status (0.17), but registration (0.06) is less important. Experts in this group distinguished the advantages of reliability (call center, consultation, feedback), management of order status. The online call center, consultation and feedback provide preconditions for increased reliability as the customer can solve his problems live and in time. Also, tracking the ordering of the item and managing the order gives the customer a sense of comfort (Figure 3a).

In the payment method group, the key factors affecting the customer’s desire to buy a product in the e-shop are payment by card (credit, debit) (0.35) and payment by transfer (0.22), while the less important aspect is payment by bitcoins (0.10). Experts pointed out that billing by crypto currency (bitcoin) is very controversial in practice, and its possibilities of growth and end are judged similarly (Figure 3b).
Conclusions

After the scientific literature analysis, it can be stated that consumer behavior models have a lot of similarities in both traditional and online commerce. Virtual space models concluded by scientists are based on traditional models, complemented by factors and functionalities that are specific to electronic space. Compared to traditional, the online store has considerably more advantages, but certain advantages of a physical store, such as the ability to evaluate the quality of a product by touching it or take the item home right after payment, still remain. The Turban model (Turban et al., 2016), describing the model of virtual user behavior in more detail, is chosen for further research after summarizing the results of the research of the scientific literature. To establish factors determining the online shop customer security preferences, five factor groups were identified on the basis of empirical research: product (service) characteristics, delivery, methods of payment, service quality and web page functionality characteristics.

The results of the structured consumer survey showed that the factors that positively influence the decision to buy goods online are lower cost, less time consumption, an ability to make an order at any time of the day, and a larger range of products. The key factors that negatively affect the online shopping are product quality, delivery costs, security aspects, delivery time, and complicated online shopping process. The main problem areas faced by online shoppers were delays in product delivery, product quality, insufficient choice of payment methods, difficult return procedures, too little information about the product.

After performing the correlation regression analysis of the structured survey, the following relationships are established: the frequency of online shopping is significantly correlated with the product’s compliance with expectations which indicates that the customers who were satisfied with the quality of online products more often shop on the Internet. Additional help is more often used by the part of customers who less frequently buy in online stores.

Analysis of the results of multiple criteria assessment and expert evaluation has shown that most consumer preferences are affected by product (service) characteristics, web page functionality, product delivery and service aspects. In the product (service) characteristics group the most important factors affecting the customer’s decision to buy online are product price and sales promotion. The most significant customer preferences in the web page functionality group are related to customer experience, product search, and website design. The most significant consumer preferences in the product delivery group are delivery speed and delivery price. In the service aspects group, the key factors affecting the customer’s decision to buy online are reliability (call center, consultation, feedback) and management of order status. In the payment method group, the most important factors affecting the customer’s determination to purchase a product in the online store are payment by card (debit, credit) and payment by transfer.

The results obtained during the study are marked by some limitations, since the study was conducted only in Lithuania. Further research trends could be developed in the following areas: for the purpose of assessing the objectivity and complexity of consumer preferences, to conduct research in a geographically and culturally similar region (for example, by integrating the Baltic region (Lithuania, Latvia, Estonia)); to investigate the relationships between consumer preference evaluation variables and their impact on the organizational performance.

References


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Analytical Support for Organizations’ Economic and Environmental Safety Management

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Abstract. In order to form an effective analytical support for the management of the economic and environment safety of organizations, the initial positions of environmental and economic analysis were substantiated. This allowed expanding the understanding of economic analysis in ensuring the effective interaction of the organization with the environment. As a result of the study of the methods of environmental and economic analysis of the priority objects of management of economic and environment safety, the absence of a system of indicators and a mechanism for their use has been established, which significantly reduces the quality level of the management information space. In order to solve this problem, the work developed the author’s methods of environmental and economic analysis: 1) models of environmental and economic analysis of the production process in terms of waste management (proposed calculation procedure, interaction mechanism, information support, procedure for factor models construction of waste cost ratios, waste capacity ratios, waste replacement ratios, waste replacement efficiency ratios); 2) procedure for analyzing the cost of processing, recycling and disposal of waste. The use of these techniques allowed us to identify the reserves for increasing the level of environmental and economic security of organizations.

Keywords: analytical management support; economic and environment safety; mechanism, reserves; information space; efficiency


JEL Classifications: F52, O39

1. Introduction

In modern economic conditions, the economic and environment safety of industrial organizations depends on the reasonableness of management decisions. Under market conditions, an organization independently makes management decisions, and this happens when there is an uncertainty in the organization’s external and internal financial and business environment, so there are risks caused by deviations of actual results from those planned. Under the influence of any risk, negative consequences can occur, resulting in the need for each organization to develop a system of measures aimed at reducing the undesirable consequences as much as possible. The main tool for such measures assessment is the system of economic analysis, which allows to establish causal relationships between measures, risks and their environmental and economic consequences for organizations.

The most effective impact on the change and development of economic phenomena and processes in conditions of democratization of management and management systems will be achieved when their regulators are balanced and comprehensively substantiated and convincing. Systematic analytical substantiation of the quantitative and
qualitative measurement of their effectiveness in a specific economic environment is a necessary and sufficient condition for implementation and spreading. The complex of such analytical tools is not regulated, however, the weight of its activities in harmonizing public, corporate and personal interests is undeniable.

2. Literature Survey

Modern approaches to the development of economic analysis are more focused on ensuring the financial and investment activities of organizations and, consequently, increasing their rating on the security market (Carranza, M. E. (2017), Bai, Y., Jiang, B., Wang, M., Li, H., Alatalo, J. M., & Huang, S. (2016)). Environmental and economic issues have been neglected and need to be developed. Researchers have made a significant contribution to the development of the science of economic analysis, but with the development of economic relations there is a need to expand its methodological tools and develop new theories that would characterize modern economic realities. So, today the priority is the development of economic analysis, which characterizes the relationship between the economic environment and the natural environment through the prism of economic activities of industrial organizations (Skrynkovskyy, R., Pawlowski, G., Harasym, P., & Koropetskyi, O. (2017)). George, R. Z., & Rishikof, H. (Eds.). (2017) in this context, note the following: economic analysis as an applied functional science has a close relationship with practice; studies, develops, improves the methods of obtaining, processing information about economic phenomena and processes, their formation and development. Practice here is a source of knowledge, because the existence of economic analysis as a science is caused by the needs of practice (Jackson, S. (2017)); is the basis of knowledge, its driving force - penetrating the entire process of scientific knowledge, ranging from its empirical level and to the construction of abstract theories, the constant movement from the concrete to the abstract and in the opposite direction; a fundamental direction (the goal in the general sense) - scientific knowledge is not happening for its own sake, but to ensure the regulation of economic phenomena and processes, their development, strengthening of positive trends and leveling of negatives (Lee, C. (2017)); is an integral criterion of truth and value of the knowledge gained - the test of knowledge for truth is a complex and ambiguous process, given the constant dynamism of the economic environment (Okoye, P. U. (2016)).

Thus, the current economic conditions have significantly influenced the development of economic analysis, because there was a need for a synthesis of economic and environmental indicators of economic activities of industrial organizations (Rushdi, A. M. A., & Hassan, A. K. (2016), Lutchman, C., Ghanem, W., & Maharaj, R. (2016)). Until now, these characteristics were considered in different planes and, accordingly, users did not require the delivering of information that is of an ecological and economic nature (Tetiana, H., Chorna M., Karpenko L., Milyavskiy M. & Drobyazko S. (2018)). When it is necessary to ensure a high level of economic and environment safety of an industrial organization, which is a determining component of its continuity, indicators of environmental and economic nature, their parameters, forecasts and changes must be taken into account in business activities management (Liu, H., & Lin, B. (2016); Atari, S.; Bakkar, Y.; Olaniyi, E. O.; Prause, G. (2019); Pavlová, H.; Bakalár, T.; Emhemed, E.M.A, Hajduová, Z.; Pařečný, M. (2019); Lavrinenko, O.; Ignatjeva, S.; Ohotina, A.; Rybalkin, O.; Lazdans, D. (2019); Hasanudin, A.I.; Yuliansyah, Y.; Said, J.; Susilowati, Ch.; Muafi (2019)). This will ensure an appropriate level of economic, environmental and social performance on the path to sustainable development.

Based on this, the development of environmental and economic analysis should be accompanied by the formation of a system of economic and environmental indicators. Ecological and economic indicators of the analysis should reflect the economic and environmental processes in all business processes of economic activities of industrial organizations, and they can be expressed both in absolute and relative values. A significant number of economic and environmental indicators of economic activities of industrial organizations is an integral part of financial indicators, because it plays a substantial role in the financial stability of organizations. Thus, environmental risks influence the system of financial indicators that determine the financial condition of an organization, its investment attractiveness and social significance.

The main difference between the indicators of environmental and economic analysis from purely economic and
financial is that they reflect not only the process or phenomenon in dynamics, but widen the consumer’s view of financial information about the results of industrial organizations both for an individual user and for society as a whole (Kotzee, I., & Reyers, B. (2016), Sebesvari, Z., Renaud, F. G., Haas, S., Tessler, Z., Hagenlocher, M., Kloos, J., ... & Kuenzer, C. (2016)). It is this property that defines them as carriers of specific information, allows not only to form conclusions about the management object for the current period, but also to predict changes in the future with less error and, accordingly, to ensure a certain level of economic and environment safety and operation continuity of industrial organizations.

3. Methods

Despite the actualization of problems of managing objects of ecological and economic nature, the theoretical principles of environmental and economic analysis of the economic activities of organizations require substantial improvement, because the range of objects is expanding, new tasks are being set, and technology is changing (Gil’orme, T., Ryzhyk, Y., & Yaresko, A. (2016), LIAO, L., & QIN, J. (2016)). In these conditions, we consider it necessary to establish the place of environmental and economic analysis in the system of economic analysis in general and determine the specifics of the components of the theoretical and methodological structure and form a forecast of its development, which will become the basis for improving and expanding the methodological tools.

In general, it is possible to form the following general list of users of analytical information with regard to the economic subject, which most clearly determines the interest in the results of environmental and economic analysis:

external users: lenders and borrowers (interested in assessment: financial resource needs for investment in environmental projects; risks and ways to minimize their consequences related to the financing of environmental projects), counterparties (interested in assessment: external and internal environmental risk factors affecting the contractual relationship with the organization), owners and potential investors (interested in assessment: environmental risks and their impact on the operation continuity of organizations; sources of financing of environmental projects; increasing environmental investment performance), state authorities (interested in assessment: influence of organizations on the ecological and economic situation in the region);

internal users: management staff, functional services of organizations (interested in assessment: maximization of target ecological and economic projects; assessment of environmental and economic performance of waste management operations; risks of formation of low-waste and waste-free production in organizations; funding mechanism for waste-free and low-waste production; risks of emergency situations and their environmental and economic consequences for organizations and the environment; effectiveness of preventive measures to prevent emergency situations).

It should be noted that both internal and external users of environmental and economic analysis can act not only as passive users, but also as customers of analytical information. For example, potential investors in assessing the continuity of organizations and the efficiency and safety of investments may be interested in analyzing the impact of the environmental component on the condition of organization business and the level of environmental and economic security, which is an integral part of economic security in general. The lenders to assess the loan project using the data of environmental and economic analysis to assess environmental risks. The owners are interested in the continuity of organizations, and therefore, when making any strategic decisions, they assess the level of environmental and economic security.

In order to ensure the functioning of an effective system of environmental and economic analysis, there is the need to determine the specifics of the functioning of the entity performing the analytical procedures (Tetiana, H., Karpenko, L., Fedoruk, O., Shevchenko, I., & Drobyazko, S. (2018), He, L., Jia, Q., Li, C., Zhang, L., & Xu, H. (2016)). After all, the environmental and economic analysis has a corresponding specifics, which consists in covering the various activities of organizations (operational, investment, financial and activity in emergency situations), various business processes (acquisition, production and sale) and various groups of integrated
facilities (waste management operations, environmental and economic consequences of emergency situations, environmental investments, etc.). These features determine the specifics of the formation of the composition of analysts or the distribution of analytical functions among employees of various analytical services. In general, the functioning of the subject of the implementation of analytical procedures in the system of environmental and economic analysis depends on the selected objects and methodology of analytical research. The questions of methodology characterize the relationship between the object and the subject and, accordingly, users of environmental and economic analysis (Nakashydze, L., & Gil’orme, T. (2015), Amalberti, R. (2017)).

4. Results

The study of the indicators of environmental and economic analysis, which allow us to assess the level of economic and environment safety of industrial organizations is quite diverse. However, such a system of indicators not always allows to determine the environmental and economic performance of the management system of priority objects of economic and environment safety of industrial organizations. Despite the identified priority objects of economic and environment safety management in the previous sections, there is a need to justify the methods of environmental and economic analysis of waste management operations and the environmental and economic consequences of emergency situations. Let’s consider the features of the formation of a set of indicators for each of these objects and determine the direction of the formation of information support and presentation of the results of analytical procedures.

Ecological and economic analysis of waste management operations. Waste and handling operations is a complex object of economic analysis, in particular, and management in general, because it determines the relationship of the organization with the environment. In addition, waste management operations are an integrated object that covers a combination of business processes and types of activities of organizations. Ecological and economic analysis of waste management operations should provide information on alternative areas for further operation of production processes and waste management systems in order to improve the rationality of natural resources use, waste treatment, reducing waste generation and, consequently, environmental pollution. In accordance with this, the analyst should evaluate the production processes for the efficiency of waste management operations both at the stages of its generation and at the stages of processing:

The condition of the system of production of finished industrial products for the formation of returnable and non-returnable waste. In particular, it is necessary to analyze the volume of waste generation for individual types of products, redistribution and calculation sites. In general, this will allow building multi-factor models and determining reserves for reducing waste volumes for individual components of industrial processes at an industrial organization. In fact, we are talking about the cost of waste of a separate type of product, redistribution and calculation sites. There is also a need to estimate the cost of waste of a separate type of material resources, which are released for the production of one or another type of finished industrial products. It should be noted that the calculation of waste cost indicators should be calculated both in cost measurers (cost of waste generated and cost of production, redistribution and calculation site), and quantitative measurers (amount of waste generated and volume of finished products, volume of semi-finished products by redistribution and calculation sites). The analyst should evaluate the cost of waste of both returnable and non-returnable waste. When analyzing the cost of waste in value terms for returnable waste, its cost is used in accordance with assessment methods, taking into account the directions of its further use, and for non-returnable waste we suggest using the value of all costs associated with its storage, disposal or dumping. When analyzing in quantitative terms the generated returnable and non-returnable waste, such questions do not arise. This group of indicators for analyzing the generation of industrial waste should be analyzed over time, since the calculated indicators at the balance sheet date will not give an opportunity to evaluate the effectiveness of production processes for waste management operations for a separate reporting period. It should be noted that the waste cost indicator should be reduced, that is, the lower the waste cost ratio of finished industrial products, redistribution or calculation site, the better for organization, and therefore this indicates less environmental impact and a high level of economic and environment safety of organizations.
The condition of the system of production of finished industrial products and the subject of waste replacement. In order to assess the waste management system, the analyst should assess the possibility and direction of the substitution of material resources with secondary resources, which are formed as a result of the recycling of waste generated at industrial organizations. We propose to determine the waste replacement by determining the share of secondary resources in the composition of a separate type of material resources. This will determine what proportion of the i-resource production costs replaced by a secondary resource created as a result of recycling its own waste. This indicator shows a positive trend in waste management, and therefore, the higher it is, the better it is for organizations. However, there is one condition: while reducing waste returns, there may be a decrease in the capacity of waste products in terms of secondary resources, because the volumes of their recycling are reduced. Therefore, these indicators should be analyzed in a complex, and, accordingly, the analyst should build factor models to increase or decrease such indicators, which will allow to estimate the reserves in one case decrease, and in another increase in the indicator.

The condition of the system of production of finished industrial products and the subject of waste replacement. This direction of environmental and economic analysis should show what economic result will give for the organization of the replacement of material resources with secondary resources formed as a result of recycling. Such an assessment can be carried out by comparative assessment of the value of material resources with analogues of their secondary resources, provided that such a replacement does not affect the quality of finished industrial products. The corresponding kind of calculations should be carried out, both at the cost of production as a whole, and for each redistribution or calculation site, which will determine the reserves for increasing the economic benefits from the use of secondary resources at industrial organizations. Indicators of this kind are positive for organizations, and therefore should increase. These areas of analytical assessment of production processes for the effectiveness of waste management operations allow us to evaluate both economic and environmental performance of economic activities. For the possibility of carrying out these directions of environmental and economic analysis, there is a need to formalize indicators and determine the directions of information support for their calculation.

The proposed model makes it possible to form a fragment of analytical support for the management of environmental and economic security in terms of waste management operations. The peculiarity of the model is that its provisions assess the industrial production system for an environmental component, namely, the generation of waste and its reuse as secondary resources. All of these indicators and their calculations are made by the author, based on the characteristics of the functioning of industrial organizations and using the mathematical apparatus. The peculiarity of indicators of waste cost, waste capacity, waste replacement and
economic efficiency of waste replacement is that all of them are interrelated and must be calculated together. It is impossible to evaluate the effectiveness of waste management operations using only one indicator without comparing it with another. In addition, it is very important to calculate indicators both in terms of value and in quantity. Thus, in particular, the indicators of the waste cost and the waste capacity, expressed in terms of value, should correspond to the values of these indicators, expressed in quantitative terms. The same applies to waste replacement, provided that the secondary resources are of identical quality and are used in the same volume as the primary material resources per unit of finished product.

We suggest evaluating the economic efficiency of waste reuse as secondary resources by calculating the corresponding indicator. Thus, by analyzing the difference between the material costs of a specific production and the production of material costs and the waste replacement rate, the analyst estimates the degree of reduction of material costs by using waste as secondary resources. In order to determine the procedure for calculating the proposed indicators, we propose the following mechanism for the formation of their components.

Waste cost of returnable waste. In order to calculate this indicator, the analyst uses data on the cost of returnable waste for the reporting period and the cost of finished products manufactured during the reporting period. The cost of returnable waste depends on the direction of its further use. In addition, the analyst must determine what the cost of waste is derived from a particular type of finished industrial products. When calculating the indicator in quantitative terms, the analyst should determine whether the volume of waste generated does not exceed the standards set for the specific type of finished industrial products.

The waste cost of non-returnable waste is a specific indicator, because it allows you to determine the amount of waste generated as a result of the production of a unit of products. For the calculation of this indicator, the analyst determines the amount of waste generated as a result of the production of a specific type of finished industrial product, and then calculates the index of waste cost. When calculating in terms of value, the waste cost is taken as the sum of expenses associated with the storage, disposal and dumping of non-returnable waste.

Waste capacity. This indicator is calculated only for returnable waste, because non-returnable waste is not reused by organizations. The analyst may use several approaches to determine the indicator of waste capacity, in particular: firstly, the analyst takes as the cost of secondary resources the amount of costs associated with recycling and the cost of waste generated by the organization; secondly, only the cost of waste generated is included in the cost of secondary resources; thirdly, the cost of secondary resources includes only the cost of recycling, provided that the cost of the generated waste has not been excluded from the cost of finished industrial products with which they are associated. However, the indicators will not always be comparable, because the issue of waste assessment is a specific and multivariate process at industrial organizations.

Resources replacement. This indicator is designed to assess the efficiency and effectiveness of the use of secondary resources generated from the recycling of own waste. Thus, when calculating this indicator, the analyst estimates how much the use of secondary resources allows to reduce the material costs in the cost of finished industrial products in terms of value and to what extent they allow to save the expenditure of material resources in quantitative terms. The calculation of the indicator can be carried out in different directions, which depends on the denominator of the indicator, that is, the primary material resource. Thus, as an indicator of the primary material resource we can use: firstly, the cost of resources, which could be in the absence of a secondary resource; secondly, when calculating in quantitative terms, the need for estimating the savings of the primary material resource, that is, an indicator is used of the secondary material resource volume that is needed to make a certain volume of finished industrial products. In turn, to calculate the waste replacement efficiency index, only the waste replacement indicator, which is calculated in terms of value, will be required.

As noted above, the peculiarity of the presented system of indicators of environmental and economic analysis is their interdependence, which allows you to determine the effectiveness of the production process for waste management. Such interdependence is presented in Table 1.
Table 1. Mechanism of interdependence of indicators of environmental and economic analysis

<table>
<thead>
<tr>
<th>Index</th>
<th>Interactions</th>
<th>Interaction value</th>
<th>Influence factors</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waste cost of returnable</td>
<td>KB &gt; BB</td>
<td>A positive tendency that indicates the conformity of a value expression to a</td>
<td>Indicates that the value expression fully corresponds to</td>
</tr>
<tr>
<td>waste</td>
<td></td>
<td>quantitative one.</td>
<td>the quantitative, which is a positive tendency</td>
</tr>
<tr>
<td>KB = BB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>KB &lt; BB</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste cost of non-returnable waste</td>
<td>KB ≠ BB</td>
<td>Waste cost of non-returnable waste in quantitative terms will not correspond to its value terms, because different output data are used.</td>
<td></td>
</tr>
<tr>
<td>Waste capacity</td>
<td>KB ≈ BB</td>
<td>Standard</td>
<td></td>
</tr>
<tr>
<td>KB &gt; BB</td>
<td>Positive tendency</td>
<td>Indicates savings resulting from the use of secondary resources.</td>
<td></td>
</tr>
<tr>
<td>KB &lt; BB</td>
<td>Negative tendency</td>
<td>Indicates the overvalued cost of secondary resources</td>
<td></td>
</tr>
<tr>
<td>Waste replacement</td>
<td>0 &lt; BM &lt; 1</td>
<td>Positive tendency when indicator moves to 1. The value of the indicator depends on the material capacity of the manufactured products of an industrial organization.</td>
<td></td>
</tr>
<tr>
<td>Waste cost and waste</td>
<td>BM ≈ 0</td>
<td>Indicates the absence of reuse of own waste as secondary resources.</td>
<td></td>
</tr>
<tr>
<td>capacity</td>
<td>0 ≤ BB</td>
<td>Waste-free or low-waste production</td>
<td></td>
</tr>
<tr>
<td>Waste cost and waste</td>
<td>BM ≥ 0</td>
<td>The situation is possible in emergency situations.</td>
<td></td>
</tr>
<tr>
<td>replacement</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Waste cost and waste</td>
<td>0 ≤ BB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>replacement</td>
<td></td>
<td>Waste capacity may have a low value, provided that the waste capacity is 0 (waste-free production) or tends to 0 (low-waste production)</td>
<td></td>
</tr>
<tr>
<td>Waste cost and waste</td>
<td>BM ≥ 0</td>
<td>Waste replace can be equal to 0, provided that the cost of waste also tends to 0 (waste-free and low-waste production)</td>
<td></td>
</tr>
<tr>
<td>replacement</td>
<td>0 ≤ BB</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The interdependence of the indicators is presented, which indicates the need for their use in complex in the analytical assessment of operations with waste generation and its reuse in the production process. However, separate comments should be submitted to this, in particular, with regard to the capacity of the waste and its replacement. When calculating these indicators, the analyst should take into account whether all types of waste can be used in the main production, in particular in the production of products, as a result of which it was generated. So, provided it is used in auxiliary production, or the production of another type of product, or even outsourcing, these indicators cannot be used by the analyst. So, there is a need to assess waste management operations subject to its further use in another form of production or auxiliary production and sale of waste to the side.

5. Discussion

The specified direction of environmental and economic analysis should include a number of indicators that will allow determining the economic efficiency of waste management, based on the position of reducing its environmental damage. This will allow to get an ecological and economic effect and to increase the level of economic and environment safety of industrial organizations. The first and most important stage of this direction of environmental and economic analysis is the analysis of operations for the recycling, disposal and dumping of waste, which determines the effect of its further use. In addition to this, there is a need for the formation of analytical information on waste recycling, disposal and dumping, in particular, it is necessary to evaluate the effectiveness of the process of recycling, disposal and dumping of waste both using own resources and using third-party services. Such analysis should be aimed at studying the cost of recycling (disposal, dumping) of waste for all business processes that accompany it.
The economic component of the effect is of great importance, because the harmonization of such components will allow to bring economic activities in accordance with the provisions of sustainable development. If it is impossible to generate environmental performance and efficiency in numerical terms (only in terms of reducing waste volumes or its reusing), then the economic efficiency of waste management operations should be expressed in a cost measurer.

The component of the information space, which is aimed at establishing the causal relationships of the condition of economic and environment safety of an industrial organization and allows to identify the reserves for increasing its level, is an economic analysis. The work widens the understanding of economic analysis through the justification of the organizational and methodological provisions of one of these types - environmental and economic analysis. This allowed to develop the theory and method of economic analysis in ensuring the effective interaction of industrial organization with the environment.

**Conclusions**

According to the results of the study of types of economic analysis in general and the specifics of the application of environmental and economic, in particular, the evidences of the latter were formed, which include: specific objects of management, functional relatedness of objects, methods of study of the economic activity of the enterprise, aspects of the economic activity study. It is established that the environmental and economic analysis of economic activities of industrial organizations is a component of economic analysis, which studies the specific management objects that characterize the interaction of the organization with the environment. The objects have ecological and economic character. The main objects are the priority objects of management of environmental and economic security, namely: waste and operations to handle it, the environmental and economic consequences of emergency situations and measures to prevent and eliminate them. Ecological and economic analysis of economic activities of industrial organizations is aimed at the study of the environmental impact of economic activity and at the study of the environmental risks that generally influence the continuity of organizations.

The task of environmental and economic analysis is manifested through its place in the system of management of economic activities of organizations. Ecological and economic analysis is associated with all information subsystems of industrial organizations and is the resulting link, which forms the information space for making management decisions on environmental and economic security. On this basis, the goals and objectives of environmental and economic analysis are justified. Thus, the goal is to understand the formation of information on the impact of economic activities of organizations, which is based on established cause-effect relationships, which allows to obtain a comprehensive assessment for making management decisions on changing the parameters of the management system as a whole and individual management subsystems aimed at ensuring the environmental and economic security of industrial organizations

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A MANAGERIAL APPROACH TO ROMANIA'S SECURITY STRATEGY WITH NATO

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Abstract. Romania’s membership of NATO and the European Union has many advantages, but also risks for each of them. Romania continues to strengthen its position and role within NATO and the EU. Romania has shown that it is a loyal and credible partner in its relationship with all international organizations. Romania’s strategic documents with NATO and the EU are well structured and clear. These include mission, vision, strategic objectives and ways of cooperating with each other, as well as the financial, material, human and informational resources needed to implement them. The objective of our research was to identify the main threats, risks and vulnerabilities of Romania as a NATO member state. The analysis has led to the discovery of new ways of reducing risks and threats, as well as solving the major vulnerabilities of Romania. The research is based on the National Defense Strategy, the Romanian Armed Forces Endowment Plan for the period 2019-2028 and other strategic documents underpinning the development of the cooperation between Romania and NATO. Within the analysis process the main threats, risks and vulnerabilities of Romania in relation to NATO were identified. Based on the analysis carried out, several ways of action are proposed through which Romania can strengthen its defense and security capabilities. The results of the research are relevant both theoretically and practically because they show the major changes that Romania has made after entering NATO and the exceptional performances achieved both in the development of the defense and security capability and in fulfilling the commitments assumed by Romania with NATO and other organizations it belongs to.

Keywords: strategy; security; management; NATO


JEL Classifications: F52; F53; F55.

1. Introduction

The international security environment is complex and is constantly changing. Complexity is determined by the relatively uncertain international climate and a continuous transformation. Alongside conventional risks and threats, new security risks and threats have emerged. Many countries and regions are arming, nuclear arms are proliferating, international terrorism is developing and cyber attacks are multiplying. All these are influencing security and stability both in the Euro-Atlantic area and beyond (Binetti, 2018). NATO is acting to reduce these risks and threats. In terms of global security, NATO’s role is particularly important for the security and stability of each state in and out of it. NATO is a responsible political and military organization that has the role of defending member states against the military aggression of other states. NATO knows a vast process of continuous transformation to adapt to changes in the international security environment. According to NATO, security means the alliance’s ability to discourage or defeat any threat from the international environment.

The NATO security concept has been redefined to integrate the non-military dimension, that is, the economic, social, cultural, religious and especially ethnic environment (Belas et al.2018; Douglas, Kovacova 2018; Esther,
2018). Globally, there is an increase in interdependencies and unpredictability in the international relationship system and an increase in the degree of difficulty with regard to classical asymmetric and hybrid risks and threats (Astrauskaitė, Paškevičius, 2018). In the medium to long term, developments in the global security environment will be influenced by several factors, such as: new geostrategic approaches; the development of information and telecommunications technologies; the intensification of nationalism and extremism; ethnic-religious fragmentation and ideological radicalization; adapting critical infrastructures against calamities, energy crises, cyber attacks, pandemics. In this international context, NATO acts to anticipate and prevent major security issues (Glyn 2018).

Romania is part of a region with many risks and threats due to the degradation of relations between NATO and the Russian Federation: Russia’s intervention on Crimean Island, Russia’s aggression against Ukraine, the 2018 Mediterranean conflicts (Chernova et al. 2018; Filipishyna et al. 2018). All these have led NATO to develop its relations with Romania and to intensify its preparations for defense. Romania plays a key role, along with Poland and Turkey, because they all have strategic positions on the east side of the alliance (Nunes et al. 2018). Most NATO member states have increased their defense budget. For example, Poland, Estonia, Lithuania, Latvia and Romania have increased their defense budgets to 2% of GDP (Sinaga et al. 2018; Lăzăroiu, 2018).

Romania has always been at the intersection of three very powerful spheres of influence that have had an impact upon its internal situation, from an economic, social and political perspective, as well as on the external situation (Gorb 2017). The three spheres of influence are: the European, the Russian and the American one. Romania is an important geostrategic area, attractive for its resources.

Romania’s accession to NATO in 2004, to the EU in 2007, and its active membership of the UN and OSCE have transformed Romania into a stability and security framework linked to the European and Euro-Atlantic values. Developing a modern, efficient and credible defense capacity and reforming the Romanian Security System have helped to strengthen and develop Romania’s capability to deal with the risks and threats posed by the instability in the Western Balkans and the issues of Russian interest areas in the Republic of Moldova and Ukraine with Transnistria. At the same time, from NATO perspective, Romania offers a new geopolitical dimension for security in the Black Sea basin, being the bridge in the transfer of stability and security to the Caucasus and the Balkans. In all this area of confluences with complex problems, Romania has its role and place. Its main objective is to defend itself by getting involved in all the initiatives, arrangements and security agreements in the area through which it can contribute directly and consistently to the reduction of the existing tensions and threats.

2. The dynamics of Romania’s strategies with NATO

The Dynamics of the National Security is closely related to the dynamics and security policy of the organizations that Romania is part of. Thus, the promotion of national interests at a global level can only be achieved through cooperation, based on dialogue, respect for the principles of international law and active participation in achieving regional security and stability. In order to promote and defend its national interests, Romania acts by political, legal, diplomatic, economic, social, military and intelligence means, either individually or in co-operation with other states on a bilateral or multilateral basis, as well as within international organizations (Șanda, Křupka 2018). Romania develops its defense and security capabilities and participates in the collective defense process of the North Atlantic Alliance. The harmonization of the process of transforming the Romanian Armed Forces with the military transformation process of the Alliance has led to the development of new capabilities or the adaptation of existing ones. Romania has reconsidered its way of planning the forces by moving from a national and territorial approach to defense to contributing to collective defense. Also, Romania continues the process of assimilation and implementation of NATO standards to ensure interoperability with the armies of other NATO member states. Romania has continuously increased its participation in international missions, both under the auspices of the UN, the EU and the North Atlantic Alliance. Regarding NATO involvement, Romania is one of the important contributors to ISAF (International Security Assistance Force). Also, Romania takes part in the NATO Training Mission (NTM) in Iraq and the events in Libya.
Since NATO integration to date, the Ministry of National Defense has many achievements appreciated within NATO: good strategic and tactical airborne capabilities, airborne and naval surveillance, ROL2 medical capabilities, ISTAR capabilities, military aerodromes upgraded to NATO standards with radionavigation systems, landing and beacon guidance. Romania supports the continuation of Alliance enlargement policy with new members and provides support and assistance to non-integrative European states wishing to adhere to NATO norms, principles, objectives and values. Romania supported the Membership Action Plan for Georgia and Ukraine on the occasion of the summit held in Bucharest. Also, Romania expressed its support for a NATO-EU political and strategic coordination relationship built on the principles of complementarity. Romania, as a member country of NATO and the European Union, promotes and protects national interests by achieving the security objectives in strict accordance with the obligations and responsibilities assumed within these organizations. Starting from the decisions and conclusions adopted at the level of NATO’s governing structures, Romania is conducting a series of actions to prevent and combat the risks and threats to regional and global stability and security.

Romania is continually working to harmonize national security policies with NATO and EU security for the development of bilateral and multilateral international relations between European states, members or partners within the various regional security bodies, as well as cooperation at the level of international security organizations (NATO, EU, OSCE) in order to build viable security and cooperation mechanisms in regional and global stability operations (Meyer 2018). Romania is actively involved in solving the problems of regional and global stability and security and supports the efforts of the new candidates to join NATO. NATO has proven to be a global force in full ascension, transformation, modernization and adaptation. As a Member State, Romania has specific strategies and programs to strengthen its defense capabilities and intensify cooperation with other NATO states (Milošević et al 2015). In the research process, we analyzed some of the most important strategic documents that Romania has, mentioning the main strategic objectives, their implementation and the expected results. Through this analysis we aimed to identify the main risks, vulnerabilities and threats for Romania and some recommendations for reducing them.

3. Romania’s objectives as a member of NATO and the EU

The first objective of Romania is to contribute to the development of a robust and relevant alliance, based on a solid transatlantic partnership. Romania supports NATO to become a powerful alliance capable of responding effectively to all security threats. In this process, a particular priority for Romania is the strengthening of collective defense. In this area, Romania aims to implement the Black Sea region decisions.

Romania’s second objective is the fulfillment of NATO membership responsibilities related to participation in Alliance operations and missions. Romania contributes to all missions and operations of the Alliance, including those outside the Euro-Atlantic area.

Romania’s third objective in relation to NATO is to support NATO’s role as a stability provider, a promoter of reforms and regional cooperation in the immediate vicinity of Romania (the Balkans and the Black Sea region). Romania believes that the border of the Euro-Atlantic community, based on democracy, freedom and security, should not stop at the eastern border of Romania. Therefore, Romania supports the integration of the Western Balkans into European and Euro-Atlantic structures. To the east of the Alliance, Romania has been and will continue to be a strong and active supporter of strengthening the partnership with the Republic of Moldova in support of its democratic evolution and European vocation. Romania also supports NATO’s special partnership with Ukraine and contributes to the support of the Alliance’s reform state. Romania also supports the NATO-Georgia partnership and the integration of Georgia into the Euro-Atlantic structures. Romania contributes to developing ways in which NATO can support the efforts of Black Sea states to strengthen regional security.

Romania’s fourth objective is the development of NATO’s partnerships with the EU and the UN. NATO’s partnerships with the EU and the UN ensure co-operation on issues of common interest and contribute significantly to reducing threats and challenges to international security. Deep and multidimensional cooperation...
between the two organizations is essential in a complex security environment in constant evolution. In recent years, especially since 2016, NATO-EU cooperation has intensified. In February 2016, a technical agreement on NATO’s Computer Incident Response Capability (NCIRC) and EU (Computer Emergency Response Team of the European Union (CERT-EU)) was signed, and in March 2016 operational and tactical arrangements between NATO (Maritime Command / MARCOM) and FRONTEX were signed. These are particularly useful in the context of NATO’s activity at the Aegean Sea. In July 2016, a Joint Statement of the leadership of the two organizations (signed by the NATO Secretary General, the President of the European Council and the President of the Commission) was issued in Warsaw which strengthened the strategic partnership in seven priority areas: (1) combating hybrid threats, including strengthening resilience Member States; (2) operational cooperation including maritime and migration; (3) cyber security and defense, (4) defense capabilities, (5) defense industry and research in this sector; (6) exercises; (7) building capacity in third countries, especially in the East and South.

In December 2016, the two organizations advanced on the implementation of the Joint Declaration by agreeing 42 measures for the seven priority areas previously identified in the Warsaw document. Common measures include measures to increase resilience to hybrid threats; operational cooperation between the Sea Guardian operation (NATO) and Sophia (EU) operation in the Mediterranean area; the exchange of information on cyber threats; ensuring coherence and complementarity between defense planning processes; parallel and coordinated exercise (PACE); efforts to support capabilities in the sphere of security and defense.

In December 2017, the two organizations agreed on a second set of 32 measures, including 3 new areas of interest: military mobility to ensure that military personnel and equipment can circulate rapidly in Europe as needed; counter-terrorism (CT); promoting women’s role in international peace and security (Women, Peace and Security/WPS). NATO Secretary General and High Representative of the EU are constantly reporting on progress in the implementation of the 74 measures, so far three such reports have been issued. Romania is part of the strategic partnership between NATO and the EU. This partnership has been developed on the basis of the political principles contained in the NATO-EU Declaration of 16 December 2002 on the European Security and Defense Policy (ESDP): mutual consultations, respect for equality, decision-making autonomy and the interests of the Member States, coherent, transparent and sustained development reciprocal military capabilities. In the meantime, the EU has also developed its own capacity to manage crises, under the Common Security and Defense Policy (CSDP). Under CSDP, the EU currently carries out numerous civilian missions and military operations. In some cases (the Mediterranean Sea, the Aegean Sea, Bosnia and Herzegovina, Kosovo), NATO and the EU are involved in the same areas but on different directions.

The new Strategic Concept, adopted at the Lisbon Summit (2010), recognized the EU as a key NATO partner in ensuring Euro-Atlantic security. Also, in the EU Global Strategy, adopted in June 2016 by the European Council, EU cooperation and NATO member states are clearly mentioned. On July 10, 2018, the leadership of the two organizations signed a new Joint Statement to continue the progress made in recent years.

4. Romania’s strategy with NATO: objectives, main principles and values applied

Romania has set the strategic objectives, values and principles on which its relationship with NATO is based. This section of the paper presents these components and how they are applied by Romania. Romania’s fundamental objective is to be an independent state with the capacity to defend and develop from a military point of view, defense, security, but also from a democratic, economic, social and political point of view. The main strategic objectives of Romania in relation to NATO are presented in Figure 1.
Achieving collective security and promoting democracy confirms that Romania has strengthened its strategic credibility. Romania is now recognized for predictability and continuity, both in foreign, security and defense policy, as well as in consolidating democracy and the rule of law. A strong Romania enjoys not only the full trust of partners, but is also a trustworthy provider and a source of stability in a complicated region. Through its strategic objectives and content, the Romanian Strategy with NATO refers to the country’s defense and national security as a whole.

The strategy explains the concept of extended national security - based on constitutional democracy and mutual respect between citizens and the state in the following areas: defense (understood as dual normative quality, national defense and collective defense), public order, intelligence, counter-intelligence and security, education, health, economic, energy, financial, environment, critical infrastructure (Urbančíková 2018; Sroka 2018). The strategy has an integrative and multidimensional approach, in which the defense dimension combines and balances with a number of other dimensions - public order; intelligence, counter-intelligence and security; diplomacy; crisis management; education, health and demography (Ciobanu, Androniceanu 2018).

The basic strategic principles underpinning Romania’s strategy with NATO are presented in Figure 2.

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**Figure 1.** Main strategic objectives of Romania with NATO

*Source: the author based on the strategic documents*

**Figure 2.** The main strategic principles of Romania with NATO

*Source: the author based on the strategic documents*
Strengthening Romania’s strategic credibility by promoting the principles of continuity, predictability, legality and proportionality derives from its status as member of the North Atlantic Alliance and the European Union. Continuity is a principle that derives from the need for policy coherence on the basis of which Romania builds its future and integrates into the European and Euro-Atlantic community. Thus, maintaining the vision and cooperation directions within NATO, the European Union and strategic partnerships, especially with the USA, provides Romania with the necessary conditions for increasing its capacity for conflict prevention, crisis management and operational capacity to respond to threats.

The predictability consists in the elaboration and implementation of national security policies at the internal and external level, while observing the principles, mechanisms and procedures for consultation, decision making and planning of the North Atlantic Alliance in order to increase Romania’s contribution to collective defense.

Legitimacy consists in fulfilling in good faith the obligations assumed by Romania at national, European and international level when acting to ensure and guarantee the defense of the country, its citizens, their fundamental rights as well as to prevent risks, fight against threats and limiting vulnerabilities.

Proportionality consists in providing the means of action necessary to ensure national security for the achievement of the established objectives and the allocated resources.

Rarely in connection with the strategic objectives are the fundamental values that are at the basis of Romania’s relationship with NATO. These are shown in Figure 3.

![Figure 3. Key strategic values of Romania with NATO](image)

Source: the author based on the strategic documents

The values on which Romania relies in its relations with NATO are understood and applied as follows: (1) dignity is understood as an essential attribute of the human person; (2) cohesion refers to the common aspirations of citizens; (3) constitutional democracy, namely participative political culture, refers to political pluralism, separation and balance of power in the state, guaranteeing the fundamental rights and freedoms of citizens and respect for constitutional and legal provisions; (4) state and territorial integrity refers to the loyalty of citizens and public institutions to national sovereignty.

Romania is permanently concerned about identifying the main ways to ensure predictability and consensus on the relationship with NATO and its other allies. At a regional and sub-regional level, the environment in which Romania defends and promotes its values, principles and interests is in a new phase of reconfiguration. The current security dynamics indirectly influences Romania’s security situation and the security of its citizens. Romania has the obligation to maintain the strategic balance in a complex area of regional security, as well as to contribute to the consolidation of the process of Europeanization through the gradual extension of the European area of freedom, prosperity, security and justice (Žuľová 2018).
An important strategic issue for Romania is regional cooperation by strengthening the eastern and southern dimensions. In a regional context, the Russian Federation is trying to strengthen its power status in the region, its actions affecting regional stability and the European course of Ukraine, the Republic of Moldova and Georgia. Perpetuation of instability in the Western Balkans generates populism, extremism and radicalization and affects the rights of ethnic communities, favoring organized crime and corruption. The regional energy architecture may experience changes due to the difficulties in using the Black Sea energy resources.

In January 2019, the Romanian National Defense Council headed by the President of Romania approved a series of measures by which Romania intensifies its efforts to strengthen the country’s defense capability and to fulfill its obligations to participate in NATO actions. Thus, the fundamental objective of endowment of the Romanian Armed Forces is to equip the structure of forces with high-quality, compatible and interoperable military equipment and equipment compatible with those existing in the armies of the other NATO and EU member states, to ensure the deterrence and defense capability and their viability over the next decades. Essential endowment programs designed to ensure the security interests of the Romanian state are referring to armored conveyors for military personnel, armored and unarmed land vehicles, multi-purpose Air Force aircraft, multipurpose corvette, personnel transport helicopters and those equipped with medical-evacuation systems. These types of techniques are included in the multi-annual procurement programs approved by the Romanian Parliament, for which financial funds have been committed and are in progress or will be implemented in the coming years.

The Romanian Armed Forces Endowment Plan of 2019 sets out the systems and equipment that will be purchased annually, thus achieving the correlation between the endowment of the structure of forces and the financial resources allocated for endowment. Romania continues to participate with military forces sent to missions in zones of operations outside the territory of Romania. Thus, in 2019, a number of 1,902 soldiers from the Romanian Armed Forces will participate in these missions and operations, 127 more soldiers compared to 2018. The forces of the Ministry of Internal Affairs, which will participate in missions and operations outside the state territory in 2019 will be of 759 soldiers and policemen. The main effort remains the Romanian participation to the force of NATO in Afghanistan, as well as the contribution to ensuring the presence of NATO within the Polish Fighting Group. Romania will maintain participation in NATO’s operations: KFOR and EUFOR ALTHEA, from the Western Balkan military area. In addition, in 2019, a military helicopter detachment will participate in the UN-led multi-dimensional stabilization mission in the Republic of Mali. Within this mission, Romania will provide medical assistance, troop and equipment transport, as well as logistical support to UN staff.

Romania continues to participate with armed forces to combat terrorism, peace support or humanitarian missions, in line with its commitments with NATO, the UN, the OSCE and other international organizations. The concept of establishing the Headquarters of the Multinational Southeast Corps was developed in Romania. The initiative arose at the NATO Summit in Brussels on 11-12 July 2018 and was followed by the adoption of a plan to increase collective defense in the Black Sea area. The role of the new command is to ensure an adequate configuration of the command and control chain between The South-East Multinational Division, the Joint Allied Force Command in Italy, and fighting forces in case of tensions and conflicts in the area. In January 2019, Romania approved the establishment of the Cyber Defense Command under the subordination of the Defense Staff as part of the process of restructuring and modernizing the Romanian Armed Forces. It will consist of building a functional, strategic structure capable of managing and responding quickly to cyber threats, peacetime, armed aggression, siege and mobilizing allied forces in case of war. The command will have to ensure cyber defense management in a coherent and efficient manner by dynamically synchronizing and directing the efforts of planning, organizing, coordinating and executing the specific actions of the force structure in a degraded cybernetic environment.

5. Analysis of the main threats, risks and vulnerabilities of Romania

Traditionally, Romania’s threats, risks and vulnerabilities in relation to NATO are assessed through military concepts, but the current security environment requires an extended approach (Thiele 2018). That is why the analysis we have made is a holistic one because it has taken into account both defense and security issues as well as economic, social, political, technological and environmental aspects.
The main threats to Romania in the field of defense and security are:

- Destabilizing actions in the eastern part that affect the security of the Euro-Atlantic area, creating regional instability and possible negative phenomena, including migration, organized crime and negative influence on the economic potential for development.

- The perpetuation of frozen conflicts in the Black Sea region and instability in the Western Balkans create additional pressure on Romania. Inter-ethnic tensions and regional imbalances in neighboring countries can lead to the emergence of regional conflicts.

- The distortions on the energy markets and competing projects of state or non-state actors affect Romania’s efforts to ensure a sufficient level of energy security.

- Cyber threats launched by hostile, state or non-state entities on information infrastructures of strategic interest of public institutions and companies; cyber attacks by cybercrime groups or extremist cyber attacks launched by hacking groups directly affect national security.

- Terrorism is a permanent threat, with forms of manifestation difficult to anticipate and counteract. The growing influx of information, especially in the virtual environment, favors the emergence of new cases of radicalization or involvement in extremist-terrorist actions.

- The proliferation of weapons of mass destruction and the trafficking of dual-use goods can affect national security, in the face of a destabilization at regional level.

- The hostile informative actions can obstruct Romania’s strategic projects and the decisions of the Romanian state institutions.

The main risks for Romania are as follows:

- Regional instability limits Romania’s capacity to promote strategic interests, especially those supporting the European path of the Republic of Moldova, solving frozen conflicts, ensuring energy security, protecting the rights of Romanian communities and economic activities carried out in the Black Sea’s Exclusive Economic Zone.

- The lack of Romania’s development objectives can be generated by the persistence of economic difficulties, the proliferation of the underground economy and corruption, tax evasion, infrastructure precariousness, as well as external factors such as the perpetuation of the development gaps at the European Union level and the low resistance to turbulence major foreign markets, mostly in the banking and finance area.

- Social risks persist against trends such as demographic decline, active population emigration, environmental degradation, national health system deficiencies, education and social assistance, and distortions in the labor market.

- The radicalization of the extremist entities present on the territory of Romania can occur in the context of the intensification of extremist actions of ethnic, religious or other origin.

- Cross-border crime, from drug trafficking, people, weapons and goods, illegal migration to economic and financial crime, is another phenomenon with a possible impact on national security.

- Illegal trafficking in conventional weapons comes from the interest of state and non-state actors to carry out such operations, targeting conflict zones or armed conflict. The risks with low probability, but with major impact remain of interest for Romania’s security, such as: low intensity military conflicts, but persistent in time, migratory flows generated by natural catastrophes, pandemics, ecological disasters.

The main vulnerabilities of Romania are:

- The limited capacity of state institutions to absorb European funds, the often inefficient use of public money, energy, critical infrastructure, agriculture, environmental protection, justice, health, education and scientific research. The absence of real multiannual budget planning has negative effects, including increasing the capabilities of the armed forces and respecting military spending commitments.

- Lack of coherence of the institutions of the Romanian state in the process of managing the various types of risks. This vulnerability becomes important and refers to the interoperability capability of the various state institutions that have to act in case of asymmetric and hybrid threats.
- Corruption is vulnerable to the state, damaging the economy and affecting the country’s development potential, good governance, decision-making for citizens and communities, and confidence in the act of justice and state institutions. At the external level, the persistence of corruption has a negative impact on the credibility and image of our country.

- Exclusion and social polarization, poverty, demographic decline, specialized labor migration, socio-economic disparities between regions and counties, fragility of the spirit and civic solidarity.

6. Directions for action and the main ways to ensure national security

Romania needs to focus its strategic efforts on the defense and security of citizens, on national territory, as well as on supporting allied and partner states, in line with the commitments made under international treaties. Based on this analysis, we have identified the following main directions of action for ensuring Romania’s defense and security in relation with NATO:

- Strengthening national defense capabilities through efficient use of existing mechanisms within NATO by continuing the process of transformation, modernization and endowment of the army with an annual budget of at least 2% of GDP for defense and national security;
- Developing the capabilities needed to respond to asymmetric and hybrid threats;
- Deepening the security dimension of the Strategic Partnership with the US by strengthening military cooperation, including on the national territory and the Black Sea region;
- Achieving performance standards to ensure interoperability with the armies of other Member States and harmonizing the legal and regulatory provisions governing the training and training of armed forces;
- Developing and adapting the security industry to the requirements of the armed forces and the competitive environment;
- Developing security industry cooperation with Euro-Atlantic countries, by capitalizing on multinational cooperation opportunities in the context of NATO and European Union initiatives;
- Strengthening the role and national presence in civilian missions and military operations through participation in crisis monitoring and management missions in priority areas of interest for Romania;
- Strengthening the strategic dialogue within the European Union, NATO and other formats of international cooperation;
- Deepening strategic partnerships by expanding economic cooperation;
- Stepping up cooperation with NATO’s eastern flank in tripartite and bilateral formats;
- Promotion of strategic Black Sea strategic valences and cooperation formats in this area;
- Romania’s involvement in the reflection process on the future role of the OSCE;
- Supporting public diplomacy actions to promote national security interests in cooperation with other public or private institutions.

Conclusions

As it results from the data and information presented and analyzed in this paper, Romania continues the process of strengthening NATO’s defense capability. A priority for Romania is the development of the material base in all areas of defense and security and the internal and international institutional framework. Romania’s programs and strategies in relation to NATO ensure the security interests of the Romanian state in areas of strategic importance for Romania, namely: armored conveyors, armored land vehicles, Air Force multilevel airplane, multipurpose corvette, personnel transport helicopters and ground-to-air missile system. The analysis proves that there are a number of risks, threats and vulnerabilities relevant to Romania and that a continued increase in Romania’s defense and security capacity is still needed. The proposed action lines show how the Romanian institutions could act in order to significantly limit the negative influences of the main identified risks, vulnerabilities and threats.
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A MODERN WARFARE PARADIGM: RECONSIDERATION OF COMBAT POWER CONCEPT

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Abstract. World Wide Web, Information Technologies and Web-Enabled Collaborative Technologies 2.0 accelerate the process of globalization. In modern globalization process, these technologies dictates how information is designed and how information flow is used in global communication system. In such interactive global environment, Fourth Generation Warfare has emerged where people’s identities and beliefs are the primary source of conflict. Primary fight is held not between countries, but between cultures. It is obvious - the nature of war has drastically changed and it almost eliminates the boundaries between the war and peace. Such an understanding generates a different view of modern warfare. From the modern perspective the main risks are directed to the state’s internal identity through people’s “hearts and minds” and society’s moods. People’s loyalty to attractive ideas and not to organizations is a major shift. It supports Sun Tzu’s and Clausewitz’s main ideas - winning wars without massive destruction by breaking down the enemy’s will and determination to fight with a limited use of military power. It is needed to reconsider not only the definitions of modern warfare and warfighting but also rethink the concept of combat power. It is obvious that the role of the military in peacetime activity must change significantly. Nevertheless, the new understanding rise a necessity to integrate the whole society and subjects of state in dealing with threats. The holistic defense approach is a new, more effective way of tackling modern security and sustainability issues of the states that need to be clearly defined.

Keywords: warfighting functions, combat functions, enabling functions, combat power, modern warfare, convergence warfare, warfighting, nature of war, military


JEL Classifications: H56, N40

Additional disciplines: political sciences; military sciences

1. Introduction

Recent conflicts have revealed new shapes and patterns of modern war and it is not surprising why scholars have renewed discussion of war and warfare (Nordin & Oberg, 2014). It is obvious that western and non-western have significantly different values and understanding of human rights, define peace and war differently (Bunker, 2011). These major differences between civilizations generates tensions, especially, when the process of globalization has reached the peak – where are not left suitable space and points for assimilation. From the position of non-western the definitions of war, warfare and warfighting are more broad than the western ones (Bartles, 2016; Kasapoglu, 2015; Nordin & Oberg, 2014). The main reason for it is that the way western understand the nature of war, mindset of warfare and logics of warfighting has not actually changed or evolved. If after World War 2 the direct confrontation (at notion of war) among nuclear superpowers was very unlikely, for now it is very likely but in different shapes at different operational domains and with different actors of war (Bartles, 2016). The main reasons of shift are emergence of Information Technology (IT), World Wide Web
It is clear that western assumptions of the post-cold war world order were totally wrong (Lucas, 2014). The euphoria about the end of the war era and trusting the future without threats for the sovereignty by military power has created the prerequisites for a drastic reduction in defense funding. It is not surprising, therefore, why military affairs are still detached from the development of the state. North Atlantic Treaty Organization (NATO) Secretary General Jens Stoltenberg’s (2018) statement accurately confirms the western attitude and mismatch to the non-western ones: “In 2014, only 3 Allies spent 2% of GDP or more on defense. This year we expect 8 Allies to meet the target”. Even the stability based on the fear of using a weapon of mass destruction is not seen as the key element of deterrence but “the possession of nuclear weapons has increasingly been used as an instrument of coercion” (Hedenskog, Persson, & Vendil Pallin, 2016, p. 111). Therefore, it is necessary that western not only reestablish the importance of military affairs but also adopt a clear and new understanding of the modern nature of war.

The main issue is not about how we fight on the ground or even is not a question of what our ways of fighting are, but firstly it is all about the definition and the nature of war (Nordin & Oberg, 2014; Renz & Smith, 2016). From the current perspective, there is a gap in the concepts of war, among the states of western and non-western. Western have a traditional claim of war – a clear distinction from peace and crisis (Nordin & Oberg, 2014). The law of war is a necessary precondition at military operations (ADRP 3-0, 2012) even when fighting against insurgents, terrorist or other combatants. Meanwhile, non-western have a totally different claim of war. Russians consider war to be a permanent process (even in peacetime) (Bartles, 2016), the Chinese perceive war without limitation of rules (Fleming, 2011) and from the Islamic point of view it is not limited by methods (White, 2014). For non-western, war is something much more than a military conflict (Bartles, 2016). From such a perspective: wartime, peacetime, crisis do not exist as separate terms. Therefore, it is clear that the non-western mindset of war are more advanced than the western ones. Such significant differences between the concepts make western and non-western stationed in to the asymmetrical position. From such a position “it is naïve to assume the West will win with this new battle with the same formula it used in the Cold War” (Pomerantsev, 2014). Therefore, it is needed western at least get back symmetry in terms of war or even better – build own war understanding.

It can be admitted that the science of war is most advanced in Russia’s military thought: “In Russian military thought, foresight is directly linked to military science, with military science being the science of future war” (Bartles, 2016). Such a holistic mindset of war is strongly connected with the laws of war (Kasapoglu, 2015) which center of gravity is legitimacy of actions. As an example – Russians many times has used a legal excuse for interventions, based on the Kosovo precedent (Karagiannis, 2014). Therefore, it clear - the manipulation and adaptation of international law and laws of war is a very important object of war. In addition, it can be assumed that Russia’s main goal is to create, sustain, and expand a gap of asymmetry in terms of war, warfare and warfighting in order to get advantage (superiority) against the mindset of western. Moreover, the asymmetry gap is rising and the biggest challenge of western is how to reconcile the new nature of war with the principles of democracy, human rights, people and media freedom.

Scientific problem – The modern warfare understanding, especially in the case of western, has a lack of theoretical solutions that meet contemporary needs on the basis of which it could be purposefully improved and implemented effective and reliable state defense systems.

Purpose – The purpose of this research is to create suitable conditions for the military and political community to operate more effectively under Fourth Generation Warfare (4GW) conditions.

Key research tasks:

- Explore to open up an actual picture of Modern War;
- Analyze to define the composition of modern warfare;
- Systemize to clarify the composition of modern warfighting functions.
Methodology/approach – This research paper was prepared by using several qualitative research scientific methods combination in order to enable symbiosis of science, art and personalized practice of the researcher. Such an approach of the study was chosen in order to get relevant concepts, definitions, meanings and usable models. In this study also was moved from exploratory literature review to the focused literature review method. Focused scientific and military relevant literature review was combined with analysis and systemization of the key definitions by understanding their causal and inter-segmental relationships. Such a mapping technique of the key definitions has created conditions for using the modeling method to create the necessary conceptual models. Visualization of conceptual models and their clear description mainly was based on deductive cognitive method.

Results of the research – The results of this study are of a qualitative origin. Relevant clarification of the basic definitions of modern warfare, actualization of their relationships through visualized models are main results of this research paper for the future studies and practical implementation. Such a models like: “corners of state security”, “composition of modern warfare” and especially “concept of modern combat power” has a scientific and practical usage possibilities.

Research limitations/implications – The proposed models, concepts and generated findings of this research paper must be empirically checked before a full-scale implementation. The implications are to be seen with regard to education in the military.

Originality/value of paper – The application of the concept of modern combat power is original. The practical value of this research paper is the relevance and specificity of conceptual models that could be successfully adapted to military needs by effectively managing military, paramilitary and non-military units.

2. Picture of Modern War

The nature of war inevitably changes the mindset of warfare and logics of warfighting. Lind et al. (1989) precisely described the future of modern warfare, and it is obvious that the real changes are still in the future. According Lind et al. (1989) we are at 4GW and it cannot be excluded from the previous warfare generations. Thus, an anticipation of what the next war will be like is essential (Lind, 2004; Lind et al., 1989). If war is “interest driven, organized collective violence” (Fleming, 2011), “an act of force to compel our enemy to do our will” and “the continuation of policy by other means” (Clausewitz, 1989), then it is clear that the primary efforts of warfare are directed towards state security. Therefore, it is essential to define clearly primary targets of an attack of each warfare generation.

According to Clausewitz (1989), resilience of states are based on three main elements – Society, Government and Military (DOD, 2007, p. 8) – which can be described as ‘Corners of State Security’ (Fig. 1). Therefore, there is no doubt that primary targets of an attack are directed to these security corners (DOD, 2007, p. 8).

According to Clausewitz (1989), the following are considered the enemy’s victory:

- Capture of the enemy’s capital (‘Government’ as a target);
- Destruction of the enemy’s military forces (‘Military’ as a target);
- The elimination of enemy allies (‘Support’ as a target).
Listed targets can be mostly associated with first, second and third generation warfare. First generation warfare (1GW) was based on massed manpower (Lind, 2004; Lind et al., 1989). The primary target of 1GW is a military corner and a mass is a center of gravity. The tactics of line and column were common (Lind, 2004; Lind et al., 1989). Evolving technologies especially in firepower enabled the emergence of second generation warfare (2GW) based on massed firepower (Lind, 2004; Lind et al., 1989). The primary target of 2GW is military corner and a place is a center of gravity. The tactics of line were common (Lind, 2004; Lind et al., 1989).

Another technological jump brought not only tanks in military operations but also a new way of fighting. It enabled the emergence of third generation warfare (3GW) based on maneuver, bypassing and collapsing enemy from the rear (Lind, 2004). The primary target of 3GW is government corner and a time is a center of gravity. Although Lind et al. (1989) and Lind (2004) treat 3GW as nonlinear but actually it has clearly defined lines between the opposing forces in battlefield and a clear distinction between combatants. Therefore, 3GW cannot be called nonlinear. It can be referred to as modified linear tactics with modification in depth and contiguous and noncontiguous operational areas (FM 3-0, 2017; JP 3-0, 2017). In other words, it could be referred to as the tactics of objective.

However, the listed targets do not limit modern resilience issues to the state security. Blurred lines between war and peace (Bartles, 2016; Kasapoglu, 2015; Lind, 2004; Lind et al., 1989), blurred distinction of opposing forces (Pomerantsev, 2014) and operational domains are truly nonlinear warfare (Kasapoglu, 2015). If in 1GW, 2GW and 3GW the main threat was external and orientated to sovereignty, in 4GW the threat is internal and orientated to core of the state identity (Davis, 2014). 4GW is based on the exploitation of superior ideological (cultural) ideas (Schmidt, 2014) by braking enemy (whole nation or society) from the inside (Davis, 2014; Lind, 2004). It can be assumed that for the first time in the history of war, nonmilitary means became more important than the military ones. From the Russian perspective “war is now conducted by roughly 4:1 ratio of nonmilitary and military” means (Bartles, 2016). The primary target of 4GW is an identity core and ideas are a center of gravity (Quackenbush, 2015) by using nonmilitary means (Davis, 2014). “Fourth Generation war is also marked by a return to a world of cultures, not merely states, in conflict” (Lind, 2004). Sustaining and developing a desirable mindset and attacking the mindset is not possible without significant differences in ideas of living. That is why the tactics of asymmetry is now common at 4GW (Bartles, 2016). Examples of the tactics of asymmetry can be found in Kilcullen’s publication (2006) where the mentioned practice is presented as still relevant.
However, 1GW, 2GW, 3GW and 4GW classification must be accepted limited. Such a classification represents only the western approach. Jokubauskas (2017) study is one of example of non-western approach to warfare, where so-called 4GW was used much earlier that western recognized it. It is a good illustration of western misunderstanding to changed nature of war. Nevertheless, the concept of 4GW is still relevant. According to theoretical insights, 4GW may be best understood by the following explanation:

- Asymmetry in operational domains;
- Asymmetry in actors of war;
- Asymmetry in mindset of fighting;
- Asymmetry in methods of fighting.

3. Asymmetry in operational domains

According to the Army doctrine reference publication (ADRP) No. 2-0 (2012), “An operational environment includes physical areas (air, land, maritime, and space domains) and the information environment, which includes cyberspace”. However, recently, cyberspace has been reconsidered as a separate domain of operations (Stoltenberg, 2016). Looking further into a newly published Army Field Manual (FM) No. 3-0 (2017) an operational environment “encompasses physical areas of the air, land, maritime, space, and cyberspace domains; as well as the information environment (which includes cyberspace); the electromagnetic spectrum (EMS), and other factors”. It is clear that the main discussion is around the Information environment and Cyberspace origin, composition and position in modern warfare. The lack of concrete distinction of operational domains is obvious. If the cyberspace is now recognized as a separate operating domain (MOD, 2017), the same cannot be said about information space, or electromagnetic space. A clear definition of operational domains enables the authority and legitimacy to operate in it for the military. Especially, it is important to the western. Without it the military has some limitations and constraints on actions and counteractions (Fleming, 2011) and are not able to respond to threats and risks in a proper way. Meanwhile, non-western have their own view in the operational environment and operational domains. In the so called the doctrine of Gerasimov Russians conceptually separated information space, while others domains are disguised (Bartles, 2016; Schmidt, 2014). However, exclusive capabilities of cyber warfare (Plėta, Karasov, & Jakštas, 2018; Wilson, 2014) and electronic warfare (McDermott, 2017) give a evident insight of Russian’s conceptualization of cyberspace and electromagnetic space as operational domains.

Nevertheless, the conceptualization of information space as an operational domain is not very accurate: “Russia’s view of the future is one of contactless war where the main battles are held in the mind” (Renz & Smith, 2016). According to Schmidt (2014) the main purpose of a modern war is “changing minds of our opponents to force them to fulfill our will”, and actually “no lethal force is needed”. Information with the combination of various measures is only the material in information warfare and does not have nothing in common with the operational domain. Thain and Bradley (2012) in the book “Store Wars: The Worldwide Battle for Mindspace and Shelfspace” have introduced and covered the term mindspace as the operational domain. Capabilities to “withstand intended mental influence to our minds” and “deliberate influence to undermine our beliefs into our value structures” are questions for discussion; as well as even attacking the enemy’s mindspace by information flow (Schmidt, 2014). Thus, the term mindspace is more accurate and less misleading.

In addition to clearly defining operational domains, connecting them into a multidimensional battlespace is also an issue. Nevertheless the lack of concrete distinction of operational domains, at FM 3-0 (2017) an operational environment is understood in terms of multi-domain extended battlefield. The mentioned term can be understood also as battlespace (AAP-06, 2013). From the modern warfare perspective, the notion of battlefield is obsolete and will be replaced by the term of battlespace (Leonhard, Buchanan, Hillman, Nolen, & Galpin, 2010). Also “the battlespace should be understood as a wide variety of battle spaces that links each other into one complex” (Schmidt, 2014). It enables a holistic mindset and major shifts in warfare. However, without IT the input cross-domain approach is not possible, especially, Command and Control (C2) (Bartles, 2016; Leonhard et al., 2010). That is why IT is becoming more and more important because it enables capabilities of creational environment (Lasmar, 2012) rather than acting in an aging environment.
4. Asymmetry in actors of war

Recently much effort has been put to explain modern warfare and its forms. Striving to explain the irregular warfare origin is not an exception (DOD, 2007; Harris, Jr, 2013; Kimbrough IV, 2008; O’Driscoll, 2011) and can be best described in the dichotomy with the regular warfare origin. Regular warfare and irregular warfare are best described by using the concept of actors of war. The understanding of modern actors of war by western and non-western differs significantly and brings parties to the asymmetry position. According to the Geneva Conventions, only combatants can hold military actions, and a distinction between combatants and noncombatants is essential in describing who is regular and who is not (Khen, 2016). However, modern warfighting is conducted not only between friendly and hostile force combatants. Moreover, non-western see modern actors of war with no restrictions. Therefore, military actions do not belong exclusively to the forces of combatants. Nevertheless, a precise dichotomy of regular warfare and irregular warfare still exists when explaining the modern warfare origin.

According to the Geneva Conventions (UN, 1949), combatants must fulfill the following conditions:

- that of being commanded by a person responsible for his subordinates;
- that of having a fixed distinctive sign recognizable at a distance;
- that of carrying arms openly;
- that of conducting their operations in accordance with the laws and customs of war;

If regular warfare used to be conducted by regular combatants and irregular warfare by non-regular combatants (Fleming, 2011) then now irregular warfare must be understood in a much wider space. The main issue regards the term irregular. From the current perspective actors of war as fighting entities have many names, like: states actors (Cordesman, 2014; Gentry, 2014), terrorists (Gentry, 2014; Zeman, Břeň, & Urban, 2018), insurgents (Gentry, 2014), adversaries (Fleming, 2011), hybrid adversaries (Davis, 2014), hybrid threat actors (Fleming, 2011), transnational actors (Lasmar, 2012), threat actors (Fleming, 2011), non-state entities (Bunker, 2011), non-state actors (Cordesman, 2014; Davis, 2014; Fleming, 2011; Gentry, 2014; Hoffman, 2009; Lasmar, 2012) non-state military formations (Jokubauskas, 2017) and many more. Nevertheless, Bartles (2016) claims that the actors of war “could come in the form of undeclared conventional forces, peacekeepers, special operators, Cossacks, private military companies, foreign legionnaires, biker gangs, Russian-sponsored NGOs, and cyber/propaganda warriors”. Also it can include “various paramilitary, terrorist, organized crime organizations, or even private armies” (ADRP 2-0, 2012) like lone wolf terrorists (Zeman et al., 2018). Thus, despite the fact that the terms unlawful combatants and unprivileged combatant/belligerent is not included in the treaties of international humanitarian law (Dorman, 2003) and they do not follow the rule of law or the Geneva Conventions (Davis, 2014) it must be part of irregular term. Therefore, from the current perspective, non-regular combatants and unlawful combatants conduct irregular warfare.

The variety of unlawful combatants (M. D. Maxwell & Watts, 2007) but also status of civilians (Khen, 2016), society, government and organizations itself in modern warfare are the main issue (Gentry, 2014). According to Bartles (2016) “warfighting subjects are no longer limited only to the military personnel”. Nevertheless, actors of war cross the physical domain boundaries and “use their own internal divisions and populations as weapons” (Cordesman, 2014). “It also includes interconnected influences from the global or regional perspective (for example, politics and economics) that impact on conditions and operations” (ADRP 2-0, 2012). Therefore, the public and worldwide opinions of civilians (Davis, 2014) and international organizations, respectively, become actors of war in the cognitive level. It is rather clear that the support from the civilians and organizations, through public opinion and world opinion will be a part of the future warfighting.

To sum up, the ability to combine regular and irregular actors of war in an exclusive way as a unified operational force (Fleming, 2011) will be a desirable capability (Leonhardt et al., 2010). Such a simultaneous combination expands military operations “functional requisites and increases its overall complexity” (Lasmar, 2012). It becomes clear that a future warfighting will be conducted neither between two sides (two countries, two blocks of allies) nor two against two, nor three against one but “all against all” (Pomerantsev, 2014). The capability
to manage such a complex military operation requires a different approach to C2 (Leonhard et al., 2010), or even the adoption of a new one military management concept. However, it will be a great challenge for western societies to acknowledge changes in actors of war, especially in terms of law.

5. Asymmetry in mindset of fighting

If the understanding of regular warfare and irregular warfare dichotomy is best described by the use of the term actors of war, then the understanding of conventional warfare and unconventional warfare dichotomy must be described by using the term mindset of fighting. According to Buffaloe (2006) “warfare is a struggle at the strategic level” and cannot be separated from the strategy. The strategy itself is “a prudent idea or set of ideas for employing the instruments of national power in a synchronized and integrated fashion to achieve theater, national, and/or multinational objectives” (DOD, 2017, p. 220). In addition, it must present “the manner in which military power should be developed and applied to achieve […] objectives” (LKS AAP-6, 2014, pp. 285–286).

To sum up, the conventional warfare and unconventional warfare dichotomy is best described in association with the two sub-objects in mindset of fighting:

- Application of physical instruments of fighting (weapons and equipment used);
- Application of cognitive instruments of fighting (methods used).

This concept can be explained by adapting the IT classification logic, where physical instruments of fighting can be understood as hardware (tools, machinery, and other durable equipment), and cognitive instruments of fighting as software (the programs and other operating information). Both in the field of IT and in the field of warfare, hardware and software cannot work separately. This understanding gives us an insight that it is hardware that can be used in many different ways by using different software. Therefore, it is not surprising that not only new weapons and methods are being developed, but also new ways of using them. These new strategies or just new ‘ways of fighting’, become more and more important at 4GW, especially when technological advances are so fast (Schwab, 2017) and using regular forces is significantly limited by weapons of mass destruction and doctrines of using them (Hedenskog et al., 2016).

According to Fleming (2011) “Strategy is often codified in overarching strategic documents to provide guidance for […] organizations to organize for war” and “much trust was placed in documents such as the Geneva Conventions – whereby the great powers agreed to certain rules of war and thus dictated the management of violence” (Buffaloe, 2006). Conventions – legal International treaties on the laws of war are the key sources in explaining conventional warfare and unconventional warfare. Nevertheless, while the definition of unconventional warfare is clearly presented in military glossaries (DOD, 2017, p. 239; LKS AAP-6, 2014, p. 455), however, the approved definition of conventional warfare is missing and can be only found in a few sources (FM 3-05.130, 2008; Kimbrough IV, 2008). The questions of what conventional warfare is what conditions it must fulfill and whether it is not obsolete remain open and unanswered. On the contrary, the unconventional warfare concept is also changing. An aspiration to separate special forces from unconventional warfare as solely holders (D. Maxwell, 2013) is lately seen by suggesting the necessity of the new special warfare concept (Madden et al., 2014). Now unconventional warfare is seen in a much wider spectrum. However, it is clear that actors of war acting too much in an unconventional way may reach to the war crime state, and it is a reason why unconventional warfare is gaining also a negative meaning.

For a long time, in describing conventional warfare and unconventional warfare was a question of military or other government security forces involvement (Kimbrough IV, 2008). In modern warfare, all actors of war can fight both conventionally and unconventionally. That is why for now, this question is obsolete, and it should be a question of regular warfare and irregular warfare.

Despite the fact that there is no approved definition of conventional warfare, clear dichotomy of conventional warfare and unconventional warfare still exist when explaining the modern warfare origin.
In order to keep the actors of war using appropriate (conventional) physical and cognitive instruments of fighting, from the modern perspective, it must fulfil the following conditions:

- that of having open and direct confrontation between two or more states (FM 3-05.130, 2008; Leonhard et al., 2010; O’Driscoll, 2011);
- that of encompassing all kind of armed confrontation (FM 3-05.130, 2008; Hedenskog et al., 2016; Leonhard et al., 2010);
- that of using not prohibited weaponry, munition and explosives (DOD, 2017, p. 52; Kimbrough IV, 2008; LKS AAP-6, 2014, p. 123);
- that of excluding usage weapons of mass destruction: nuclear, biological, and chemical munitions (Kimbrough IV, 2008; LKS AAP-6, 2014, p. 123);
- that of using military or (and) paramilitary equipment (Leonhard et al., 2010);
- that of conducting military style operations (DOD, 2017, p. 52; FM 3-05.130, 2008; Kimbrough IV, 2008) in accordance with the law and customs of war (Schmidt, 2014; UN, 1949);
- that of using military style activities exclusively against military or other government security power and military purpose installations (FM 3-05.130, 2008; Kimbrough IV, 2008);
- that of seeking to force a change in an adversary’s government or policies (FM 3-05.130, 2008);
- that of seeking to minimize civilian interference in operations (FM 3-05.130, 2008);

To sum up, if actors of war fulfil the mentioned conditions of combatants then their activity can be treated as regular warfare, if they do not – as irregular warfare. Moreover, if mindset of fighting falls under the mentioned conditions of appropriate (conventional) physical and cognitive instruments of fighting then it can be treated as conventional warfare, if it does not – as unconventional warfare. Nevertheless, it must be admitted that totally conventional warfare, unconventional warfare, regular warfare or irregular warfare exist only in theory.

It should be admitted that regular warfare and irregular warfare as well as conventional warfare and unconventional warfare are naturally paired (Kimbrough IV, 2008). In addition, these warfare dichotomies are not just only naturally paired itself, but also they are interconnected (Fig. 2). Such an understanding is especially important in explaining modern warfare.

![Fig. 2. Composition of modern warfare](Source: Author)
In modern warfare, the strong divisions between regular warfare and irregular warfare as well as conventional warfare and unconventional warfare are out of date. Complex modern warfare “will incorporate as many decentralized components of war as possible that are not and will not be understood as traditional components of war, but will provide a strategic advantage over an unprepared enemy in unprecedented ways by unanticipated means with unpredictable impacts” (Schmidt, 2014). Moreover, the “strategic success goes to those who identify important vulnerabilities in their opponents and successfully exploit them in ways that terminate the conflict on favorable terms before the other side can do the same” (Gentry, 2014). According to Hoffman (2009), the modern warfare is best described by the notion of convergence and can be called as convergence warfare. Nevertheless, convergence warfare can be also called as compound Warfare or hybrid warfare (Fleming, 2011). Hoffman (2009) has precisely described the philosophy of Convergence warfare as following:

“However, the evolving character of conflict that we currently face is best characterized by convergence. This includes the convergence of the physical and psychological, the kinetic and nonkinetic, and combatants and noncombatants. So, too, we see the convergence of military force and the interagency community, of states and nonstate actors, and of the capabilities they are armed with. What once might have been distinct operational types or categorizations among terrorism and conventional, criminal, and irregular warfare have less utility today. They suggest that our greatest challenge in the future will not come from a state that selects one approach but from states or groups that select from the whole menu of tactics and technologies and blend them in innovative ways to meet their own strategic culture, geography, and aims”.

Lately Russian mindset of fighting, as the specific shape of convergence warfare, is widely discussed. According to Bartles (2016), western have misinterpreted it as hybrid warfare. However, it is something very different.

Firstly, western have stuck in mindset of reductionism, while Russians have evolved and improved their mindset of holism. The habits of clear objects, subjects and activities separation that are concerned with western do not fit modern needs. From the modern perspective, nothing can be separated from the development of the state. Therefore, peace cannot be separated from war, the government from the society or military and the vice versa. Western see objects, subjects and activities in many clearly separated pieces, while Russians and many others non-western perceive it as a whole. From such a perspective it is clear why mass media, private companies, gangs, NGOs, etc., in non-western, are part of warfare. Meanwhile, the law and regulations of war are a great challenge to western. Also, the western are looking at the warfare theoretical extremes, while non-western look at warfare as a whole. It imposes constrains, which include “rules of engagement, political will, global media coverage, military traditions, norms of warfare, as well as cognitive and geographic boundaries” (Fleming, 2011). It is evident that non-western use manipulation as a weapon (Schmidt, 2014). Therefore, the great question is how to reconcile the western understanding by the term of law and the non-western understanding by manipulation of term of law? Actually, it is great risk to the Western’ way of living.

![Fig. 3. Current picture of strategic approaches](Source: Author’s adaptation of Huntington, 1993; Arreguín-Toft, 2005; Richardson, 2011)
Secondly, the modern Russian mindset of fighting cannot be called as hybrid warfare, because it seeks to create, maintain and develop the state of asymmetry and indirectness through unique campaigns and operations (Bartles, 2016). According to Buffaloe (2006), such a multidimensional mindset of fighting has an asymmetric nature. That is why such a mindset of fighting can be best described as asymmetric warfare (Bartles, 2016; Leonhard et al., 2010). The main difference of Russian warfare is firstly based not on the capability of combining different types of warfare but rather based on the capability to find, build and use the indirect strategic approach. The same approach is seen in other mindsets of fighting of non-western (Fig. 3). It allow to obtain the advantage against western, which have superior direct action capabilities.

While western are developing and building direct military capabilities, non-western are developing and building indirect capabilities of multidimensional actions. The primary targets of western are military and government corners (Fig. 1). The main efforts are concentrated on the development of direct military power capabilities and pressures on the enemy government’s apparatus sustainment. Meanwhile, the primary target of non-western is identity – the core of state security (Fig. 1). The main efforts are concentrated on nonmilitary capabilities and influencing the development of the enemy government by sustaining long-term tensions in the society of an enemy. Such very different strategic approaches are an illustration of asymmetric reality.

Another illustration of asymmetric reality is Chinese modern mindset of fighting, known as unrestricted warfare (Buffaloe, 2006; Schmidt, 2014). According to Buffaloe (2006), the Chinese do not pose a real traditional threat. China’s asymmetric threat is expressed in their military doctrine by the three main principles (Schmidt, 2014):

- omni-directionality – the recognition that the battlefield is everything around us;
- synchrony – the recognition that war can be conducted at the same time on different battlefields;
- asymmetry – the recognition that the overlooking and circumventing laws of war is a norm.

It is obvious that the mindset of fighting of western is still based on 3GW while non-western base their mindset of fighting on 4GW. According to Schmidt (2014), “there is no way how to enforce states to play a fair game of traditional conventional war”, so it obvious, this asymmetry must to change.

6. Concept of modern combat power

According to ADRP 3-0 (2012) “combat power is the total means of destructive, constructive, and information capabilities that a military unit or formation can apply at a given time”. In other words, combat power can be understood as the potential of military power capability to perform an effective action at specific time and space (in terms of operational domains). However, as recent modern conflicts has shown, the current concept of combat power does not fit modern needs (Fleming, 2011). Nevertheless, NATO and United States military publications has significantly different recognition of combat power and their elements composition and definitions (ADRP 3-0, 2012; ATP-3.2.1, 2018). In addition, if United States military publications sustains a conceptual framework integrity of combat power and warfighting functions, while in NATO publications this is not the case. Especially it is seen between ATP-3.2.2 (2016) and ATP-3.2.1 (2018) publications, where definition of “combat power” is mixed with “fighting power”, definition of “warfighting functions” is replaced by “combat function”, and most important these publications has significantly different composition and explanation framework of combat functions. Such a confusion is unacceptable, so the best way is to take combat power framework for improvement which is expressed in ADRP 3-0 (2012). The existing concept of combat power was good for 3GW actions, operations and campaigns but not for 4GW. It is obvious that 3GW and 4GW have different methods of fighting. Therefore, the obvious asymmetry in methods of fighting is unacceptable.

Firstly, the existing concept of combat power is suitable for the so-called hard power development and application. However, under the conditions of convergent warfare the hard power (the conventional combat power) is important but no more decisive. The military based on hard power can fight direct threats at conventional wars, but is incapable to fight indirect threats at unconventional wars (Fleming, 2011). According
to Arreguín-Toft (2001) it is needed to have two militaries: one for direct threats based on hard power, and another for indirect threats based on the so-called soft power. It is obvious that non-western have advanced rapidly by developing soft power capabilities (Cordesman, 2014; Hedenskog et al., 2016; Renz & Smith, 2016; Weichong & Chong, 2013). Nevertheless, lately mixed variations of hard power and soft power at war actions, operations and campaigns have been noticed (McDermott, 2017). Moreover, western lately highlighted the need of soft power development (Glando, 2013; Stoltenberg, 2016; Wilson, 2014). Therefore, it is needed to have not two armies but one army with hard power and soft power capabilities. That is why the concept of combat power must be changed and adapted to the modern needs. The adoption of upgraded warfighting functions could be promising. The future combat power will be used in the unified land operations (ADRP 3-0, 2012), but with an increased complexity regarding the involvement of soft power and the application need at crossover operational domains.

The overall complexity of modern warfare poses a need to rethink the logic of combat power. The way we understand the combat power in the cognitive level is very important, because it programs our thinking and acting. Military traditions of structural logic are very old and strong (Zakarevičius, 2013). The frameworks of elements of combat power (ADRP 3-0, 2012, fig. 3-1, p. 3-1) and the operations process (ADP 5-0, 2012, fig. 1, p. iv) are examples of structural logic. In the first example, the most important is the mission command warfighting function, in the second one – commanders. Also, it must be added that “The Army’s framework for exercising mission command is the operations process” (ADP 5-0, 2012). Thus, commanders and the chain of command are still a center of gravity. Such a structural and hierarchical thinking was suitable for first, second and 3GW but as far as 4GW is considered it is out of date. The rapid development of IT and cybernetics is changing structures into networks and hierarchies into hubs. Such a major shift in the logic of military by changing structural thinking and by enabling holosystematic thinking has a perspective. That is why the future concept of combat power must be based on the holosystematic approach instead of the structural approach.

Based on the symbiosis of science, art and personalized practice, the concept of modern combat power is further suggested (Fig. 4). The suggested concept of modern combat power is based on elements of combat power framework (ADRP 3-0, 2012, fig. 3-1, p. 3-1), but it has a major improvements.

Firstly, the concept of modern combat power is based on the holosystematic approach instead of the structural approach. All elements are an important part of the system and crossover related. Neither element is defined as most important. Each element has its own functions, tasks and unique purpose. All elements are treated as the convergent system with the common mission and purpose. The fusion of the elements enables a capability to use hard power and soft power simultaneously. In such a system, the position of a commander should be understood firstly as a facilitator (Shekshnia, 2018) and then, if there is a struggle, as a commander. Such an understanding of the modern combat power allows to accelerate both the speed of processes and precision of actions. According to Schwab (2017), namely speed and precision will be the most important principles of effective acting which can be defined as core principles of the future warfighting. Core principles of future warfighting define for what purposes the concept of modern combat power has been designed.

Secondly, the elements of modern combat power are called as warfighting functions (ADRP 3-0, 2012). Warfighting functions split into two categories – combat functions (ATP-3.2.2, 2016) and enabling functions. Such a distinction of functions clarifies what the military can do bearing in mind their responsibility. Combat functions define clearly how military power is going to conduct actions, operations and campaigns, whereas enabling functions define clearly how military power can decisively enhance speed and precision. Based on the concept of modern combat power, combat functions have seven elements: management, movement and maneuver, intelligence, fires, sustainment and support, intercommunication, and protection. In addition, enabling functions have four elements: knowledge, technology, leadership, experience. All elements of combat functions and enabling functions are collectively described as warfighting functions. Nevertheless, the suggested concept has some major changes, which need to be discussed.
The structural warfighting functions framework is transformed into a holosystematic concept. Moreover, in order to fit modern war needs the mission command must be accepted as the military management technique, as much important as the detailed command. The introduction of military management instead of mission command as the warfighting function element would be a major shift in military. The future commander will have not only to command but also facilitate (Shekshnia, 2018) team members, units and activities in the complex military activities, operations and campaigns (Leonhard et al., 2010). The ability to facilitate and if it is needed to command, firstly will be enabled through the so-called social power. The acceptance of commanders’ position as part of the team but not as the most important element in the team will be essential (Kilcullen, 2006). Schmidt (2014) has precisely described the future of military management as following:

“The future conflict will have a hybrid shape in a sense that the conflict will be conducted in several battle-spaces, by several means and will pretend to be isolated as different actions with no relation to each other in a military campaign, but will still be driven by a collective idea without the need of a central command and control”.

Further, the reconsideration of the military but also whole society roles in the state defense is an issue. According to Davis (2014), in modern warfare “the minds and mindsets of the warring parties play a significant role” and “mental resilience is a crucial defensive capability” (Schmidt, 2014). The military is no more a buffer between the enemy and its own government or people (Buffaloe, 2006). Therefore, defense is not just a military affair but also a matter of every citizen (Cordesman, 2014). Moreover, the battles of ideas is an important attribute of modern warfare allowing gain advantage against a superior enemy. That is why “tactical victories become meaningless without civil victory” (Cordesman, 2014). Therefore, to sustain a shared awareness of common identity (Schmidt, 2014), gain and sustain supportive public opinion and world opinion is an objective of the military community. It is evident that the future military activities, operations and campaigns will have to deal with internal threats to our ideology and willingness of our society to exist and fight. In order to resist the indirect strategy of ‘divide and govern’ (Schmidt, 2014), the sustainment warfighting function must be extended into sustainment and support warfighting function. From the modern perspective, the effective application of sustainment and support warfighting function enables achieving a strategic victory without direct fighting (Cordesman, 2014).

Moreover, the rapid advance and importance of communication and cybernetics systems cannot be ignored anymore. The intercommunication are forms of soft power, which must be taken in account seriously. Firstly,
intercommunication does not belong to the C2 authority exclusively. Cross-over and proactive communication between various systems without human intervention is a common picture of modern interaction. However, resilience of communication and cyber systems is a great concern, especially, having in mind capabilities of the enemy (McDermott, 2017; NATO STRATCOM, 2016; Wilson, 2014). Therefore, the signal-warriors, cyber-warriors and mind-warriors will be common in the battlespace as now is a machine-gunner. That is why the intercommunication must be accepted as the new elements of warfighting function. The capabilities of friendly forces to have effective internal communication and have appropriate resilience as well to have superior capabilities to attack enemy’s communication and cyber systems will be an essential need.

If combat functions are closely related to the direct military unit capability to accumulate combat power, then enabling functions have an indirect impact. The acceptance of enabling functions as part of combat power is conceptually important. Enabling functions acts as a catalyzing effect to the combat power, which allows exclusively to enhance the speed and precision of warfighting. A clearly defined purpose of the enabling element is inseparable from the use of suitable elements. A precise naming of enabling elements gives priorities of real benefit.

If leadership fits the concept of enabling functions as an element, then the information element must be replaced with knowledge. Effective knowledge management envelopes data, information and knowledge holistically by sharing an explicit ‘know-how’ among the internal community. Moreover, knowledge must be understood in more in a broader sense, where knowing, insight and wisdom is integral parts of knowledge paradigm (Razma, 2014). Exclusive knowledge is a great advantage, which is not easily replicated, and it is the reason why obtainment of knowledge is important part of organizational capabilities. Mainly knowledge is identified through the effective knowledge management, but without knowledge-oriented leadership, it is hard to expect obtain desirable knowledge (Shamim, Cang, & Yu, 2017).

Due to the rapid technological advance (Schwab, 2017), the face of modern warfare has been changing faster than ever before and it is a reason why technology must be taken into account as an enabling element. A possession of superior technologies is a great catalyst of warfighting and the social (soft) and material (hard) technologies must be equally important (Lasmar, 2012). However, the real power lies under the capability to use and combine technologies by creating superior measures (equipment, weapons, installations etc.) and means of usage. Every new technology, especially, when its usage is not regulated, creates an advantage for those who possess it. Therefore, the speed in time of the new technology adoption is essential. Especially, it is important when new technologies reduce or even neutralize-conventional military superiority (Fleming, 2011). Moreover, IT plays a major role because of its capability to fusion other technologies; thus, the advance of IT must be viewed as priority (Davis, 2014).

Leadership, superior technology and knowledge are important, but experience is no less important. Experience is a personalized and collectivized practical knowledge of actions, which mainly are based on mistakes. Combat or at least appropriate training experience has a direct correlation with the probability to be wounded or shot down (Fraher & Grint, 2016) and from the collective perspective with the probability of the failure of mission accomplishment. According to Buffaloe (2006), “if force planners, strategists, soldiers, academics, bureaucrats, legislators, executives and citizens have a better understanding of the type of warfare in which the United States is engaged, their actions will be better integrated”. Therefore, mutual warfighting experience of ‘we have been doing it before’ will be important not only for the military community but also for the whole society and government.

Conclusions

The nature of war has fundamentally changed. Now the war must be understood as a permanent process, where peace and war do not have distinctive lines. War no more has limitations on operational domains, actors of war, mindset of fighting, or methods of fighting. Direct military confrontation between the states as a form of war is less likely than before. Currently, the main fighting power is related to soft power instead of hard power. Also, the conventional and regular capabilities has been not only updated with unconventional and irregular capabilities, but also have been fused in a convergent way. The main reasons for such a transformation are related to changes
in the use of weapons with capabilities of mass destruction and a rapid development of technologies, especially, information technology. According to theoretical statements a modern warfare can be called as convergent warfare, where Regular and Irregular warfare capabilities as well as Conventional and Unconventional warfare capabilities are uniquely combined for a specific campaign. Such an understanding of the convergent warfare is closely related to the concept of the 4GW, but it is more applicable for states security policy and military practical needs. Convergent warfare is directed to the long-term achievements, the main target of which is the enemy’s ideology rather than sovereignty. The desire to create and maintain an asymmetrical position in such a war is very important. Such a needs makes an impact on the warfighting logic, which necessitates the introduction of soft power capabilities into warfare strategies and tactical warfighting. Also, the military on their own cannot withstand the modern war effectively; that is why the complete integration of state subjects is necessary as well.

State security policy and states practical preparedness for state defense must be based on specific and clear picture of modern war. However, the practical value, especially for political and military communities, can be obtained if specific and clear details about modern war is stated. It is very important to define in which operational domains modern war is held, who is an actors of modern war, what kind of warfare strategies and tactical methods can be used. Based on insights of research paper: air, land, maritime, space, cyberspace, electromagnetic space and mindspace can be defined as operational domains of modern war. These operational domains are crosslinked to each other by forming one complex battlespace where actors of war conduct campaigns, operations and actions. Such a complex battlespace would not be possible without advanced information technology and changed pattern of actors of war. “All against all” warfighting are conducted not only among friendly and hostile force combatants, but also cover non-regular and unlawful combatants. Nevertheless, modern warfighting cannot be ruled out without at least interaction or even participation of civilians in war campaigns, operations or tactical actions. The same thing can be said about public opinion and world opinion importance. It is obvious that pure warfighting among combatants are out of date, and it is needed integration of soft power capabilities as never before. There is no doubt that soft power mainly can be enabled through direct and indirect activity of civilians, public opinion and world opinion. It cannot be ignored, but acceptance of these changes will be a great challenge for western democratic societies.

Changes in warfighting logic alter the composition of modern combat power. The whole of combat power must be understood from the perspective of the holosystematic approach, which emphasizes the use of warfighting functions. It must be recognized that warfighting functions are composed of combat functions (management, intelligence, movement and maneuver, fires, protection, sustainment and support, intercommunication) and enabling functions (knowledge, technology, leadership, experience). People use resources, measures (equipment, weapons, installations etc.) and the means in order to accomplish tasks, missions or visions. The effective accomplishment is not separated from achieving desirable results, bigger consolidation of people, and obtainment of new superior knowledge. The synergy of warfighting functions will be essential in the future warfare. The same can be said about the fusion of their internal elements. The core principles of future warfighting will be speed and precision, on which the future successful warfare will be based. Mainly precision will be achieved through the outstanding capabilities to use warfighting functions, and most speed will be acquired through the ability to fuse internal elements of combat functions and enabling functions. Rethinking of modern warfare concepts, changing of mindset and rebuilding combat power of warfighting capabilities will be a vital transformational need.
References


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**TERRORIST ATTACKS ON SELECTED SOFT TARGETS**

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**Abstract.** Soft targets are places that are typical of a large concentration of population and a low level of security. Compared to so-called hard targets, these places are not permanently protected. Soft targets are shopping centers, clubs, restaurants, schools, transport, airport terminals, gatherings, entertainment centres etc. Soft targets are increasingly being chosen as a target for terrorists. It is caused mainly by its characteristics. This paper focuses on the safety situation of soft targets due to current threats of terrorist attacks, it specifically addresses the issue of safety in the entertainment industry. Based on the available terrorist attacks database, terrorist attacks, attacks on soft targets and entertainment during the years 1970 – 2017 were evaluated. There is an increase specifically in attacks on soft targets and attacks on entertainment in the years 2005 – 2015 and the most in 2011 – 2015. Based on the analysis of available data, basic safety measures have been designed to increase the resilience of soft targets – entertainment centres that are used for other objects and events with a large number of citizens. The aim of this article is to establish basic criteria to identify soft targets and to assign a level of importance to the criteria based on a questionnaire survey carried out among professionals.

**Keywords:** Entertainment industry, safety, soft targets, terrorism, terrorist attack

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**JEL Classifications:** H55

1. **Introduction**

Nowadays, there is a growing number of attacks which are caused by individuals or groups. These individuals or groups are often labelled as terrorists. New and more attractive targets for terrorists are crowded places. Due to the increasing number of terrorist attacks or other violent attacks on places with a high concentration of people (so-called soft targets), it is necessary to secure these places and prevent them from being attacked. The issue of soft targets, their protection, security, and citizen’s protection is therefore a very current. An example of this issue are the recent attacks in Spain (attack on Las Ramblas in Barcelona), Britain (attack on London Bridge, Manchester Arena, and Westminster Bridge), a series of attacks in Paris and many others.

The level of threats to soft targets has been increasing, especially due to their attractiveness, ease of access, availability and number of people. There is a need to identify areas that may be potentially at risk and to take preventive measures to improve their safety and security. Relating soft targets, the greatest attention must be paid to objects or events that involve a large number of people in a relatively small area, such as temples, schools, universities, hospitals, sport events, concerts etc.

Current laws and standards do not regulate the definition and characterization of soft targets. There are no clear criteria for determining soft targets, nor for procedures that would determine what can be included in these
targets and what does not belong there anymore. There is a number of documents in the Czech Republic dealing with this issue and trying to clearly define soft targets (Ministry of the Interior, 2017).

The subject of our investigation are terrorist attacks directed at the entertainment industry, where venues such as clubs, concerts, festivals, etc. are very common targets for terrorists for their insufficient or minimal security measures.

In general, soft targets are characterized as places with high concentration of people and low level of security. According to the terminology dictionary of the Ministry of the Interior, Czech Republic, soft targets are defined as “public frequented sites, easily attackable objects or non-military sites that are not permanently guarded by armed forces or otherwise, or are not guarded at all. Such places and objects are characterized, in particular, by a permanent or temporary high concentration of persons, of a symbolic, cultural or religious significance, or constitute an important part of the state’s infrastructure. The disruption of them has a negative impact on the functioning of the system and on society”.

Recently, the European Commission defined soft targets as locations that “are vulnerable and difficult to protect and are also characterized by the high likelihood of mass casualties in the event of an attack” (European Commission, 2017). Typical soft targets include:
- shopping centers, market places, supermarkets;
- railway and bus stations, subway stations, airport terminals;
- sporting arenas and stadiums;
- cinemas, theatres, concert halls;
- schools, dormitories, libraries;
- religious sites;
- gatherings, parades, demonstrations;
- bars, restaurants, clubs, dance clubs, hotels;
- hospitals, medical centers;
- tourist monuments and places of interest, museums, galleries.

For more details, see (Kalvach, 2016; Ministry of the Interior, 2017).

The Global Terrorism Database divides the soft targets into 22 categories, which are further divided into 113 subcategories. The authors have chosen the subcategories the Entertainment/Cultural/Stadium/Casino area which was subjected to in-depth research. The reason for the research of the Entertainment soft target was especially a high concentration of people in these areas and a relatively high risk of committing an attack with a great number of victims.

2. Methodology and data collection

The issues studied concern security questions, and therefore some data and information are not available for the public. In some cases, the majority of data is classified. These data are then available only to the police and security forces. It is because of an easy misuse of data and especially information.

2.1 Data collection from public resources

The only source of information which is verified and regularly updated is the Global Terrorism Database (GTD), which was used as a resource for this article. This database is a comprehensive overview of the terrorist attacks committed between 1970 and 2018. Moreover, it is an open-source database including information on terrorist attacks around the world. The GTD includes systematic data on domestic as well as transnational and international terrorist incidents that have occurred during this time period and now includes more than
180,000 cases. For each GTD incident, there is information available on the date and location of the events, weapons used and nature of the target, the number of casualties, and, when identifiable, the group or individuals responsible. Main characteristics of the GTD are:

- contains information on over 180,000 attacks;
- currently the most comprehensive unclassified database on terrorist events in the world;
- includes information on more than 88,000 bombings, 19,000 assassinations, and 11,000 kidnappings since 1970;
- includes information on at least 45 variables for each case, with more recent incidents including information on more than 120 variables;
- over 4,000,000 news articles and 25,000 news sources were reviewed to collect incident data from 1998 to 2016 alone (National Consortium for the Study of Terrorism and Responses to Terrorism (NCSTRT), 2017).

2.2. Survey

Another data source that served to meet the research goal was data from the questionnaire survey. These data served to determine the importance of criteria for recognizing the so called “soft target”. The questionnaire survey was carried out on a sample of 95 respondents from the whole Czech Republic. These were experts from different areas of safety. They were contacted by Czech police officers, HZS staff, security agency staff, and security technicians at the offices of municipal councils. Out of the sent questionnaires, 88 returned. The selection of the addressed respondents was made so that all regions of the Czech Republic were covered. Last but not least, the emphasis was also on the even representation of large and small towns and municipalities.

2.3. Research questions formulation

The authors of the article drew from the above-mentioned database. They carried out a research of available data and used them to work out basic descriptive statistic. They focused especially on answering these questions:

- How is the number of terrorist attacks and number of victims progressing?
- How is the number of soft targets attacks progressing?
- How is the way the terrorist attacks are done progressing and is the target of these attacks statistically significantly changing?

Out of the total number of possible terrorist attacks targets, as differentiated by the database, the following soft targets have been chosen:

<table>
<thead>
<tr>
<th>Code</th>
<th>Type of soft target</th>
<th>Code</th>
<th>Type of soft target</th>
<th>Code</th>
<th>Type of soft target</th>
<th>Code</th>
<th>Type of soft target</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>Restaurant</td>
<td>57</td>
<td>Civilian Maritime</td>
<td>80</td>
<td>Memorial</td>
<td>100</td>
<td>Train</td>
</tr>
<tr>
<td>8</td>
<td>Hotel</td>
<td>60</td>
<td>Port</td>
<td>81</td>
<td>Museum</td>
<td>101</td>
<td>Bus station</td>
</tr>
<tr>
<td>11</td>
<td>Entertainment</td>
<td>74</td>
<td>Market place</td>
<td>86</td>
<td>Place of worship</td>
<td>102</td>
<td>Subway</td>
</tr>
<tr>
<td>44</td>
<td>Airport</td>
<td>78</td>
<td>Procession</td>
<td>96</td>
<td>Tour bus</td>
<td>103</td>
<td>Bridge</td>
</tr>
<tr>
<td>49</td>
<td>School</td>
<td>79</td>
<td>Public areas</td>
<td>99</td>
<td>Bus</td>
<td>104</td>
<td>Highway</td>
</tr>
</tbody>
</table>

Source: data (National Consortium for the Study of Terrorism and Responses to Terrorism, 2017), elaboration: authors

In pursuance of gaining more knowledge and new information regarding the safety measures applied on soft targets, some methods of scientific work have been used:

- Method of controlled interviews with specialists from Police of the Czech Republic and Fire Rescue Service of the Czech Republic.
- Research of current state of the subject matter - survey of measures and processes actually used in practice.
Basic statistical methods, linear trends, trends equation.
Establishing possible criteria to identify soft targets.
Sorting and summing method.

3. An analysis of the current state of terrorist attacks

According to the records of all known attacks obtained from the Global Terrorism Database (National Consortium for the Study of Terrorism and Responses to Terrorism, 2017), there has been 181,691 attacks in 175 countries from 1970 to 2017. At the time of researching this issue, the year 2016 and 2017 had not been available in the database yet. Therefore, we focused only on events from 2015 and the year 2016 and 2017 was later used as a verification year for the calculated prediction of terrorist attacks for the upcoming years. The distribution of the number of terrorist attacks in this time period is shown in Figure 1, along with the trend equation expressed with the polynomial functions of 4th degree:

\[ y = 0.0207x^4 – 1.1683x^3 + 9.721x^2 + 293.74x – 564.04. \]

The reliability of this trend is quite high because the value \( R^2 \) is 0.8298 (Vališ et al., 2014). Source of data for figures 1-7 and tables 1-3 is the database (NCSTRT, 2017), the elaboration was done by authors.

![Terrorist attacks from 1970 - 2017](image)

**Fig. 1.** Number of all terrorist attacks from 1970 – 2017

*Source:* data (NCSTRT, 2017), elaboration: authors

The highest number of terrorist attacks occurred in 2014, with the total of 16,903 attacks. The number of terrorist attacks on soft targets between 1970 and 2017 was 21,924. Of these, 941 attacks were directed to entertainment industry.

The Table 2 shows the number of terrorist attacks, attacks on soft targets and entertainment industry in individual years.
Table 2. Comparison of the number of terrorist attacks

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of</th>
<th>Year</th>
<th>Number of</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>terrorist</td>
<td>attacks</td>
<td>attacks on</td>
</tr>
<tr>
<td></td>
<td>attacks</td>
<td>soft targets</td>
<td>entertainment industry</td>
</tr>
<tr>
<td>1970</td>
<td>651</td>
<td>105</td>
<td>9</td>
</tr>
<tr>
<td>1971</td>
<td>471</td>
<td>64</td>
<td>6</td>
</tr>
<tr>
<td>1972</td>
<td>568</td>
<td>29</td>
<td>6</td>
</tr>
<tr>
<td>1973</td>
<td>473</td>
<td>21</td>
<td>0</td>
</tr>
<tr>
<td>1974</td>
<td>581</td>
<td>56</td>
<td>10</td>
</tr>
<tr>
<td>1975</td>
<td>740</td>
<td>95</td>
<td>5</td>
</tr>
<tr>
<td>1976</td>
<td>923</td>
<td>94</td>
<td>7</td>
</tr>
<tr>
<td>1977</td>
<td>1319</td>
<td>151</td>
<td>13</td>
</tr>
<tr>
<td>1978</td>
<td>1526</td>
<td>177</td>
<td>19</td>
</tr>
<tr>
<td>1979</td>
<td>2662</td>
<td>355</td>
<td>30</td>
</tr>
<tr>
<td>1980</td>
<td>2662</td>
<td>446</td>
<td>40</td>
</tr>
<tr>
<td>1981</td>
<td>2586</td>
<td>328</td>
<td>27</td>
</tr>
<tr>
<td>1982</td>
<td>2544</td>
<td>307</td>
<td>16</td>
</tr>
<tr>
<td>1983</td>
<td>2870</td>
<td>312</td>
<td>16</td>
</tr>
<tr>
<td>1984</td>
<td>3495</td>
<td>494</td>
<td>16</td>
</tr>
<tr>
<td>1985</td>
<td>2915</td>
<td>385</td>
<td>26</td>
</tr>
<tr>
<td>1986</td>
<td>2860</td>
<td>427</td>
<td>38</td>
</tr>
<tr>
<td>1987</td>
<td>3183</td>
<td>427</td>
<td>17</td>
</tr>
<tr>
<td>1988</td>
<td>3721</td>
<td>554</td>
<td>39</td>
</tr>
<tr>
<td>1989</td>
<td>4324</td>
<td>572</td>
<td>18</td>
</tr>
<tr>
<td>1990</td>
<td>3887</td>
<td>609</td>
<td>19</td>
</tr>
<tr>
<td>1991</td>
<td>4683</td>
<td>570</td>
<td>22</td>
</tr>
<tr>
<td>1992</td>
<td>5071</td>
<td>854</td>
<td>36</td>
</tr>
<tr>
<td>1993*</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

* Year 1993 is not complete in the database

Source: data (NCSTRT, 2017), elaboration: authors

The Figure 2 shows a comparison of the total number (“N”) of terrorist attacks, attacks on soft targets and entertainment centers.
The greatest number of attacks on entertainment industry was recorded in 1995, namely 44 attacks and in 2014, namely 43 attacks. However, number of terrorist attacks on entertainment centers is a relatively small number compared to the total number of terrorist attacks.

Most of victims died as a result of terrorist attacks on entertainment centers in 1978, when 428 victims died. These were mainly bomb attacks. The second worst year with a large number of casualties was 2002 with a total of 214 dead. One of the biggest cases happened on October 23, 2002 on Dubrovka Theater in Moscow, Russia, when forty Chechen rebels took 912 hostages. The siege lasted until 26 October 2002, when Russian Special Forces filled the building with an unidentified gas intended to subdue the perpetrators. The gas killed all 40 perpetrators and 125 hostages. Five additional hostages were killed by the attackers during a shoot-out (National Consortium for the Study of Terrorism and Responses to Terrorism, 2017; Kalyugina et al., 2018).

Although the number of terrorist attacks after 2014 has been relatively decreasing, the risk of a terrorist attack is still high and it is important not to underestimate it. Unpreparedness for terrorist attacks was seen for example in a series of attacks on November 13 in Paris, where the security measures have completely failed. Most of victims died as a result of shooting assault in the Bataclan concert hall. An explosion was also heard at the Stade de France football stadium, where France with Germany played (Zeman et al., 2018).

Table 3 shows the number of victims in all terrorist attacks, attacks on soft targets and attacks on entertainment industry.
Table 3. Comparison of the number of victims in terrorist attacks

<table>
<thead>
<tr>
<th>Year</th>
<th>Number of victims</th>
<th>Year</th>
<th>Number of victims</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>terrorist attacks</td>
<td></td>
<td>attacks on soft targets</td>
</tr>
<tr>
<td>1970</td>
<td>171</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>1971</td>
<td>173</td>
<td>25</td>
<td>1</td>
</tr>
<tr>
<td>1972</td>
<td>566</td>
<td>36</td>
<td>1</td>
</tr>
<tr>
<td>1973</td>
<td>370</td>
<td>41</td>
<td>0</td>
</tr>
<tr>
<td>1974</td>
<td>542</td>
<td>107</td>
<td>2</td>
</tr>
<tr>
<td>1975</td>
<td>617</td>
<td>122</td>
<td>0</td>
</tr>
<tr>
<td>1976</td>
<td>672</td>
<td>99</td>
<td>0</td>
</tr>
<tr>
<td>1977</td>
<td>456</td>
<td>11</td>
<td>0</td>
</tr>
<tr>
<td>1978</td>
<td>1459</td>
<td>593</td>
<td>428</td>
</tr>
<tr>
<td>1979</td>
<td>2100</td>
<td>245</td>
<td>15</td>
</tr>
<tr>
<td>1980</td>
<td>4428</td>
<td>502</td>
<td>82</td>
</tr>
<tr>
<td>1981</td>
<td>4851</td>
<td>289</td>
<td>21</td>
</tr>
<tr>
<td>1982</td>
<td>5135</td>
<td>335</td>
<td>18</td>
</tr>
<tr>
<td>1983</td>
<td>9443</td>
<td>530</td>
<td>18</td>
</tr>
<tr>
<td>1984</td>
<td>10449</td>
<td>690</td>
<td>6</td>
</tr>
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<td>1985</td>
<td>7094</td>
<td>486</td>
<td>53</td>
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<td>1986</td>
<td>5003</td>
<td>823</td>
<td>76</td>
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<td>1987</td>
<td>6478</td>
<td>871</td>
<td>11</td>
</tr>
<tr>
<td>1988</td>
<td>7192</td>
<td>1000</td>
<td>18</td>
</tr>
<tr>
<td>1989</td>
<td>8121</td>
<td>824</td>
<td>10</td>
</tr>
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<td>1990</td>
<td>7148</td>
<td>1090</td>
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<td>1991</td>
<td>8429</td>
<td>938</td>
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</tr>
<tr>
<td>1992</td>
<td>9745</td>
<td>1142</td>
<td>27</td>
</tr>
<tr>
<td>1993*</td>
<td>-</td>
<td>-</td>
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</tr>
<tr>
<td></td>
<td>TOTAL</td>
<td>412,549</td>
<td>52,542</td>
</tr>
</tbody>
</table>

* Year 1993 is not complete in the database

Source: data (NCSTRT, 2017), elaboration: authors

The comparison of the number of victims in all terrorist attacks, attacks on soft targets and entertainment centers is shown in Figure 3.
As can be seen from Table 2, the number of terrorist attacks has often changed. Therefore it is very difficult to predict future development. This is obvious from the value of index R in individual predictions. We can observe a large increase in terrorist attacks and attacks on soft targets since 2012, when the number of attacks increased significantly in comparison with previous years. For example, while 2,017 violent attacks were committed in 2005, these attacks increased sevenfold in 2015, as well as attacks on soft targets. In 2017, we can see a more significant decrease in the number of attacks - both total number of attacks, and attacks on soft targets. The reason for this decrease could be better preparedness of the bodies of the Integrated Rescue System, cooperation with the private sector, increase in public awareness, improved securing of soft targets and many more.

Because of terrorists’ focus on soft targets, the number of victims unfortunately remains high. One of the reasons is the selection of the locations which are difficult to secure, such as Christmas markets, street demonstrations, queues in front of the museum etc. Another reason is, unlike in the previous attacks, which were planned over a long period of time and well thought-out, the quick execution of the terrorist’s attack using a simple weapon - therefore even the uncovering of a planned attack is almost impossible. This fact is supported by the graph (Fig. 5), where you can see a drastic decrease in the use of explosives when committing a terrorist attack on soft targets.

The use of explosives on entertainment centres is shown in Figure 6. It is evident that the use of explosives is often changing in time. However, there has been a decrease in the number of bomb attacks on entertainment centres. The attack is very often connected either to a vehicle driving into a crowd of people in front of an entertainment centre, the use of an explosive in a car and subsequent shooting, shooting in the entertainment facility, the use of a stab weapon etc (Otřísal, 2018). Figure 4 illustrates types of attack.
Fig. 4. Type of attack on entertainment centres

Fig. 5. Use of an explosive in individual years

\[ y = 0.0524x^3 - 3.3605x^2 + 66.483x - 148.39 \]
\[ R^2 = 0.694 \]
4.1 Terrorist attacks 2011 – 2017

In this chapter, we want to show how rapidly the attacks on soft targets and entertainment centers increased. The following two graphs (Fig. 6 and Fig. 7) show the number of victims of these attacks, a linear and logarithmic trend line given by the available data, and a forecast of upcoming time periods. For graphical reasons, the outlook is only one year ahead, however, the equations of these trends make it possible to calculate the outlook even for a much longer period. The reliability of these trends is determined by the reliability coefficient $R^2$ and it is a sufficiently high.

However, it would be very interesting to verify the calculated and factual values. As was mentioned before, the data for 2016 and 2017 were not available at the moment of the first statistical evaluation. (NCSTRT, 2017). During our research, the data were completed and now 2016 and 2017 data are available in the database. So, when we look at the prediction for 2016 and 2017 (done in 2015) and the values available in the database, it can be observed that the number of realized attacks and a number of victims is less than it was predicted. Even though the number of terrorist attacks on entertainment centres decreased, the number of victims in entertainment centres increased in 2017. Table 4 gives the comparison of predicted and real data. For prediction were used the logarithmic trends.

Table 4. The number of victims in 2016 and 2017

<table>
<thead>
<tr>
<th>Year</th>
<th>Precited number of victims</th>
<th>Real number of victims</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>attacks on soft targets</td>
<td>attacks on entertainment industry</td>
</tr>
<tr>
<td>2016</td>
<td>5485 (192)</td>
<td>3095 (158)</td>
</tr>
<tr>
<td>2017</td>
<td>5904 (209)</td>
<td>3190 (183)</td>
</tr>
</tbody>
</table>

*Source: data (authors and NCSTRT, 2017), elaboration: authors*
Especially from the linear trend equation $y = 1082.5x - 28.9$ it is clear how the rapid increase in the victim count occurs in the past years. The direction of the trend line (blue) is steep, amounting to 1082.5. However, the logarithmic estimate of the trend (orange) for help seems more likely.

The increase in the number of victims in entertainment centers is fortunately not that high because the linear trend equation is $y = 45.5x - 35.3$, the trend directive is “only” 45.5. One of the possible reasons why this number is not that high could be the existence of at least basic safety measures, unlike areas accessible to the public (e.g. Christmas markets, demonstrations, parades etc.) where it is not possible to implement radical safety procedures (Vališ et al., 2010).
5. Safety in the entertainment industry

The security of soft targets is one of the most difficult security challenges. One of the countries most concerned with protecting soft targets is the United Kingdom. In relation to reducing the vulnerability of soft targets, the UK has developed a strategic framework of essential documents in the form of the so-called British Initiative. The following (three) documents include instructions aimed at reducing the vulnerability of soft targets:

- Working together to protect crowded places;
- Crowded places: the planning system and counterterrorism;
- Protecting crowded places: design and technical issues.

These documents are closely linked to The National Counter Terrorism Security Office in cooperation with the Centre for the Protection of the National Infrastructure and the Royal Institute of British Architecture in counter-terrorism planning.

The aforementioned documents are complemented by the following studies:

- Crowded Places: A response to the consultation;

All of the above documents complement the material of safety recommendations for specific groups of selected objects in the form of handbooks. These guides are created for every soft target and aimed at their security, helping all owners to secure their object. Finally, attention is paid to a number of questions (checklists) to assist them in identifying the hazards and risks associated with counter-terrorism planning (GOV.UK, 2014, Tvaronaviciene et al., 2018).

In other European countries, the concept of the securing of soft targets is still a bit suppressed. The frequency of terrorist attacks is increasing in Europe. Examples of the worst terrorist attacks in Europe in the last year are:

<table>
<thead>
<tr>
<th>Table 5. Example of terrorist attacks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Louvre knife attack: February 3, 2017</td>
</tr>
<tr>
<td>Westminster attack: March 22, 2017</td>
</tr>
<tr>
<td>Stockholm attack: April 7, 2017</td>
</tr>
<tr>
<td>Paris shooting: April 20, 2017</td>
</tr>
</tbody>
</table>

Source: data (Foster, 2017), elaboration: authors

The security of soft targets is a global problem. Most countries are trying to increase the safety of these targets. For example, in the Czech Republic, there was founded a working group to methodically support managers and owners of soft targets. There was issued a methodology “Basics of protection of soft targets” which focuses primarily on preventing and mitigating terrorist attacks (Kalvach, 2016). A brochure has also been published about the 10 principles for Making the Soft Target More Resilient, Evaluating the Threat to a Soft Target, Safety Plan of a Soft Target, and Safety Standards for Organizers of Sport, Cultural, and Social Events. In the Czech Republic, 359 million CZK will be set for the protection of soft targets in the years 2019 - 2021. The aim is to motivate owners and managers of soft targets to improve their ability to prepare themselves and respond to a possible violent attack. The government of the Czech Republic, at its session on July 24, 2017, approved the release of the fund support which will be received mainly by state, municipal, or private non-commercial soft targets and much more.

The protection of soft targets has also been reflected in several security documents, which are:

- Strategy of the Czech Republic for Combating Terrorism from 2013;
- National Security Audit;
- Anti-terrorism package (defines protection of soft targets as one of the main priorities).
To find out the safety of soft targets, it is possible to use the method of safety audit and checklist analysis. The safety audit is a structured process whereby information is collected relating to the efficiency, effectiveness, and reliability of the total health and safety management system of a company. It is a formal review in which an independent and qualified auditor prepares a report on the assessed security risks of the project and submits proposals for their elimination (Beňová et al., 2017; Project Management Knowledge, 2017). Using the method of safety audit, the weaknesses in the security of places of entertainment centers can be identified. The checklist analysis is one of the simplest and quickest ways to identify risks (Oulehlová et al., 2015). One of its advantages is that it is suitable for team members who have less experience. The checklist is usually developed based on the knowledge obtained from previous projects that are similar to the current one, as well as historical information and from other sources of information (Beňová et al., 2017; Safeopedia, 2017). An example of the questions is shown in Table 5.

<table>
<thead>
<tr>
<th>Table 6. An example of the questions (checklist)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
</tr>
<tr>
<td>-----</td>
</tr>
<tr>
<td>Do I have enough security staff to protect the building/area?</td>
</tr>
<tr>
<td>Is the security staff deployed throughout the building?</td>
</tr>
<tr>
<td>Is the security staff adequately well-trained?</td>
</tr>
<tr>
<td>Is the camera system turned on?</td>
</tr>
<tr>
<td>Do I have a camera system regularly maintained?</td>
</tr>
<tr>
<td>Is the camera system in the whole building / areas?</td>
</tr>
<tr>
<td>Do I constantly monitor cameras images or playback overnight recordings for evidence of suspicious activity?</td>
</tr>
<tr>
<td>Do I have physical barriers to prevent unauthorized persons from entering? (fencing etc.)</td>
</tr>
<tr>
<td>Do I prevent vehicles from parking close to the building/arena or under the structure?</td>
</tr>
<tr>
<td>Do I have in place physical barriers to keep all but authorized vehicles at a safe distance and to mitigate against a hostile vehicle attack?</td>
</tr>
<tr>
<td>Do I conduct random overt searches of vehicles as a visual deterrent?</td>
</tr>
<tr>
<td>Have I reviewed the use and location of all waste receptacles in and around building/arena?</td>
</tr>
<tr>
<td>Do I keep furniture to a minimum to provide little opportunity to hide devices?</td>
</tr>
<tr>
<td>Are reception staff and deputies trained and competent in managing telephoned bomb threats?</td>
</tr>
<tr>
<td>Are reception staff and deputies trained to handle an emergency?</td>
</tr>
<tr>
<td>Do I regularly meet with staff and discuss security issues?</td>
</tr>
<tr>
<td>Do I have access control measures for persons and vehicles?</td>
</tr>
<tr>
<td>Are visitors sufficiently controlled before entering the building/area?</td>
</tr>
<tr>
<td>Are all luggage adequately inspected?</td>
</tr>
<tr>
<td>Are all employees issued with photographic and barcode identification retained on an up to date database and checked before access is permitted?</td>
</tr>
<tr>
<td>Do I have an access control policy for press and photographers, allowing entry only for those whose identity is confirmed and have booked in advance?</td>
</tr>
</tbody>
</table>

Source: authors

Each checklist should be done for a given object or at least a category of objects individually, in order to be as effective as possible.

6. Received results - Security options

The first step towards determining if my object can be regarded as a soft target is the evaluation of the following criteria which were selected from the literature research and past attacks:
Cr. 1 population density
Cr. 2 time;
Cr. 3 object location;
Cr. 4 openness of the area (object);
Cr. 5 symbolicalness;
Cr. 6 assessed safety measures;
Cr. 7 media presence;
Cr. 8 popularity/visibility of the area to the public;
Cr. 9 occurrence of dangerous (CBRN) substances in the area.

Table 7 presents the results of the questionnaire survey. The individual rows indicate the number of responses that ranked the criterion in the given order. For example, criterion Cr.3 “location of object” ranked 4 experts to second place of importance, 33 experts to 3 place, 18 to fourth place in the evaluation of the importance of the criterion, etc.

Table 7. Survey results

<table>
<thead>
<tr>
<th>Criterion order</th>
<th>Cr. 1</th>
<th>Cr. 2</th>
<th>Cr. 3</th>
<th>Cr. 4</th>
<th>Cr. 5</th>
<th>Cr. 6</th>
<th>Cr. 7</th>
<th>Cr. 8</th>
<th>Cr. 9</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>57</td>
<td>0</td>
<td>0</td>
<td>20</td>
<td>2</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>31</td>
<td>0</td>
<td>4</td>
<td>39</td>
<td>6</td>
<td>8</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>0</td>
<td>3</td>
<td>33</td>
<td>27</td>
<td>20</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>0</td>
<td>7</td>
<td>18</td>
<td>2</td>
<td>45</td>
<td>2</td>
<td>11</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>31</td>
<td>21</td>
<td>0</td>
<td>6</td>
<td>3</td>
<td>7</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>6</td>
<td>0</td>
<td>16</td>
<td>1</td>
<td>0</td>
<td>8</td>
<td>23</td>
<td>20</td>
<td>5</td>
<td>15</td>
</tr>
<tr>
<td>7</td>
<td>0</td>
<td>16</td>
<td>11</td>
<td>0</td>
<td>1</td>
<td>15</td>
<td>14</td>
<td>11</td>
<td>20</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>22</td>
<td>24</td>
<td>28</td>
<td>8</td>
</tr>
<tr>
<td>9</td>
<td>0</td>
<td>9</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>6</td>
<td>11</td>
<td>27</td>
<td>35</td>
</tr>
</tbody>
</table>

Source: authors

For clarity, the results presented at Table 7. are illustrated also graphically at Figure 8, where the number of particular orders assigned by experts to the criterion is presented in the column of particular colour.

![Fig. 8. Number number of particular orders assigned by experts to each criterion](source)

Source: authors

Every object is specific and it is important to view it independently of other soft targets. The next step is to consider whether my object can be a potential target of terrorist or other violent attack. One of the possibilities is to determine the probability and effect of an attack. In terms of the attack probability, it is important to consider the availability of devices used to commit the attack, the occurrence of this type of attack and the complexity of it.
Regarding the effect of an attack, it is important to focus especially on the impact on the lives and health of citizens.
The total level of the object threat is calculated by multiplying the probability of occurrence and its impact.

The degree of importance of the given criterion is expressed using the weight of the criterion. One of the basic
methods of assigning weight is to sort the criterion by importance. The scales have to be normalized so that their
sum is 1. The weights of the criteria can be calculated, for example, by sorting or evaluating the criteria. One of
the simplest methods is a sorting and summing method. According to it, we define the normalized weights $w_j$ of
the j-th criterion as follows:

$$W_j = \frac{n - r_j + 1}{\sum_j n - r_j + 1}$$

where $n$ is the number of criteria ($k = 1, 2, ..., n$) and $r_j$ is the position of order of the criterion.

### Table 8. Results

<table>
<thead>
<tr>
<th>Sum of the order numbers assigned to each criterion</th>
<th>Assign Criterion Order</th>
<th>Significance assign to each criterion</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population density</td>
<td>119</td>
<td>1</td>
</tr>
<tr>
<td>Time</td>
<td>529</td>
<td>5</td>
</tr>
<tr>
<td>Object location</td>
<td>367</td>
<td>4</td>
</tr>
<tr>
<td>Openness of the area (object)</td>
<td>187</td>
<td>2</td>
</tr>
<tr>
<td>Symbolicalness</td>
<td>339</td>
<td>3</td>
</tr>
<tr>
<td>Used safety measures</td>
<td>521</td>
<td>7</td>
</tr>
<tr>
<td>Media presence</td>
<td>591</td>
<td>6</td>
</tr>
<tr>
<td>Popularity/visibility of the area to the public</td>
<td>648</td>
<td>8</td>
</tr>
<tr>
<td>Occurrence of dangerous (CBRN) substances in the area.</td>
<td>659</td>
<td>9</td>
</tr>
<tr>
<td>Sum</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: authors

Soft targets can be secured by using security components. According to guidelines Basic of soft targets protection (Kalvach, 2016) the security components were divided into three basic categories – personnel safety, electronic devices and mechanical devices.

Personnel safety is a system of measures to prevent or ensure the difficulty of access by unauthorized persons. In the entertainment industry, for example theaters, cinemas, stadiums, clubs, etc., there is always at least one guard member who lets people in and check their tickets, or in the case of bigger events the guard member checks personal belongings. The question remains whether he could avert a terrorist attack. As a rule, they are not trained and experienced workers who can respond to an emergency situation. Well-trained security staff is a very effective security tool to deter potential attackers and immediately respond to mitigate their impact, especially in case of an emergency with mass health disabilities (Kalvach, 2016; Švarcová, et. al., 2016).

Electronic devices are a system of measures to capture the suspect in a timely manner, possibly identifying and capturing an attacker after an attack has been committed.

The most common electronic devices are camera systems, which can identify a suspect behavior before entering the object, or can help identify the perpetrators of an attack. At bigger events such as football matches or festivals, guards can be seen using portable X-ray devices to detect weapons and explosives.

Mechanical devices are systems of measures serving mainly to prevent the entry of potential attackers, or their authorization while entering the facility. The most frequently used mechanical devices are fences serving to prevent the entry of unauthorized persons, and turnstiles for identification of people entering the building (Kalvach, 2016).
Discussion and findings

In terms of security of selected soft targets, however, it is essential to combine the security features appropriately. Introducing the above security features greatly contributes to increasing the resilience of soft targets against violent attacks. If we evaluate cultural centers (cinemas, clubs, theaters), most of them will only have a security officer who will let us in and check the tickets. However, no one checks whether we are smuggling something inside. On the other hand, sports events (hockey, football matches), festivals, and concerts are better guarded. However, even in these cases, we often encounter the possibility of passing a suspect object into the premises. Therefore, it is important to set certain security measures to avoid such mistakes and possibilities.

By evaluating the availability of security measures, it shows that the security of entertainment venues is at a very low level. There is no manual in the Czech Republic to deal with the introduction of security features for soft targets, as is the case for example in the United Kingdom. It is necessary to increase the number of security personnel, frequency of police checks, training of security staff to deal with emergencies and the awareness of other employees and people about the possibility of the occurrence of a terrorist attack. Training of public is a very important step to ensure conditions for adequate response in case of disasters and other emergencies. Conditions for successful solutions can be created by acquiring knowledge and skills, having mastered technical and technological readiness to manage critical crisis situations and so on. It is also necessary to minimize the impact of terrorist attack. Camera systems are very important in monitoring not only buildings, but also places where the events take place. The camera systems help detect suspicious behavior in time. These and many other security measures can significantly reduce the likelihood of a terrorist attack and its possible impacts (Hošková-Mayerová, 2016).

The safety of soft targets in the entertainment center area (and in general) is at a low level. The security of a soft target is always in the hands of its owner and operator. In the Czech Republic, there is an increase in the awareness of owners and operators of soft targets about possible violent attacks and the possibilities of securing their objects. In order to protect soft targets and increase their security, the Basics of Protection of Soft Targets Methodology was published, which focuses on protection against serious violent attacks. In addition, a hotline has been set up for operators and owners of soft targets where they can consult experts on security of their premises or organized events. Moreover, a working group was set up to provide methodological support to operators and owners of soft targets. The institution Soft Target Institution Protection also deals with the development of soft targets security. Finally, the safety standard “ČSN 73 44 00 Prevention of Crime - Safety Management in the Planning, Implementation and Use of Schools and School Facilities” was issued, which was created mainly on the basis of the fatal event that took place at an elementary school. However, it is also necessary to focus on the physical security of the object and increase its resistance to violent attacks. One possibility is to create a checklist of issues, so-called Check List, and to evaluate the safety of the object and propose new measures.

Conclusions

The threat of terrorist attacks is a very serious issue. From the analysis of data available in the Global terrorism database, it is evident that the number of terrorist attacks has increased significantly especially in the last 10 years. As can be seen from the analysis of the current situation and recent events, terrorist attacks are increasingly focused on soft targets. Due to the wide range of potential soft targets, it is impossible to determine where and when other attacks will be committed. A very likely target is the area of entertainment, where security measures are unfortunately often underestimated. To ensure the safety of visitors (persons), it is very important to have a comprehensive approach in which security personnel and organizers of entertainment events will be well-trained. Professional security staff is a very effective security and safety tool to identifying potential attackers, respond quickly and mitigate their impact. It is advisable to inform people about terrorist threats, methods to detect suspicious behavior of the attackers and their characteristics, and knowledge of safety procedures and escape routes when an attack occurs.
Another important security component is the complex camera system and other modern devices (X-ray scanners, detectors of explosives, entry and attendance control systems etc.) that will monitor participants attending entertainment venues.

Reviews of available literature and an analysis of the current state also showed that the United Kingdom is at the forefront of security in Europe. The United Kingdom is very concerned about the security of soft targets and unlike other countries, has made guides to secure these objects that can help all owners. These guides can greatly help to prevent a potential terrorist attack, and should be used by all owners to increase the safety of soft targets and visitors.

In the Czech Republic, security components are currently being tested at the airport and selected metro stations in Prague. From the standpoint of security forces and organizers of entertainment events, attention should be paid to developing awareness of threats, preventing and eliminating any indication of attacks on soft targets. It is apparent that people do not deal with this issue until they themselves have become the victim of terrorist attacks.

Given that neither the Czech legislation nor the European Union legislation has in any way undefined the definition of the soft target concept and it is therefore not clear which objects fall within it, the authors of the article focused on solving this problem. Based on controlled interviews with practitioners, the authors identified the most important criteria for categorizing the object into the “soft target” category. In addition, a questionnaire survey was carried out, where the basic research question was the degree of significance of each criterion. From the results, the rate of the individual criteria was then determined by the order method. Thanks to this knowledge, this result can now be used to determine the degree of risk to the individual object. Once the risk of a given object is known, measures can be taken to remedy the deficiencies in the safety of the object, respectively. Other security measures. For this reason, the authors of the article have also prepared a sample of a check list. Using the method of safety audit, the weaknesses in the security of places of entertainment centers can be identified.

Finally, we have to say that is necessary to focus more on securing soft targets and to prepare a suggested handbook for specific soft targets that can help operators and owners to ensure the safety of visitors and employees.

References


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Abstract. This article is a continuation of the historical overview of corporate social responsibility (CSR), took place in the 20th century. The main definitions, principles, actions were explained with the purpose of research the influence if the kinds of responsibilities as legal, ethical, philanthropic on the sustainable development of the enterprise. The consequent CSR concepts observations are presented, namely Social Responsibility of Business Man, Stakeholder Approach, Three dimensional model, Three-dimensional model of principles, policies and processes, Institutional framework and extended corporate actions, Three-domains approach, Contemporary concept. The new XXI centuries SCR concepts were discovered and their theories fixed. Novel insights into contemporary meaning of SCR are being suggested.

Keywords: corporate social responsibility, ethics, sustainable development, sustainability, responsible behaviour, stakeholders


JEL Classifications: L22, L24, L25

1. Introduction

Concerns about corporate social responsibility have grown significantly during the last two decades. On a wide range of issues, corporations are encouraged to behave socially responsibly (Welford, & Frost, 2006; Engle, 2006). Nevertheless, in both business and academic world there is no certainty as to the definition of CSR. Some state the following «We have looked for a definition and basically there isn’t one». The main problem is rather that there are too many of such definitions, which are, as professor of Business Anthropology in University of Amsterdam Van Marrewijk concludes (2003), often biased toward specific interests and thus prevent the development and implementations of the concept. Not only has the issue become commonplace in the business press and among business and political leaders (Buhr & Graffstro, 2004), but a body of academic literature has also emerged around it (Margolis & Walsh, 2003). Nevertheless, little theoretical attention has been paid to understanding why or why not corporations act in socially responsible ways (Rowley & Berman, 2001). Indeed, much of the literature on corporate social responsibility has been more descriptive or regulative than positivist in tone (Prahald, & Porter, 2003). Maignan and Ralston (2002) conceptualised corporate social responsibility as motivating principles (directed by values, stakeholders, performance); processes (programs and activities with the goal to implement the CSR principles and/or handle specific stakeholder issues, including
philanthropic, sponsorships, volunteer, code of ethics, quality, health and safety, and managing environmental impacts); and stakeholder issues (community, customer, employee, shareholders, suppliers). Corporate social responsibility (CSR) can be characterized as a beguiling field of research with «implications for academia, industry and society» (Okoye, 2009) which are worth attention. Despite the interest to the subject and broad academic discussion, there is still considerable absence of agreement regarding a correct or universal definition of CSR (Font et al, 2012). Even a cursory examination of foreign materials on CSR tends to suggest that there is a tendency to evolution of business behaviour and changes of paradigm. The existing literature also reminds us of the diversity of CSR in different countries, which should also be taken into consideration e.g. the Canadian (Montreal school of CSR), the Continental European and the Anglo-Saxon approaches to CSRS (Saether, Kim T.; Ruth V. Aguilera, 2008) have their individual specifics. These differences are known as a beliefs and cliches, some of examples are, for Chinese consumers, a socially responsible company makes safe, high-quality products; for Germans it provides secure employment; in South Africa it makes a positive contribution to social needs such as health care and education (Knox, Simon, 2007). And even within Europe the discussion about CSR is very heterogeneous (Habisch et al., 2005). A more common approach to CSR is corporate philanthropy. This includes monetary donations and aid given to nonprofit organisations and communities. These donations could be made in areas such as the arts, education, housing, health, social welfare and the environment, among others, excluding political contributions and commercial event sponsorship (Tilcsik, A. & Marquis, C., 2013).

2. A historical overview of Corporate Social Responsibility definition

The 21st century brings attention to «stakeholder» diversity, whereas previously it was presented and used to describe stakeholders impacted by individual businesses. The beginning of this period was also marked by the appearance of the following theories: «sustainable development», «corporate citizenship», «corporate sustainability», «corporate reputation», «socially responsible investment» and «corporate social reporting» (Epstein, 2002). After the long-term evolution, Corporate Social Responsibility became an ethical and responsible path for business, thus CSR is a way of forming «higher and higher standards of living, whilst preserving the profitability of the corporation, for people both within and outside the corporation» (Hopkins, 2003). Hopkins (2004) narrated that CSR means the ethical behaviour of business towards its constituencies or stakeholders. However, there are a broad diversity of concepts and definitions describing the term «corporate social responsibility», but no general agreement of terms. Some companies prefer to use the terms «corporate citizenship», some «the ethical corporation», while others resort to such concept as «good corporate governance» or «corporate responsibility». These discrepancies cause some companies to consider CSR as clearly corporate philanthropy, others as a new corporate strategic structure, while others ignore the concept completely. Hopkins (2004) is of the opinion that using the term «corporate responsibility» (CR) instead of «corporate social responsibility» changes the nature of what the concept is all about. Many practitioners included the term «social» to encourage corporations to look at their social responsibilities as well as their usual «responsibilities». Hopkins (2004) further expressed that «Corporate Sustainability» is another parallel concept to CSR that has led to a lot of useful work on quantifying the issue of sustainability.

Technically, CSR is not a traditional management tool, thus it can be viewed as a moral duty rather than a business tactics (Gerard, & Zwetsloot, 2003), which is reinforcing the need for clear guidance and a deeper understanding of social responsibility (Boeger, Murray, & Villiers, 2008). A different suggestion is possible when CSR is broken down into manageable pieces and processes «CSR must be defined to contain a number of minimum requirements and to entail a system of corporate accountability through regulatory intervention and enforcement of obligations» (Boeger, Murray, & Villiers, 2008).

According to the Commission of European Union (2001), the definition of CSR is a concept by which companies integrate social and environmental issues in their business transactions and in their cooperation with their stakeholders on a voluntary basis. Following an evaluation of the influence of current European CSR Policy, the Commission proposes a new definition of CSR:
«The responsibility of enterprises for their impacts on society». The Communication then states that: «To fully meet their corporate social responsibility, enterprises should have in place a process to integrate social, environmental, ethical and human rights concerns into their business operations and core strategy in close collaboration with their stakeholders». Later in the Communication, the Commission stresses that «Enterprises must be given the flexibility to innovate and to develop an approach to CSR that is appropriate to their circumstances».

The balance between minimising risks through accountability and maximising opportunities through transparency and social innovation forms the basis of European Commission Enterprise 2020 initiative.

The United Nations Industrial Development Organisation defining Corporate Social Responsibility as a management concept by which companies integrate social and environmental concerns in their business operations and interactions with their stakeholders. CSR is generally understood as being the means through which a company attains a balance of economic, environmental and social essential actions («Triple-Bottom-Line-Approach»), while simultaneously dealing with the expectations of shareholders and stakeholders. In this respect it is vital to differentiate between CSR, which can be a strategic business management concept, and charity, sponsorships or philanthropy. Even though the latter can make it possible to contribute considerably to poverty reduction, will directly boost up the reputation of a company and promote its brand, the concept of CSR is definitely over and above that (UN IDOC web page).

The World Business Council for Sustainable Development emphasized that CRS is the continuing responsibility by businesses to act ethically and enable economic development while making the quality of life, workforce and families better as well as the local community and society in general. Fundamentally, Corporate Social Responsibility must also have common actions. These actions are the following:

- **Environmental sustainability**: recycling, waste management, water management, renewable energy, reusable materials, ‘greener’ supply chains, reducing paper use and adopting Leadership in Energy and Environmental Design (LEED) building standards (Matthews, 2012; Štreimikienė et al., 2016; Simionescu et al., 2017);

- **Community involvement**: it may mean attracting funds for local charities, providing volunteers, financing local events, making use of local workers, assisting local economic development, joining in fair trade practices, etc. (Hammers, 2003; Blanco-Encomienda & Ruiz-Garcia, 2017; Bilan et. al., 2017);

- **Ethical marketing**: companies that ethically market to consumers are putting a higher value on their clients and respecting them as people who are ends in themselves. They do not attempt to manipulate or impose their false advertisement on potential consumers. This is essential for companies that want to be regarded as ethical (McWilliams, & Siegel, 2001 Danaj et al., 2018).

According to M. Scilly, an American writer and editor who writes for various online publications (for example, Houston chronicle journal) specialising in business and management, the four types of CSR are as follows:

The **economic responsibility** is primarily concerned with profit. So the simple fact is that if an enterprise does not render a profit, it will not stay long in business, employees will be put out of work and the company will not even be able to bear its social obligations at all. Before a company intends being a good corporate citizen, it is necessary to make certain that it can first of all bring profit.

The **legal responsibility** is the obligations that are put on it by the legislation. Next to ensuring that a company is profitable, and obeys all laws, it is the most important aspect in accordance with the theory of corporate social responsibility. Legal responsibilities can vary from securities regulations to labor law, environmental law and so much as criminal law.
The **ethical responsibility** of a company considers its employees, customers and society as a whole. Ethical responsibilities are imposed on the company by itself, due to the fact that its proprietors consider it the right decision and not because they have any commitment to act like this. Ethical responsibilities may involve being environmentally friendly, paying decent salaries or refusing to deal with autocratic regimes.

The **philanthropic responsibility** should exceed what is simply required or what the company considers right. It involves making an effort to help the society, for instance, by providing free services to organisations in local community, involving in projects to protect the environment or making contribution to charitable causes. To summarise this part we present the development of CSR concept in a following table:

**Table:** Evaluation of Corporate Social Responsibility concept since 1950s-2000s

<table>
<thead>
<tr>
<th>Period</th>
<th>Name of concept</th>
<th>Description</th>
<th>Literature</th>
</tr>
</thead>
<tbody>
<tr>
<td>1950s</td>
<td>Social Responsibility of Business Man</td>
<td>The obligations of businessmen to conduct policies, to make decisions or to act in such ways that are desirable according to the goals and values of society. Some socially responsible business decisions can be accounted for by the long-term economic profit of the firm, paying back accordingly for its socially responsible behavior. Private contribution to society’s economic and human resources and a wish from the side of business to see that those resources were used for a wide range of social projects.</td>
<td>Bowen (1953)</td>
</tr>
<tr>
<td>1960s-1970s</td>
<td>Stakeholder Approach</td>
<td>Instead of aiming exceptionally at larger profits to its shareholders, a responsible company takes into consideration the interests of employees, suppliers, dealers, local communities and the nation as a whole. Three dimensional model The concept contains corporate responsibilities (i.e., economic, legal, ethical and philanthropic), social aspects of business (labour standards, human rights, environment protection and anticorruption) and corporate actions (reactive, defensive, accommodative and proactive).</td>
<td>Johnson (1971)</td>
</tr>
<tr>
<td>1980s-1990s</td>
<td>Three-dimensional model of principles, policies and processes</td>
<td>Adaptation of the principles of corporate responsibility, the policies of social issue management and the process of action to a developing system. Institutional framework and extended corporate actions Established frame-work and extended corporate actions Four types of corporate responsibilities (i.e., economic, legal, ethical and philanthropic) were connected to three basic levels (legal, organisational and individual), while corporate actions are extended to assessment, stockholder management and implementation management.</td>
<td>Wartick and Cochran (1985)</td>
</tr>
<tr>
<td></td>
<td>Contemporary concept</td>
<td>A process to bring together social, environmental, ethical, human rights and consumer issues into business operations and basic strategy in close association with the stakeholders.</td>
<td>European Commission (2001)</td>
</tr>
</tbody>
</table>

2. **Evolution of Corporate Social Responsibility (CSR) to the New Concepts**

The field of corporate social responsibility (CSR) has notably increased and today includes an abundance of theories, approaches, and terminologies. Furthermore, some theories combine different approaches and use the same terminology with different meanings (Garriga, & Melé, 2004). The following theories: «sustainable development», «corporate citizenship», «corporate sustainability», «corporate reputation», «socially responsible investment» and «corporate social reporting» (Epstein, 2002). Until now, it has no generally accepted common framework, however, most agree that one of its main characteristics undertaking a commitment with society. In order to facilitate its incorporation, a largely voluntary corporate responsibility infrastructure has been created, including, among others: business principles; business-related standard setting; accreditation and certification organisations; corporate responsibility consulting organisations; business membership organisations with sustainability and responsibility orientation; industry-specific initiatives; business-related corporate responsibility institutions; and stock indexes with responsibility orientation (Waddock, 2008; Balcerzak & Pietrzak, 2016; Karnitis & Karnitis, 2017; Peterlin et al., 2018; Tvaronavičienė et al., 2018; Aktan et al.,
Several scholars have offered a number of classifications of the concept. Frederick (1987, 1998) presents the evolution of CSR based on a conceptual transition and classifies it in to four chronological phases:

| CSR I. philanthropic and voluntarily assumed approach; |
| CSR II. + III. company could be recognised by the quality of its corporate culture and the normative society that embodies universal human rights principles vital to society, while granting economic enterprises the degree of flexibility and practicality needed for successful market operations; |
| CSR IV. truly corporate global citizens. |

For their part, Garriga and Melé (2004) present a classification that considers each theory from the viewpoint of how cooperation phenomena between business and society are highlighted:

<table>
<thead>
<tr>
<th>Instrumental theories</th>
<th>concentrating on achieving economic goals through social activities</th>
</tr>
</thead>
<tbody>
<tr>
<td>Political theories</td>
<td>concentrating on a responsible use of business power in the political arena</td>
</tr>
<tr>
<td>Integrative theories</td>
<td>concentrating on the integration of social needs</td>
</tr>
<tr>
<td>Ethical theories</td>
<td>concentrating on the right means to attain a good society</td>
</tr>
</tbody>
</table>

Over six decades the field of CSR has developed several approaches, each within its own theoretical framework. Which theory is the best? It depends on what you are looking for, states Melé (2008). In *Figure 2* Melé (2008) presents chronology of the various theories and approaches to CSR with historical account.

*Figure 2.* Corporate social responsibility (CSR): theories and approaches Melé (2008)

The following table present a short genesis of the Concept of Corporate Social Responsibility.
### Table 2. The Genesis of the Concept of Corporate Social Responsibility (Madrakhimova, 2013)

<table>
<thead>
<tr>
<th>The name of the concept</th>
<th>Authors</th>
<th>Basics</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Corporate Social Responsibility</strong></td>
<td>Bowen, 1953</td>
<td>Ordered content of CSR, systematic level of normative</td>
</tr>
<tr>
<td></td>
<td>Davis, 1960</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carroll, 1979</td>
<td></td>
</tr>
<tr>
<td><strong>Corporate Social Responsiveness</strong></td>
<td>Ackerman, 1973</td>
<td>Corporate social susceptibility, the capabilities of corporations to take social action</td>
</tr>
<tr>
<td></td>
<td>Preston, Post, 1975</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Frederick, 1978</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Carroll, 1979</td>
<td></td>
</tr>
<tr>
<td><strong>Corporate social performance</strong></td>
<td>Carroll, 1975</td>
<td>A model of corporate social performance</td>
</tr>
<tr>
<td></td>
<td>Wood, 1991</td>
<td></td>
</tr>
<tr>
<td><strong>Corporate social performance Management (concept) stakeholders</strong></td>
<td>Freeman, 1984</td>
<td>Give a new definition of the corporation disclosed its relationship with stakeholders</td>
</tr>
<tr>
<td></td>
<td>Clarkson, 1988</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Donaldson, Preston, 1995</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post, Preston and Sachs, 2002</td>
<td></td>
</tr>
<tr>
<td><strong>Corporate Citizenship</strong></td>
<td>Longsdon Wood, 2002</td>
<td>A model formed of corporations in relation to its stakeholders</td>
</tr>
<tr>
<td><strong>Corporate Sustainability</strong></td>
<td>Van Marreviyk, 2003</td>
<td>The relation between social responsibility and corporate social problems of stability with agency problems</td>
</tr>
<tr>
<td></td>
<td>Steuer, 2005</td>
<td></td>
</tr>
</tbody>
</table>

The curved arrows and the plus signs are intended to emphasise that the emergence of every new theory and approach has contributed to the enrichment of CSR and the awareness and comprehension of the issue. An impressive history associated with the development of the concept and description of corporate social responsibility brought alternative themes and thematic framework.

### Conclusions

This is the first and most widely accepted world standards for sustainability reporting. It allows businesses and governments all over the world to understand and convey their influence on essential sustainability problems such as climate change, human rights, governance and social well-being which promotes to establish social, environmental and economic advantages for everybody. The GRI Sustainability Reporting Standards are elaborated with multi-stakeholder contributions and based in the public interest. The practice of making sustainability information public stimulates liability, contributes to identifying and managing risks, and promotes organisations to take advantage of new opportunities. Corporate Social Responsibility in a contemporary understanding is a pillar of Corporate Sustainability. It could regarded as the corporate response to sustainable development represented by strategies and practices that address the key issues for the world’s sustainable development.

### References


MANAGEMENT OF INFORMATION SECURITY AND ITS PROTECTION IN CRIMINAL MATTERS: CASE OF POLAND

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Abstract. Information today is becoming increasingly important, especially in the era of progressive computerization and advancements in the area of computer technology. At the same time, there are also increasingly more threats to this category, of which the most important are criminal offenses against information protection. These are enforced by competent state authorities whose activity is necessary to maintain the proper level of security. The article deals mainly with the phenomenon of crime involving infringement of information, and its scale, using for this purpose the statistical data collected by the Polish National Police Headquarters.

Keywords: security, information, management, criminal matters


JEL Classifications: K42, O10, P00

Additional disciplines: law, criminal law

1. Right to information in the republic of Poland

Criminal activities inevitably affect development processes, therefore they have to be understood and prevented with the highest possible efficiency (Čentěš et al. 2018; Šišulák 2017; Šincāns, et al. 2016; Čentěš, J.; Beleš, A. 2018). Various countries attempt to solve issues related to contemporary threats. A special attention is being paid to information security (e.g. Limba et al. 2017; Siemiątkowski, 2017; Abbas 2018). In the presented paper a case study of Poland will be scrutinized.

The main tasks of the Polish State include, in particular, safeguarding the independence and integrity of its territory and ensuring the freedoms and rights of persons and citizens, the security of the citizens, safeguarding the national heritage and ensuring the protection of the natural environment pursuant to the principles of sustainable development, as set out in Art. 5 of the Constitution of the Republic of Poland of 2 April 1997 (Journal of Laws No. 78, item 483, as amended, hereinafter referred to as the Constitution of the Republic of Poland). The duties indicated in this standard are aimed at ensuring the security of the state understood as a political institution with sovereign power, a defined territory and a population that is subject to state power. Ultimately, the role of the state comes down to maintaining order within its community, ensuring external and internal security, and above all, exercising its authority wherever necessary. On the other hand, from the point of view of axiological foundations, the specific relationship between the state and the citizen can be observed
already in the preamble to the Constitution. From the content that establishes the Constitution of the Republic of Poland as a set of fundamental rights for the state based on respect for freedom and justice, cooperation of authorities, social dialogue, and on the principle of subsidiarity strengthening the rights of citizens and their communities, the adopted formula proves that the legislator considers as complementary both state security and individual security, which means that these values are not in opposition to those aforementioned. The same applies to the protection by the state of freedom plus human and civil rights, as well as the security of citizens. The state is to ensure the security of the individual, and to that end, it should rely not only on legal solutions, but also on the efficient implementation of statutory tasks by relevant state entities in all areas of human life.

In addition, the legislator also defined the security of the individual by defining its status in other constitutional provisions. It is about ensuring freedom, rights and obligations of man and citizen, which refer – either directly or indirectly - to various forms of security. This reference may be to the individual’s security in the legal, personal, social, ecological sphere, or it may as well relate to the protection of the security of other entities, including that of the state itself. (Jurgilewicz 2018).

Among the numerous rights granted to the human individual in the Basic Law, the right to access public information occupies a significant place, which implies the need to ensure information security by the state, together with the protection of this sphere. According to Art. 61(1-3) of the Constitution of the Republic of Poland, a citizen has the right to obtain information on the activities of organs of public authority as well as persons discharging public functions, including receipt of information on the activities of self-governing economic or professional organs and other persons or organizational units relating to the field in which they perform the duties of public authorities and manage communal assets or property of the State Treasury. The right to obtain information should further ensure access to documents and entry to sittings of collective organs of public authority formed by universal elections, with the opportunity to make sound and visual recordings. Limitations upon the right of access to public information may be imposed by statute solely to protect freedoms and rights of other persons and economic subjects, public order, security or important economic interests of the State.

An example of restrictions in this area is the Act of 5 August 2010 on the Protection of Classified Information (UION) (Journal of Laws of 2018, item 412 as amended., hereinafter referred to as UION, abbreviated from Polish Ustawa o Ochronie Informacji Niejawnych [Act on the Protection of Classified Information]), defining the protection of classified information, unauthorized disclosure of which would cause, or is likely to cause, damage to the Republic of Poland or would be disadvantageous to its interests, also at the stage of their preparation and regardless of the form and manner of its expression, i.e. the principles of classification, organization, protection and processing of classified information, investigating proceedings to determine whether the person privy to it provides a guarantee of secrecy, proceedings conducted to determine whether the entrepreneur privy to it provides conditions for the protection of classified information, organization of control of the status of protection of classified information, protection of classified information in ICT systems, as well as the application of physical security measures in relation to classified information (Article 1(1) of UION). In addition, it should be noted that the provisions of this Act also apply to: public authorities (in particular: the Sejm [lower house] and the Senate [upper house], the President of the Republic of Poland, government administration bodies, local-government bodies, and other organizational units under their subordination or supervision, courts and tribunals, state control law protection bodies), organizational units subordinate to or supervised by the Minister of National Defense, the National Bank of Poland, state legal persons and other state organizational units other than those listed above, organizational units subordinate to or supervised by public authorities, entrepreneurs who apply or intend to apply for the conclusion of contracts related to access to classified information or executing such contracts or performing tasks related to access to classified information pursuant to the law. Furthermore, the provisions of the Act on the protection of classified information normally are not in breach of the provisions of other laws on the protection of professional secrecy or similar secrets protected under law (Art. 1(1-2) of UION). On the other hand, classified information may be made available only to a person who guarantees secrecy, and only to the extent necessary to carry out his work, service or commissioned activities, while any exemption from the obligation to secrecy of classified information and the handling of case files containing classified information in proceedings before courts and other bodies are specified in the provisions of separate acts (Art. 4 (1-2) of UION).
2. Security and protection of information in light of the regulations of the penal code

Speaking about security and protection of information in Poland, a catalog of offenses established by the legislator from Chapter XXXIII of the Act of 6 June 1997 of the Penal Code should be indicated (Journal of Laws of 2018, item 1600, hereinafter referred to as Penal Code). The first act penalized in that concerns crimes against classified information - specified in Art. 265 and. 266 of the Penal Code. Thus, in Art. 265 of the Penal Code, the legislator penalizes a prohibited act involving the disclosure or use of state secrets. In practice, the penalty of deprivation of liberty for a term from 3 months to 5 years can be imposed on anyone who has disclosed, or used in a way contrary to the provisions of UION, classified information classified as “secret” or “top secret”.

If such information has been disclosed to a person acting on behalf of a foreign entity, the offender is subject to deprivation of liberty for a term from 6 months to 8 years. On the other hand, if a person breaching Art. 265 of the Penal Code acted unintentionally in disclosing the classified information that he has read in connection with the performance of a public function or received authorization, then he will be subject to a fine, restriction of liberty or imprisonment for up to 12 months. Classified information is marked as “top secret” if its unauthorized disclosure may cause extremely serious damage to the Republic of Poland by: threatening the independence, sovereignty or territorial integrity of the Republic of Poland; jeopardizing internal security or the constitutional order of the Republic of Poland; threatening the alliances or the international position of the Republic of Poland; weakening the defense readiness of the Republic of Poland; leading, or potentially leading, to identification of officers, soldiers or state officials responsible for carrying out intelligence or counterintelligence tasks who perform operational and reconnaissance activities, if it jeopardizes the security of the activities performed or may lead to the identification of persons providing assistance in this regard; threatening, or potentially threatening, the life or health of officers, soldiers or state officials who perform operational-reconnaissance activities or persons providing assistance in this regard; threatening, or potentially threatening, the life or health of crown witnesses or persons closest to him, persons who have been granted protection and assistance measures provided for in the Act of 28 November 2014 on protection and assistance for victims and witnesses, referred to in Art. 184 of the Act of 6 June 1997 – the Code of Criminal Procedure, or persons closest to him (Art. 5(1) of UION).

In turn, classified information is signified as “secret” if its unauthorized disclosure may cause serious damage to the Republic of Poland, by: disabling the implementation of tasks related to the protection of the sovereignty or constitutional order of the Republic of Poland; worsening the relations of the Republic of Poland with other states or international organizations; disrupting the defense preparations of the state or the functioning of the Polish Armed Forces; hindering the performance of operational and reconnaissance activities carried out to ensure state security or prosecute perpetrators of crimes by authorized services or institutions; significantly disrupting the functioning of law enforcement and justice; bringing about a considerable loss in the economic interests of the Republic of Poland. Then, an authorized disclosure of information categorized as “confidential” refers to acts that may cause damage to the Republic of Poland by: impeding the conduct of the current foreign policy of the Republic of Poland; hindering the implementation of defense projects or negatively affecting the combat capability of the Polish Armed Forces; disturbing public order or threatening the security of citizens; hindering the performance of tasks for services or institutions responsible for protecting security or basic interests of the Republic of Poland; impeding the performance of tasks for services or institutions responsible for protecting public order, for the security of citizens or prosecuting perpetrators of fiscal crimes and offenses and for judicial authorities; threatening the stability of the Polish financial system; adversely affecting the functioning of the national economy. In addition, classified information is classified as “restricted” if it has not been classified, and their unauthorized disclosure may have a detrimental effect on the exercise of tasks of national defense or other organizational units in the field of national defense, foreign policy, public security, observance of rights and freedom of citizens, justice or economic interests of the Republic of Poland. On the other hand, classified information provided by international organizations or other states on the basis of international agreements is marked with the Polish equivalent of the classification level.
Recalling statistical data on the number of instituted proceedings and the number of recognized criminal offenses under Art. 265 of the Penal Code, it can be observed, as shown in Chart 1, that one is dealing with a downward trend. In total, 32 offenses under Art. 265 of the Penal Code were recognized in the five-year perspective, while in 2016 there were only two such cases. Similarly, the downward trend was also noted for the number of instituted proceedings under Art. 265 of the Penal Code, as 37 such instances were recorded, of which only two in 2016.

![Chart 1. Criminal offenses under Article 265 of the Penal Code](image-url)

Another crime in this category of prohibited acts to disclose a state secret in connection with the performed function. According to Art. 266§1 of the Penal Code, anyone who, in violation of the law or obligation he has undertaken, discloses or uses information with which he has become acquainted with in connection with the function or work performed, or public, community, economic or scientific activity pursued should be subject to a fine, the penalty of restriction of liberty or the penalty of deprivation of liberty for up to 2 years, although the prosecution of this offence should occur on a motion of the injured person. In turn, the object of protection in this case is the discretion of information, and the subject of direct protection - the right to keep certain information in secret, where the obligation of discretion on the information depositor may be dictated by the need to protect a significant private interest, the trust relationship between the information holder and its depositary, but also the proper performance of certain professions or conducting specific activities, in which the relationship of trust between its entities is of the utmost importance.

Then, a public official who discloses to an unauthorized person information which is an official secret or information with which he has become acquainted in the performance of his official duties and whose disclosure can endanger a legally protected interest should be subject to the penalty of deprivation of liberty for up to 3 years (Art. 266§2 of the Penal Code). Thus, what essentially distinguishes a professional secret from a business secret is the order of interests protected by prohibitions of disclosing information covered by these types of secrets. Maintaining professional secrecy is a public act, justified by social interest, whereas professional secrecy encompasses information about the most common sphere of personal life and refers to personal interests (J. Preussner-Zamorska, *Zakres prawnie chronionej tajemnicy w postępowaniu cywilnym*, KPP 1998, No. 2, p. 310. See Judgment of the Polish Supreme Court of 21 March 2013, Ref. act III KK 267/12).
Statistically, the phenomenon of criminal offenses under Art. 266 of the Penal Code is shown in Chart 2, with 474 recognized offenses in the five-year period and nearly twice as many, 851, instituted proceedings. These figures are significant compared to the number of criminal offenses under Art. 265 of the Penal Code, and they also show an upward trend, as evidenced by the increasing annual tendency of committing crimes falling under Art. 266 of the Penal Code.

![Chart 2. Criminal offenses under Article 266 of the Penal Code](image)

Source: Polish National Police Headquarters data

Subsequent crimes included in Chapter XXXIII of the Penal Code are prohibited acts, focused on the threat to ensuring the security of information, as a value in itself, understood in the category of data, or its sum, about a person or the state of affairs regarding the facts. Therefore, Art. 267 of the Penal Code refers to an offense of unlawful obtaining of information, stating that a person who, without being authorized to do so, acquires information not destined for him, by opening a sealed letter, or connecting to a wire that transmits information or by breaching electronic, magnetic or other special protection for that information should be subject to a fine, the penalty of restriction of liberty or the penalty of deprivation of liberty for up to 2 years. A similar punishment is to be imposed on anyone, who, in order to acquire information which he is not authorized to access, installs or uses tapping, visual detection or other special equipment, or imparts to another person information obtained in that way.

Statistically, offenses falling under Art. 267 of the Penal Code are relatively common, and they show an upward trend. In total, 11,187 such offenses were recorded in the five-year period, with 15,227 proceedings initiated against the perpetrators of these acts, as shown in Chart 3.
Further offenses from this category of prohibited acts are set out in Art. 268, 268a, 269, 269a, 269b and 269c of the Penal Code. Accordingly, Art. 268 of the Penal Code provides for a fine, the penalty of restriction of liberty or the penalty of deprivation of liberty for up to 2 years for anyone who, not being himself authorized to do so, destroys, damages, deletes or alters a record of essential information, or otherwise prevents or makes it significantly difficult for an authorized person to obtain knowledge of that information. If the act in question concerns the record on an electronic information carrier, the perpetrator should be subject to the penalty of deprivation of liberty for up to 3 years. Then, a more severe penalty of deprivation of liberty for a term of between 3 months and 5 years awaits a person who, by committing that act, causes a significant loss of property. Thus, the sanction under Art. 268 of the Penal Code only covers acts undertaken by a person who is not authorized to do so, resulting either from the provisions of law or from the will of the information administrator. In turn, the significance of information should be assessed objectively, taking into account the interests of the person who is entitled to know it. As for the next offense in this category, Art. 268a of the Penal Code refers to the penalty of up to 3 years of deprivation of liberty for destroying computer data (IT data). The perpetrator who, without being authorized to do so, destroys, damages, removes, alters or obstructs access to computer data, or significantly disturbs or prevents automatic processing, collection or forwarding such data, is punishable for the offense indicated, and the penalty becomes more severe - deprivation of liberty from 3 months to 5 years - if the perpetrator commits the act causing a significant loss of property in the process. In this case, the Polish Supreme Court ruled in one of its judgments that Art. 268a of the Penal Code penalizes two types of prohibited behavior. The first is destroying, damaging, removing, altering and obstructing access to all computer data, while the second undermines the process of correct automatic processing, collection and transmission of computer data to a significant extent. This behavior may consist in interfering with, or preventing, the proper operation of the process, whereas the concept of disruption of automatic processing, transmission or collection of Computer data encompasses all activities affecting these processes, which result in their improper course or slowdown, as well as distortion or modification of the information that is being processed, transmitted or collected. Preventing, in this case, means halting these processes or being unable to initiate them, while computer data referred to in Art. 268a of the Penal Code is a record of specific information.
stored on a computer disk or another computer storage medium (Judgment of the Polish Supreme Court of 30 September 2015, Ref. act II KK 115/15).

As far as statistical data is concerned, the scale of criminal offenses under Art. 268 and Art. 268a of the Penal Code is rather extensive, given that, in the five-year period, 4,621 such cases were recorded, with 4,460 proceedings instituted, as shown in Chart 4.

**Chart 4.** Criminal offenses under Articles 268 and 268a of the Penal Code

![Chart showing criminal offenses under Articles 268 and 268a of the Penal Code](chart-image)

*Source: Polish National Police Headquarters data*

Meanwhile, in Art. 269 of the Penal Code, the legislator described the act of damaging computer data, imposing on anyone who destroys, deletes or alters a record on an electronic information carrier, having a particular significance for national defense, transport safety, operation of the government or other state authority or local government, or interferes with or prevents automatic collection and transmission of such information, the penalty of deprivation of liberty for a term of between 6 months and 8 years. The same punishment is to be imposed on anyone who commits the act in question by damaging a device used for the automatic processing, collection or transmission of information. Although damaging computer data is not seen as harmful as violation of correspondence, in the five-year period, 51 proceedings arising from these acts were instituted, of which 35 were identified as criminal offenses, as shown in Chart 5.
In the case of criminal offenses under Art. 269a and Art 269b of the Penal Code, they concern, respectively, the disturbance of the IT system (the so-called computer sabotage) and the unlawful production (development) of computer software. As regards computer sabotage, it essentially consists in that an unauthorized person, as a result of transmission, destruction, deletion, damage, obstruction of access or alteration of computer data, significantly disturbs the operation of the computer system, ICT system or ICT network, thus exposing himself to the penalty of deprivation of liberty from 3 months to 5 years. Statistically speaking, the problem of computer sabotage is not a particularly dangerous phenomenon, since 233 proceedings were instituted for these acts in the five-year period, of which 218 were identified as criminal offenses under Art. 269a of the Penal Code, as shown in Chart 6.
**Chart 6.** Criminal offenses under Article 269a of the Penal Code

In turn, the illegal production of computer software, an act referred to in Art. 269b of the Penal Code, consists in producing, acquiring, selling or making available to other persons devices or computer programs adapted to committing an offense specified in Art. 165§1.4., Art. 267§3, Art. 268a§1 or 2 in relation to §1, Art. 269 §1 or 2, or Art. 269a of the Penal Code, as well as computer passwords, access codes or other data enabling unauthorized access to information stored in the computer system, ICT system or ICT network.

Accordingly, the perpetrator committing the act in question is to be punished by deprivation of liberty for a term from 3 months to 5 years, albeit liability in this area excludes the acts aimed solely at protecting the computer system, ICT system or ICT network prior to committing the offense mentioned in this provision or developing a method of such protection. In the event of punishment, the court decides to forfeit the items specified therein, and may decide to forfeit them if they were not the property of the perpetrator.

Statistically, the scale of crimes falling under Art. 269b of the Penal Code, i.e. the production of computer software with a view to committing a crime, is shown in Chart 7, which illustrates that it is not a particularly dangerous act, given that, in the five-year perspective, 239 cases of instituted proceedings and 210 cases of identified criminal offenses were recorded under Art. 269b of the Penal Code.
However, pursuant to Art. 269c of the Penal Code (counteracting actions to detect errors in the security of information systems), there is a possibility of exemption from liability for an offense under Art. 267§2 or Art. 269a of the Penal Code with respect to the person who acted solely to secure a computer system, IT system or ICT network, or to develop a method of such protection, and immediately notified the system or network administrator about the identified threats, and whose action did not damage the public or private interest. This provision provides for not criminalizing both unauthorized access to the computer system (Art. 267§2 of the Penal Code), as well as unauthorized disruption of the system’s operation (Art. 269a of the Penal Code).

For the perpetrator to avoid punishment, he needs to acts solely with at least one of the two objectives, that is, either to secure the computer system, ICT system or ICT network, or to develop a method of such protection, as well as to promptly notify the system or network administrator about the identified threats without violating public interest, private interest or causing damage. Therefore, the advantage of not being subject to punishment will not pertain to a perpetrator acting for the purpose other than those mentioned in this provision (e.g. to obtain material gains), or a perpetrator who caused damage to protected goods as a result of committing indicated crimes.

Conclusions

In conclusion, the problem of criminogenic threats to information security is statistically valid. Its scale is fairly extended, becoming particularly significant in the case of crimes falling under Art. 267 of the Penal Code (disclosure of the secret of correspondence) or under Art. 268 and Art. 268a of the Penal Code (thwarting or obstructing the use of information), which undoubtedly implies activating actions, primarily for the police, aimed at counteracting these acts, simultaneously ensuring the desired level of security in this area, which is a manifestation of security management and information protection in Poland.
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Abstract. The theoretical and methodological principles of researching the tax security of a state were substantiated with the emphasis placed on the two basic economic theories: the social choice theory and the reflectivity theory. The differential features of national tax systems under globalization conditions and their impact on the economic security of the countries that differ in the political regime, the level of economic development, geography and location were identified. There was given the assessment of the cross-sector approach, based on which multifactor effective marginal tax rates in the European Union (EU) are calculated, and of the marginal approach to taxation in general. The analytical study of tax security of the countries of Organization of economic cooperation and development (OECD) was carried out based on the assessment of the specific weight of taxes in gross domestic product, as well as the structure of taxes in the context of taxation objects: income individuals, income corporates, social security contributions, property, value added taxes, other consumption taxes. A particular attention is attached to the problems of taxation of the motion of capital and goods between the EU countries within the framework of ensuring the mutual economic benefits of the collective interests. The assessment of external and internal threats to tax security of Ukraine was performed based on the identification of the shadow economy segment, reasons for its emergence and consequences for the national economy, as well as the dynamics of the absolute and relative indicators of the budget-debt security. The recommendations on strengthening the tax security of Ukraine under the European integration conditions were given.

Keywords: tax, economic, national, security, system, globalization

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JEL Classifications: F15, F52, F65, E62, H21, O11

Additional disciplines: law, sociology

1. Introduction

The national security is the most important benefit, provided by the legal system, electoral process, constitutional economy, and so on. In this context, taxation should be considered in two dimensions, i.e. legal and economic: the synthesis of these two components reveals its essence and significance in terms of the national security. The role of the tax security for the development of the national economy grows under conditions of the transformation processes, which are accompanied by the variability of the environment of taxpayers, including instability of the legal regulation of their activities, deterioration of the financial state of economic entities, reduction of the tax base and the range of taxation entities. The emergence of threats to the tax security may affect not only the budget deficit, but also have cumulative effects associated with the increasing risks of deterioration of the state of the national security components.
2. Literature review

Taxes take a special place in the economic security system, because they not only provide financial resources for almost all components of the economic security (financial, social, environmental, legal, etc.), but also act as the tool of influence on economic and social processes and the factor of feedback and dependence of state functioning on taxpayers (Onyshko et al. 2004; Tvaronavičienė, Gatautis 2017; Vandina, et al. 2018; Fabuš, Csabay, 2018).

Some authors have proposed the progressive scale of taxes, solidarity taxes and other measures to provide security (Menshikov et al. 2017).

3. Theoretical and methodological principles of researching tax security

Taxation is the basis for the sustainable development, it supports the functions of effective state administration and creates the conditions for economic growth (Prichard 2010). Full implementation of taxation functions involves a responsible activity of the government, its accountability to the society. One of the purposes of taxes is funding the social benefits. The public choice theory is of primary importance for the interpretation of the tax security of the state, since it studies the issues of taxation and public spending in the context of providing the shared benefits. The material basis of the economic security is the national wealth, which is accumulated by collection of the part of social benefits in the form of taxes. Consequently, provision of their receipt in sufficient quantities is the economic basis of existence of the state, and of social development, while the rules and standards of the taxation system determine the institutional guidelines for the development of the institutions in the domain of economic safety (Ball 2014; Tarasova et al. 2018).

Tax administration acts as an important tool of filling the revenue part of the budget, which funds the costs of the execution of the state administration functions, as well as provides the resources for other components of national security: the military-political, economic, financial, innovative-investment, eco-agricultural etc.

Depending on the state of the development of the tax system of a country and the general macroeconomic state, it is possible to separate two approaches to the interpretation of tax security: the resource approach – the ability to tax part of the budget to fund the needs of the support of national security at the determined level (is guaranteed by sustainability and sufficient amount of tax revenues, budget surplus, existence of reserve funds); the risk approach – increased threats to national security (is manifested in the reduction of tax revenues to the budget, the failure to attain the planned indicators of taxes accumulation, budget deficit and existence of expenditure articles associated with the service of credit lines, bonds of internal and external debt, etc.).

From the point of view of the reflectivity theory, tax security can be defined as a cognitive (passive) and influence (active) function (Soros 2015). Reflectivity is described by the pair of recursive functions:

\[
\begin{align*}
  y &= f(x) \text{ cognitive function} \\
  x &= \varphi(y) \text{ influence function}
\end{align*}
\]

Thus

\[
\begin{align*}
  y &= f(\varphi(y)) \\
  x &= \varphi(f(x))
\end{align*}
\]

The influence function of the tax security is associated with the provision of members of the society with the benefits of collective use by the state, with ensuring the state support of priority industries of the national economy, the implementation of socio-economic programs, etc. In the influence function, the dynamics and the amount of tax revenue to the budget affects the state and the development of macroeconomic processes. In the cognitive function, the tax provision of national security is the function of its separate components – tax security of separate national economy entities. The separated recursive functions operate in the opposite directions: in the influence function, the economic security of a state is a factor, and in the cognitive function –
it is a resulting indicator. The interaction of the separated recursive functions leads not to the balance, but rather to the process of endless changes. For example, the requirements for the provision of tax security under conditions of the budget deficit by means of attracting external loans increase the risks of the debt insecurity of the state and determine the need for an increase in the tax revenue of the budget for their repayment with the interest in future. Often taxation is considered as a restriction to any market development, lessening the willingness to effective actions or raising the opportunity costs. Therefore lots of investigations are dedicated to identification of optimal measures in order to satisfy the fiscal needs still encouraging market performance (Astrauskaite et al. 2016).

Tax security is a complex and multifaceted phenomenon, which manifests itself at different hierarchical levels. Security tax components of the national economy are: tax security of the state budget; tax security of local budgets; tax security of regions; tax security of economic entities; tax security of households; tax security of the institutional environment of enterprise functioning, which has to ensure the sustainability of the legal regulation and the uniform tax burden. All tax security components are in a close dialectic relation. They are different in entities, but apart from them, the term “tax security” can be defined as a state of tax relations, characterized by sustainability and stability of object parameters and implies the ability of entities to protect their economic interests, to confront external and internal threats, to implement and develop the tax potential, to use the competitive advantages of the tax system under the globalization conditions (Petrenko 2012).

4. Differential features of national tax systems and their impact on economic security

The differential features of national tax systems are determined by many factors, which include: the socio-political formation, the trajectory of institutional development, the level of openness of the national economy, the state of budget-debt relations, the mechanisms of interaction between the financial and the actual sectors of economy. The construction of the tax system is essentially influenced by the type of the political regime, but there is no unambiguous conclusion about the consequences of the democratic or authoritarian nature of the statehood on the taxation level.

The paper of Garcia et al. (2016) deals with studying the relations between political regimes and the ratio of tax indicator to gross domestic product based on the data of 131 countries of the world within 1990-2008. It was concluded that democratic regimes contribute to increasing taxation effectiveness, but there is no linear tendency.

The method of income taxation in different countries becomes a significant factor of the international tax competition, even in countries that formerly comprised the whole. It is illustrated by the case of Czechoslovakia— in Slovakia, there is a tendency to find and develop more effective income taxation methods, to construct a socially fair and at the same time less costly tax system. Dobrovič et al. (2017) refer to the importance to strengthen the battle against tax frauds and tax evasions in Slovakia and the aim is to point out the current tax collection and the overall tax administration in the Slovak Republic with the focus on value added tax (VAT). The Czech Republic is more conservative and does not resort to sudden radical changes, implementing iterative reforms (Lipkova et al. 2017). The aim of the article of Paseková et al. (2018) is to evaluate how information about deferred tax is reported by small and medium sized enterprises in Czech Republic and evaluate quality of such reporting. The research was conducted in the form of a questionnaire survey concerning recognition of deferred tax among accounting units which prepare their financial statements according to IFRS or according to Czech accounting standards. The research clearly showed the unwillingness of accounting entities to recognize deferred tax voluntarily.

There is a cautious attitude to marginal reforms in the world practice, because there are political and economic restrictions on major reforms of direct (or indirect) taxation (Sevryukova et al. 2016), the emphasis is placed on the need to perform not only the fiscal but also the social function by a tax. According to the survey of respondents-taxpayers, one may trace a strong effect of the own interest in tax relations, since in Sweden, the most unpopular tax is the real estate tax and the least unpopular – the corporative tax (Hammar et al. 2009).
In foreign countries, there are significant differences in the law on organization of taxation of economic entities. The Korean income tax does not require a consolidated tax return, and business groups with lots of branches have some stimuli to redistribute the income between member companies to reduce general taxes of the group (Jung et al. 2009). So, there are certain features of the behavior of affiliated firms in Korean business groups.

Progressive changes in the taxation system in Vietnam are: replacement of the turnover tax with the value added tax. Regressive changes include a minor role of profit tax of enterprises because much of the gross domestic product is produced and consumed by households, the activities of which are not taxed; cancellation of the agricultural farming tax; uneven distribution of agricultural subsidies between rich and poor households.

Analyzing the Australian tax system, Jun et al. (2011) say that the creation of institutional funds of shares (domestic analogues are institutions of collective investment) has tax advantages over the shares, by which the dividends taxed by the income tax of an enterprise are paid. Taxes are accumulated as a result of the activity of a formal sector of the national economy. Zimbabwe, like most developing countries, faces the problems of imposing taxes on the informal sector, specifically: corruption, quasivoluntary compliance with and selective application of tax regulations by its entities (Dube 2014).

Cluster analysis allowed the authors to determine that agreement of tax policies in the European Union still remains at the insufficient level, therefore, there is a need for further harmonization of the actions of separate states in the tax sphere (Mihokova et al. 2016). A description of the measures regarding exogenous changes in the marginal tax rates, related to the tax reforms in the United States, allowed determining the tax elasticity at the level of 1.2. A decrease in the marginal level to 1% leads to an increase in actual GDP growth and a decrease in the unemployment rate (Mertens et al. 2018). Important information for the analysis of the effectiveness of tax systems is provided by national calculations. Researchers from the United States offer to apply distributive national calculations (Piketty et al. 2018), which can be used for consistent comparison of the income between countries, as well as for assessment of the level of fiscal decentralization (in case of their implementation at the state and the local levels).

In the countries with the imperfect market, the needs of provision of economic independence require monitoring conditional and unconditional amounts of the state debt, tax revenues, estimation of the dispersion of invariant distribution, as well as the average reversion rate. For the conditions of the United States, it was found that an optimal level of debt by the target index is negative or close to zero, the invariant debt distribution is very scattered, and the average reversion is insignificant (BhaEvans et al. 2017). This indicates a sufficient level of the tax-debt security of the state. Taxation changes of EGTRRA (Economic Growth and Tax Relief Reconciliation Act, 2001, 2003) have a considerable impact on the development of the economy of the United States. The Act introduced significant changes to the Tax Code of the United States in the part of the income tax rates, including that on property and gifts, reduction of duties for individual pension insurance. The original motivation for its adopting was focusing on a decrease in the state debt of the United States (Heim et al. 2008).

Guaranteeing the country’s tax security requires taking into account the tendencies of development of information technologies; the development of the rules of taxation of Internet transactions, e-commerce; the use of electronic documents circulation for the tax administration (Nellen 2012). The competitiveness of Internet shops is based on the elasticity of prices. E-commerce may be significantly reduced, if the sale of goods in the Internet is taxed.

5. Analytical research into tax security of OECD countries

Institutional features of the national tax codes and international interaction between them leads to emergence of complex financial instruments, determines the need for their unification, harmonization, as well as the international tax planning. In the OECD countries, the unified structure of the tax system, which includes taxes for capital, labor and energy is used (Barrios et al. 2018). Assessment of their tax security is carried out using the generally accessible information regarding the most important indicators of the effectiveness of tax policy of a state (Afanasyeva et al.2016).
The basis for the creation of the system of collective tax security of the OECD countries is the inter-sector approach and calculation of multifactor effective marginal tax rates (EMTR). The contribution of the input factors to the effective tax, which is collected from the companies–taxpayers is calculated taking into account the substitution degree, the tax share and the profitability rate. The most important factor of the effective tax rate is the taxation of labor, capital investment, and corporate earnings. Marginal tax burden on investment projects is determined by comparing their value before and after capital taxation. The traditional measures of the effective marginal taxation additionally imply the perfect competition. So they ignore the ability of companies to set prices that exceed the marginal production costs, including taxes. This implicit assumption contradicts the existing evidence of the ability of multinational companies to generate profits after taxation. It the competition is imperfect, the companies can set a positive markup to their final price, and this markup can vary essentially between the companies and production sectors. Such elimination can be the result of the assumption about loss-free investments for the calculation of effective marginal tax rates for capital investments.

The summary of key tax revenue ratios in the OECD is presented in Table 1. The OECD countries differ considerably by the tax share in the GDP, the variation span is from 30.0 % in 2017 to 37.5 % in 2000. The following countries have the highest specific weight – Iceland (51.6 %, 2016), Sweden (49.0 %, 2000), France (46.2 %, 2017), Denmark (46.1 %, 2015), while Mexico has the lowest (within the entire studied period the specific weight of the country increased from 11.5 % to 16.6 %).

<table>
<thead>
<tr>
<th>Country</th>
<th>Tax revenue as % of GDP</th>
<th>Tax revenue as % of total tax revenue in 2016</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>2017</td>
<td>2016</td>
</tr>
<tr>
<td>OECD-average</td>
<td>34.2</td>
<td>34.0</td>
</tr>
<tr>
<td>Australia</td>
<td>-</td>
<td>27.8</td>
</tr>
<tr>
<td>Austria</td>
<td>41.8</td>
<td>42.2</td>
</tr>
<tr>
<td>Belgium</td>
<td>44.6</td>
<td>44.1</td>
</tr>
<tr>
<td>Canada</td>
<td>32.2</td>
<td>32.7</td>
</tr>
<tr>
<td>Chile</td>
<td>20.2</td>
<td>20.2</td>
</tr>
<tr>
<td>Czech Republic</td>
<td>34.9</td>
<td>34.2</td>
</tr>
<tr>
<td>Denmark</td>
<td>46.0</td>
<td>46.2</td>
</tr>
<tr>
<td>Estonia</td>
<td>33.0</td>
<td>33.7</td>
</tr>
<tr>
<td>Finland</td>
<td>43.3</td>
<td>44.0</td>
</tr>
<tr>
<td>France</td>
<td>46.2</td>
<td>45.5</td>
</tr>
<tr>
<td>Germany</td>
<td>37.5</td>
<td>37.4</td>
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<tr>
<td>Greece</td>
<td>39.4</td>
<td>38.8</td>
</tr>
<tr>
<td>Hungary</td>
<td>37.7</td>
<td>39.2</td>
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<tr>
<td>Iceland</td>
<td>37.7</td>
<td>51.6</td>
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<tr>
<td>Ireland</td>
<td>22.8</td>
<td>23.3</td>
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<tr>
<td>Israel</td>
<td>32.7</td>
<td>31.3</td>
</tr>
<tr>
<td>Italy</td>
<td>42.4</td>
<td>42.6</td>
</tr>
<tr>
<td>Japan</td>
<td>-</td>
<td>30.6</td>
</tr>
<tr>
<td>Korea</td>
<td>26.9</td>
<td>26.2</td>
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<tr>
<td>Latvia</td>
<td>30.4</td>
<td>30.4</td>
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<tr>
<td>Lithuania</td>
<td>29.8</td>
<td>29.8</td>
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<tr>
<td>Luxembourg</td>
<td>38.7</td>
<td>38.1</td>
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<tr>
<td>Mexico</td>
<td>16.2</td>
<td>16.6</td>
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<tr>
<td>Netherlands</td>
<td>38.8</td>
<td>38.4</td>
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<tr>
<td>New Zealand</td>
<td>32.0</td>
<td>31.6</td>
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<tr>
<td>Norway</td>
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<td>38.7</td>
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<tr>
<td>Poland</td>
<td>33.9</td>
<td>33.4</td>
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<tr>
<td>Portugal</td>
<td>34.7</td>
<td>34.3</td>
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<tr>
<td>Slovak Republic</td>
<td>32.9</td>
<td>32.4</td>
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The highest specific weight in the average structure of tax revenues of OECD countries in 2016 belongs to: social security contributions (27.7 %); taxes on income, individuals (23.5 %), value added taxes (20 %) and other consumption taxes (12.4 %). The following countries have, respectively, considerably higher shares as for the specified taxes: Slovak Republic (43.5 %), Denmark (53.5 %), Chile (41.2 %), Turkey (23.8 %). At the average share of corporate taxes in the amount of 9.0 %, it was 21.0 % in Mexico. Specific weight of the taxes on property in Iceland (34.2 %) is by 5.34 times higher than the average indicator (6.4 %).

In the process of the European economic integration, the EU member states faced the negative impact of the existing fiscal mechanisms on the economic security due to their differentiation and in view of the intensified tax competition. Hence, the decisive actions to preserve the domestic fiscal standards, although still insufficient to ensure full unification of the respective regulations. From the standpoint of eliminating the threats to the economic safety of the European Union in the member states, state management of the fiscal system is increasingly relying on the concept of congruence and alignment of interests of all the participants in the fiscal process, i.e. the state, taxpayers and bearers of tax (natural and legal persons). Positive outcomes of such policy include elimination of the criminal schemes of shadow economy, VAT reimbursement, decreased contraband supply of excisable goods etc.

European governments are currently engaged in the struggle with tax havens, which lead to unfair tax competition (Teather 2002). In this context, the Internet is perceived as a tax haven, which enables economic agents to avoid payment of taxes on sale-purchase of goods through Internet shopping, because sellers (households and small sellers) are not required to declare their business activity and are exempted from taxes, including VAT (Beauvallet 2018). The article of Bikas et al. (2017) analyses the impact of VAT revenues on the EU Member States budgets (Bulgaria, Italy, Ireland and Lithuania), and the dynamics of the standard VAT rate and income from VAT collection efficiency. Imperfect legal regulation of e-commerce in this context leads to the loss of budget revenues (fiscal leakages). But if we consider cross-border purchases, it can be stated that Internet technologies contribute to the fight against evasion from tax payment, as they bring the sales tax in accordance with the location of a consumer.

Taxation of incomes of non-residents has an important influence of the tax security of a country (Eckhardjaneba 2001). When it has a non-discriminative character, in the equilibrium state, the international portfolio capital due to the mobility of motion quite successfully evades taxation even in the legal plane. If the countries agree upon the decision on setting the tax rates, the absence of discrimination encourages tax competition and leads to less evasion from tax payment. The advantage of the purpose-oriented principle is the considerations of effectiveness of distribution, because the purpose-oriented tax is neutral in terms of relative prices. The openness of the borders in the economic associations allows moving away from the principle of goods origin, but its use is simpler and allows the countries to expand the tax base, and to ensure convergence of tax rates. That is why small countries prefer the taxation by origin, and large countries – taxation by destination. In 2015, the European Union passed from the principle of origin to the purpose-oriented principle and set the VAT rate for the sale of e-services in the EU at the level of rate of a consumer country. However, in practice,
the European countries received the right to set the marginal magnitude of agreements, the volume of sales that exceeds it makes the seller an entity of taxation of the goods in the destination country. For the agreements, the amounts of which are less than the marginal magnitude, the origin-based tax is applied. The implementation of this right is beneficial for large European countries, since taxation based on the purpose-oriented principle expands their tax base, but at the same time complicates the system of taxes coordination and contributes to decreasing tax competition.

6. Assessment of external and internal threats to tax security of Ukraine in the conditions of European integration

The threats to the tax security of the national economy are divided into external and internal. The external threats are related to low competitiveness of the tax system of Ukraine in terms of an increase in the level of openness of its economy. The internal threats include corruption, which affects the efficiency of the tax administration; ineffectiveness of the state tax policies; considerable intensity of shadow processes in the economy. The shadow economy is the segment of the national economy, which is beyond the state control and accounting, and its assets, capital, business operations and financial results fall out of the scope of taxation objects in the legal field of the state.

The national economy of Ukraine is characterized by a high level of shadow economy (Fig. 1).

![Figure 1. Integral indicator of the shadow economy level in Ukraine (in% of official GDP)](source: Ministry of Economic Development and Trade of Ukraine (2018))

The maximum value of the integral shadow economy level in Ukraine was observed in 2014 (43%), the minimum – in 2011, 2012, 2017 (34%). To calculate it, the following methods are used: “expenditures of the population – retail trade turnover”, the method of company’s losses, electric method, and the monetary method. Reasons for the existence of the shadow economy include its considerable dollarization; macroeconomic instability; inefficiency of the processes of economy reforming; their lack of investment support; the instability of the legal field and unpredictable changes in the tax law; negative business and inflation expectations; the existence of the territories, formed during the military aggression on the territory of the country, which are uncontrollable by the government; unfavorable economic conditions for domestic exporters; critical dependence on imports of important commodity groups; a high level of corruption; low efficiency of functioning of the bodies of the judicial system; inadequate protection of property rights (movable and non-movable property), including the rights for financial assets. The shadow economy is a threat to the national security, because it distorts the mechanisms of action of market laws and tools, de-stimulates economic development, affecting negatively the formation of the financial resources of the public sector and the level of official employment, etc. The article of Giriūnienė et al. (2015) analyses the concept of tax system in terms of entrepreneurship promotion given the fact that more and more attention is recently paid to entrepreneurship and promotion of it precisely through the national tax system. Tax system is one of the economic entities’ operating conditions enabling to promote or suppress entrepreneurship in the country; both self-employed persons and companies can be entrepreneurial...
entities; in any case, a state, in promoting or suppressing their entrepreneurship, thus, influences the national economy and its changes. The process of de-shadowing of economy will be facilitated by the creation of the institutional conditions for the growth of economic activity of economic entities in the legal economy through the improvement of the investment and business climate (Ohotina et al. 2018) in the country; as well as the improvement of the processes of tax collection and administration, transformation of the state fiscal service into the modern and efficient service body (Luzgina, 2017; Osipov et al. 2018).

In a market economy the activity of subjects involved in financial relationship is accompanied by various risks: financial, economic, technological, institutional, social, political. The tax gaps are defined as the difference between the amount of taxes which should be paid, and the amount of taxes that is actually paid. The main goal for application of the tax gaps concept is to evaluate the main threats to the taxation base (Voronkova et al. 2016). The calculation of potential theoretical amount of paid taxes is based on the level of economic energies and includes the assumption that all taxpayers fulfill their obligations in accordance with law. The gross tax gap allows assessing the amount of unpaid taxes as a result of tax evasion. The net tax gap is the amount of the gross tax gap minus the amounts levied by the results of control and supervision activity of the relevant authorities. The disbalance of the budget-debt relationships is a substantial threat to the national economy. Within 1993–2017, the consolidated budgets of Ukraine are chronically deficit, with the exception of 2000 and 2002 (Table 2–4).

<table>
<thead>
<tr>
<th>Table 2. Consolidated budgets of Ukraine in 1993-2001, mln UAH</th>
</tr>
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<tbody>
<tr>
<td>Revenue</td>
</tr>
<tr>
<td>Expenditure</td>
</tr>
<tr>
<td>Net lending</td>
</tr>
<tr>
<td>Deficit “-”/surplus “+”</td>
</tr>
<tr>
<td>Ratio of deficit and budget revenues, %</td>
</tr>
</tbody>
</table>

**Source:** Ministry of Finance of Ukraine (2017)

<table>
<thead>
<tr>
<th>Table 3. Consolidated budgets of Ukraine in 2002-2010, mln UAH</th>
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<tbody>
<tr>
<td>Indicator</td>
</tr>
<tr>
<td>Revenue</td>
</tr>
<tr>
<td>Expenditure</td>
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<tr>
<td>Net lending</td>
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<tr>
<td>Deficit “-”/surplus “+”</td>
</tr>
<tr>
<td>Ratio of deficit and budget revenues, %</td>
</tr>
</tbody>
</table>

**Source:** Ministry of Finance of Ukraine (2017)

<table>
<thead>
<tr>
<th>Table 4. Consolidated budgets of Ukraine in 2011-2017, mln UAH</th>
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<tbody>
<tr>
<td>Revenue</td>
</tr>
<tr>
<td>Expenditure</td>
</tr>
<tr>
<td>Net lending</td>
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<tr>
<td>Deficit “-”/surplus “+”</td>
</tr>
<tr>
<td>Ratio of deficit and budget revenues, %</td>
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</tbody>
</table>

**Source:** Ministry of Finance of Ukraine (2017)
Depending on the trajectory of the budget deficit, it is possible to distinguish the following stages, which have common characteristics (Fig. 2–4): a description with the parabola with upward branches and clearly expressed critical points, which represent the highest level of tax insecurity of the national economy: 1993–2001 (the maximum deficit of 6200.7 mln UAH in 1997), 2002–2006 (the maximum deficit of 11009.0 mln UAH in 2004), 2007–2017 (critical points of 2010 (-64684.9 mln UAH) and 2014 (-72030.5 mln UAH).

![Figure 2. The deficit dynamics of Consolidated budgets of Ukraine in 1993-2001, mln UAH](source: own calculations)

![Figure 3. The deficit dynamics of Consolidated budgets of Ukraine in 2002-2006, mln UAH](source: own calculations)

![Figure 4. The deficit dynamics of Consolidated budgets of Ukraine in 2007-2017, mln UAH](source: own calculations)

Conventional indicators of budget deficit, calculated as the ratio to the total revenues of consolidated budget, have a different dynamics (Fig. 5–6).
Within 1993–2001 the dynamics of the relative indicator of the deficit of the consolidated budget is described by the ascending branch of second-degree polynomial with the largest negative value in 1997 (-22.06%) and the largest positive value in 2000 (1.97%). In 2003, the ascending dynamics was replaced by the descending dynamics, which lasted until 2010. In 2002, the budget surplus level was 2.4%, in 2010 the relative budget deficit increased up to 20.57% of its income. At the ascending trend, the budget deficit level in 2017 decreased to 4.14%.

One of the ways to reduce the deficit of the consolidated budget of Ukraine as a unitary state is to strengthen local finances (Kosova et al. 2015). Fiscal federalism is the world-renowned model of the public sector economy and reflects the complexity of the relationship between budgets of different levels. The main task is to determine the optimal level of centralization or decentralization of budget funds in the revenue part of the local budget.

Conclusions

The theoretical and methodological principles of researching the tax security of the state based on the theories of social choice and reflectivity were substantiated in the article. Taxes are considered as the payment for using the social benefits and the guarantee of national security. Tax security was described with a pair of recursive functions – the influence function and the cognitive function.

The differential features of national tax systems in the conditions of globalization and their impact on the economic security of the countries that differ in political regime, the level of economic development, geographical location, etc. were identified. The cross-sector approach, based on which multifactor effective marginal tax rates in the European Union (EU) are calculated, and the marginal approach to taxation in general were assessed.

Based on the analytical study of the tax security of the countries of the Organization of economic cooperation and development (OECD), it was found that social security contributions; taxes on income, individuals; value added taxes have the largest specific weight in the average structure of tax revenues. The special attention was paid to the problem of taxation of capital and goods movement between the EU countries in the framework of ensuring the mutual economic benefits and collective interests. The conclusion about the transition from the origin-based principle to the purpose-oriented principle in levying VAT in foreign trade operations was made.
The assessment of the external and internal threats to the tax security of Ukraine was carried out based on the identification of the shadow economy segment, the reasons for its occurrence and consequences for the national economy, as well as the dynamics of absolute and relative indicators of the budget-debt security. Recommendations for strengthening the tax security under conditions of European integration were made.

An important pre-requisite of guaranteed safety of the national economy is sufficiency of the budget income to ensure functioning of the state and provide socially useful benefits to the citizens on a proper level. To that end, the fiscal policy of Ukraine needs to be transformed, in order to meet the requirements of fiscal convergence, which represents alignment, complementarity, compromise and stabilization of interests of the stakeholders in the fiscal process. The new institutional model of national economic safety is expected to fill the gaps in the fiscal policy that prevent effective functioning of the state, and ensure verification of its basic provisions.

The prospect of the subsequent research may be the agreement of the tax-budget and debt policy of the state in the context of strengthening their economic security.

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ENSURING ENVIRONMENTAL SAFETY VIA WASTE MANAGEMENT

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Abstract. Criteria are determined that can be applied to recognize waste as economic resources. The criteria for recognition of waste as economic resources include the following: the existence of property rights, the possibility of sale, the receipt of economic benefits and the environmental effect. These criteria are the basis of a new understanding of this economic concept and the basis for shaping the behavior of economic agents in waste management. The proposed criteria have a significant impact on the formation of the accounting system for waste and waste management operations. The place of waste in the environmental safety management system is substantiated on the basis of determining the process of its generation at all stages of economic activity of an industrial organization and the directions of its management both at the internal and inter-economy level. A waste classification matrix is developed for identification and recognition purposes, which makes it possible to form an information space as the basis for making management decisions in the field of environmental safety of industrial organizations.

Keywords: circular economy, waste, security, economic benefits, concept of sustainable development, environmental effect


JEL Classifications: F52, O39

1. Introduction

The priority direction of development of environmental safety of large industrial organizations in the world is management of waste, which have anthropogenic impact on the environment. In the conditions of the dynamic development of science and technology, the need arises for the transformation of economic relations at different levels of economic systems and the “man-nature” relationships. This is especially true for waste management. Waste generation is an irresistible process that inevitably accompanies human activity. Waste generation stop is impossible even with the use of the most advanced technologies. The high level of its generation is a consequence of the inefficient use of natural resources in production activities. The experience of developed countries has shown that humanity can successfully develop by significantly reducing the consumption of natural resources per unit of production.

Scientists have made a significant contribution to the development of theoretical, methodological and organizational provisions for waste management. However, today there is still a number of theoretical and organizational-methodological problems that need to be solved at large industrial organizations to ensure their sustainable development and compliance with the provisions of the circular economy. In particular, the following problems require solutions:

substantiation of the nature and classification of waste as an object of environmental safety management of an industrial organization (Rigamonti, L., Sterpi, I., & Grosso, M. (2016));

determination of the essence, composition and specifics of waste management operations as a basis for the environmental safety management of an organization (Cucchiella, F., D’Adamo, I., & Gastaldi, M. (2017)).

So, today waste is not only a concept in the natural, technical or geological sciences, but it is an economic category. Waste is an economic object, the management of which depends on the development of economic systems of both a separate organization and the country as a whole, and in some cases, individual regions. After all, waste is an integral component of production and interaction between the organization and the environment.

2. Literature Survey

Thus, waste as a result of production is considered in the works of many scientists. In particular, Vučijak, B., Kurtagić, S. M., & Silajdžić, I. (2016) note that waste is an inevitable consequence of production, which is included in the price of goods and itself becomes a commodity, that is, a specific product of production, because it is involved in the structure of the production, consumption and accumulation system. In addition, the definition of waste in scientific works is limited to the remains of material resources generated in the production process. Regarding this, the approaches to the essence of waste as a result of production can be limited to the following: remains of material resources, as unsuitable for further use; secondary resources (Tetiana, H., Karpenko, L., Fedoruk, O., Shevchenko, I., & Drobyazko, S. (2018)).

Today, in the industrialized countries of the world there is awareness that progress means not only an increase in labor productivity, but also an increase in the productivity of the material resources used while reducing their consumption. Countries with significant reserves of natural resources in recent years tend to reduce their extraction (Ravindran, R., & Jaiswal, A. K. (2016)). It is economically more profitable to process own secondary resources than to develop new fields. Thus, a radical solution to the resource problems of metallurgy and improving the structure of the production of ferrous metals in the United States provides for an increase in the use of scrap and waste as the main alternative to primary iron ore raw materials (Zaman, A. U. (2016), Turner, D. A., Williams, I. D., & Kemp, S. (2016)). The technological efficiency of recycling of secondary raw materials is beyond doubt. Using 1 ton of prepared ferrous scrap allows you to save more than 1.8 tons of ore, sinter and pellets, 0.5 tons of coke, 45 kg of fluxes, about 100 cubic meters of gas. This saves more than half of the energy required for steelmaking in the case of sequential processing of raw materials (iron ore) (Haupt, M., Vadenbo, C., & Hellweg, S. (2017)). In general, characterizing these approaches, it should be noted that they consider waste unilaterally, and do not characterize its importance in environmental management and do not determine the directions of its management. After all, waste today is not only the remains of material resources, it is the result of an appropriate process associated with the use of a complex of economic resources, which, in turn, can bring economic benefits to business entities.

We consider it necessary during the study of waste as remains of material resources and secondary resources to determine it as the result of a certain production process associated with the use of a complex of economic resources. In particular, such resources should include natural resources, labor resources, financial resources. Moreover, speaking of waste as a result of production, it should be noted that it can act as assets for an industrial organization, provided that it can bring economic benefits.
3. Methods

Waste as a result of production is a separate object of management of economic activities of an industrial organization, because it can be a relevant resource in its future activities, or operations with it lead to certain costs incurred by the company in the course of its management. Waste management can be expressed in a complex of operations related to disposal, recycling or dumping. All this indicates the need to develop a complex system of analytical support for waste management in order to comply with the basic provisions of the circular economy, which will ensure the environmental safety of organizations. In turn, the environmental safety management system of industrial organizations should be aimed at complying with the complex of social and economic interests of both business and society.

As you know, economic processes should be considered from the point of view of production and consumption, and each of these areas uses environmental resources to one degree or another and creates waste. A significant amount of material waste can be returned to production, and the remaining part is not recyclable (Mir, M. A., Ghazvinei, P. T., Sulaiman, N. M. N., Basri, N. E. A., Saheri, S., Mahmood, N. Z., ... & Aghamohammadi, N. (2016)). Large percentage of the material waste can be returned to production through various types of effects, such as recycling, and components that could not be recycled are to be incinerated or disposed of in specially equipped sites. To increase the efficiency of interaction between the economy and the environment, it is necessary to develop such economic mechanisms that would, on the one hand, reduce the negative environmental impact of waste management activities on the environment, and on the other, increase the economic efficiency of this activity. Thus, waste, as a result of production, can, in turn, act as an economic resource for both industrial organization (through reuse) and other industrial organizations. In addition, waste management is associated with the creation of gross domestic product in the service sector, because the activities of waste-disposal organizations are quite profitable and form a special range of services. This allows us to speak about a new product - a service for disposal/recycling.

This type of service is quite profitable. As for the United States, in Alaska the cost of disposal of hazardous waste costs 125 thousand dollars, while the total cost of the program with hazardous waste is 400 thousand dollars. (Rhyner, C. R., Schwartz, L. J., Wenger, R. B., & Kohrell, M. G. (2017)). Switzerland has extensive experience in organizing this type of business. So, Switzerland recycles about 80% of its waste. There are 7 large waste recycling organizations: FERRO-Recycling (banks), IGORA (household aluminum), INOBAT (household batteries), PET-Recycling Switzerland (bottles), the SENS Foundation (electrical equipment), TExAID (textiles) and VetroSwiss (glass), which are combined into Swiss Recycling (Kinnaman, T. C. (2017)).

4. Results

The disposal and recycling of industrial waste is a global problem in shaping the balanced development of the global community and ensuring sustainable development. In addition, this problem is more concerned with industrial organizations, because the world’s reserves of various types of industrial wastes are growing exponentially.

Using real examples from world practice, it is shown that the technologies of waste disposal in the world to a large extent can reduce the costs of waste recycling compared to conventional landfill. These methods of disposal are not only environmentally friendly, but also cost-effective. For example, waste recycling using bio composting allows not only to safely dispose consumption waste, but also to maximally bring it into commercial use with a recycling depth of up to 90%. The generalized world experience of using a combination of state and market management mechanisms allowed for more flexible use of these levers in the actual conditions in the sector (Nakashydze, L., & Gil’orme, T. (2015); Androniceanu A., Drăguănescu Irina-Virginia (2016); Rogalev, A.; Komarov, I.; Kindra, V.; Zlyvk, O. (2018); Vegera, S.; Malei, A.; Sapeha, I.; Sushko, V. (2018); Vegera, S.; Malei, A.; Trubovich, R. (2018)). Business development in the field of disposal/recycling is the basis, firstly, from an environmental point of view, for: a stabilization of the ecological situation and increase in the efficiency of using natural resources; secondly, an increase in the number of industrial organizations.
of small and medium-sized businesses, the creation of new work places, an increase in revenues to the state budget. In particular, in Germany, the activities of enterprises for the disposal and recycling of waste reaches 80 billion euros per year. In turn, in the United States, 122,000 organizations are engaged in this type of business, which employ more than 1600,000 people. (Blackman Jr, W. C. (2016)). Thus, currently established waste management mechanisms are not always effective from an environmental and economic point of view, they are not adapted to specific conditions. This leads to the problem of conceptual approaches development for ensuring waste management in the environmental safety of industrial organizations that have taken into account the requirements of today’s world. This will allow to consider waste both from an environmental point of view, because its volumes in the environment are decreasing, and from an economic one, as it makes the organization more attractive for investments.

This prompts the study of waste as a result of the interaction of the organization with the environment. The problem of consumption waste management is one of the key issues in the field of environmental protection. Around the world, attempts are being made to effectively manage ever-increasing waste flows. Relevant in this regard is the consideration of the problem of consumption waste management from the standpoint of the concept of sustainable economic development, which provides for such development that meets the needs of the present, but does not jeopardize the ability of future generations to meet their own needs.

In turn, the basics of the circular economy today are the most popular in China, because this country has accumulated a large amount of industrial and household waste over the past decades. In China, the total annual volume of hazardous waste is about 11 million tons, of which industrial production accounts for more than 10 million tons, medical waste — 650 thousand tons, radioactive waste — 115300 tons (Zeng, X., Yang, C., Chiang, J. F., & Li, J. (2017)). In addition to the above, in 1996-2004, 26,400,000 tons of hazardous waste were dumped without any handling or proper disposal (Zeng, X., Duan, H., Wang, F., & Li, J. (2017)). As for the waste of Chinese production, more than 1 billion tons of it is generated annually, which is 5 times more than the annual volume of household waste (Yong, J. Y., Klemeš, J. J., Varbanov, P. S., & Huisingh, D. (2016)). Thus, in China, three categories of waste are clearly defined: municipal, industrial and hazardous waste. The composition of municipal waste includes household, departmental, commercial, street garbage and unprocessed industrial waste.

Waste management combines both economic components and environmental, because the generation of waste is a chemical process, which, in turn, affects the environment. After all, waste in nature is generated as a result of the openness of the global biotic circulation and represents the difference between the synthesis and destruction of organic matter in the biosphere, which is derived from the biotic circulation “into geology.” Such is the nature of fuel and energy minerals: coal, oil, peat, natural gas. The “waste” of nature is localized and does not make a serious impact on the course of biospheric processes. A person attracts to the technosphere, to the “social metabolism” a huge amount of natural resources, which are both components of ecosystems and part of the components of the natural environment (Joshi, R., & Ahmed, S. (2016)).
Figure 1. Changes in temperature, content of CO₂ and dust in Antarctic glaciers over the past 450,000 years, according to data from Vostok station, Eurostat http://ec.europa.eu/eurostat/statistics-explained/index.php/Environmental_tax_statistics

The study of the human impact is carried out today through the calculation of the number of indicators, which are grouped in the ecological trace index. The basis for the calculation of these indicators is the study of the dynamics of the formation of CO₂ (Figure 1) in the result of economic activity, especially when using fossil fuels, which can be demonstrated through the use of technological capabilities of the electronic resource of the World Bank.

The results of the assessment of the impact of environmental revenues on the indicators of sustainability of environmental development indicate that:

- Emissions of greenhouse gases increase in the year of receipt of environmental taxes, and decrease with a lag in one year, and in the three-year perspective, this indicator is practically reduced to "0";
- Renewable water resources remain at the same level in the year of receipt of taxes, but with the lag in one and three years the amount of renewals increases;
- the indicator of energy renewal decreases both in the year of receipt of taxes and with the lag in one and three years, that is, it has a positive dynamics;
- energy saving has the opposite dynamics, since with the lag in three years this figure reaches a critical point, unlike in the first year of tax receipts, where the indicator has a minimal value;
- the protection of biodiversity is similar to that of energy conservation, with a time lag of three years, although in the first two years this figure is decreasing;
- the indicator of biodiversity increases in the year of tax receipts and with the time lag in one year, and this indicator reaches the lowest point three years after the payment of environmental taxes.

Based on the above calculations, we can say that the most effective income from environmental taxes is used over the next three years. The indicators of sustainable ecological and human development with a growing summary reflect the positive dynamics of close interconnections in the three-year perspective. With regard the assessment of the relationship between these indicators and the parameters of sustainable development, this should be the basis for the development of environmental policies aimed at reduction the burden on the natural
environment and targeted financing of the ecosystem protection through the revenues from environmental taxes. In order to assess the impact of financial and economic instruments on the state of the environment, it is proposed to conduct an assessment of the interconnection of environmental taxation parameters and indicators of environmental development using the example of the 16 European countries considered (Belgium, Bulgaria, Czech Republic, Denmark, Estonia, Spain, Croatia, Latvia, Lithuania, Hungary, Poland, Romania, Slovenia, Finland, Sweden, and United Kingdom). So, the ecological taxation to assess the relationship between indicators is proposed to be considered on the basis of three indicators:

- growth of environmental taxes - the ratio of increase in the sum of total environmental taxes for the current year to the level of the previous year, in%;
- the share of environmental taxes in tax revenues - the ratio of the annual amount of total environmental taxes to the annual amount of aggregate tax revenues, in%;
- the share of environmental taxes in GDP - the ratio of the annual amount of total environmental taxes to the annual GDP, in%.

According to the results of the analysis of international methods for assessing the level of sustainable development and environmental parameters, a system of indicators was created, which can be influenced by the state through indicators of environmental taxation, namely, a sample totality of indicators of sustainability of human development:

- the length of a healthy life - the expectation of the length of a healthy life from the moment of birth in years;
- consumption - the difference between the environmental and carbon effects of human life on the environment, in ha;
- health care - health care per capita, US $;
- mortality - the mortality rate per 1 thousand people;
- safety of access to water - percentage of population using safe drinking water supply services, %;
- access to quality water sources - % of population with access to high-quality water resources.

Statistical data for calculations is presented in Appendix B. In order to assess the impact of environmental taxation on environmental development indicators, panel regression modelling tools using Stata software were used, which allowed to estimate the averaged level of links for a sample from 16 countries during the research period covering 2006-2016.

The results of the assessment of the impact of environmental taxation parameters and indicators of sustainability of human development on the basis of annual observations are presented in Table 1.

| Table 1. Results of the assessment of the impact of environmental taxation parameters on indicators of sustainable human development for the period 2006-2016 |
|-----------------|-------------|---------|--------|------------------|----------|----------|
| Factor signs    | Influence factor | Standard error | Z     | P>|z|               | Lower 95% | Top 95% |
| Access to quality water sources | -0.813 | 0.483 | -1.680 | 0.092 | -1.759 | 0.133 |
| The share of environmental taxes in tax revenues | -1.308 | 1.450 | -0.900 | 0.367 | -4.150 | 1.534 |
| Safety of access to water | 0.263 | 0.108 | 2.430 | 0.015 | 0.051 | 0.476 |
| The share of environmental taxes in GDP | 0.778 | 0.300 | 2.590 | 0.010 | 0.189 | 1.367 |
| Mortality | 0.118 | 0.048 | 2.440 | 0.015 | 0.023 | 0.212 |
| The share of environmental taxes in tax revenues | 0.224 | 0.159 | 1.410 | 0.158 | -0.087 | 0.535 |
| Healthcare | -76.901 | 61.554 | -1.250 | 0.212 | -197.545 | 43.742 |
| The share of environmental taxes in GDP | -266.504 | 193.560 | -1.380 | 0.169 | -645.875 | 112.868 |
| Consumption |  |  |  |  |  |  |
The given results of the calculation show that there is a close connection between the presented indicators. Thus, the share of environmental taxes in GDP and total tax revenues has a significant impact on most indicators of sustainability of human development, namely access to high-quality water sources and safety of access to water and a healthy life expectancy. First of all, this is due to the process of renewal of these types of resources at the expense of these revenues, that is, reduction in the amount of harmful use of the environment, which indicates the complexity of environmental policies of countries. The effect of the environmental tax rates in the year after their application is somewhat worse, but also maintains a positive dynamics of interaction. The close correlation between the increase in environmental taxes and the costs of safe access to water points to an improvement in this indicator by improvement of the quality and availability of water resources (Table 2).

Table 2. Results of the assessment of the impact of environmental taxation parameters on indicators of sustainable human development for the period 2006-2016 with time lag of one year

| Factor signs                        | Influence factor | Standard error | Z     | P>|z| | Lower 95% | Top 95% |
|-------------------------------------|------------------|----------------|-------|-------|-----------|----------|
| Access to quality water sources     |                  |                |       |       |           |          |
| The share of environmental taxes in tax revenues | -0.337 | 0.515 | -0.650 | 0.513 | -1.346 | 0.672   |
| The share of environmental taxes in GDP | 0.026 | 1.410 | 0.020 | 0.985 | -2.740 | 2.790   |
| Increase in environmental taxes     | 0.002 | 0.037 | 0.060 | 0.954 | -0.070 | 0.074   |
| Safety of access to water           |                  |                |       |       |           |          |
| The share of environmental taxes in tax revenues | 0.135 | 0.110 | 1.220 | 0.223 | -0.082 | 0.351   |
| The share of environmental taxes in GDP | 0.449 | 0.286 | 1.570 | 0.117 | 0.112 | 1.009   |
| Increase in environmental taxes     | -0.020 | 0.008 | -2.480 | 0.013 | -0.036 | -0.004   |
| Mortality                           |                  |                |       |       |           |          |
| The share of environmental taxes in tax revenues | 0.047 | 0.058 | 0.810 | 0.416 | -0.066 | 0.160   |
| The share of environmental taxes in GDP | -0.022 | 0.170 | -0.130 | 0.899 | -0.354 | 0.311   |
| Increase in environmental taxes     | 0.000 | 0.004 | 0.120 | 0.908 | -0.007 | 0.008   |
| Healthcare                          |                  |                |       |       |           |          |
| The share of environmental taxes in tax revenues | -53.064 | 59.746 | -0.890 | 0.374 | -170.164 | 64.035   |
| The share of environmental taxes in GDP | -63.344 | 174.858 | -0.360 | 0.717 | -406.058 | 279.371   |
| Increase in environmental taxes     | 2.829 | 3.865 | 0.730 | 0.464 | -4.746 | 10.404   |
| Consumption                         |                  |                |       |       |           |          |
| The share of environmental taxes in tax revenues | -0.014 | 0.048 | -0.300 | 0.767 | -0.108 | 0.079   |
| The share of environmental taxes in GDP | -0.045 | 0.138 | -0.320 | 0.746 | -0.315 | 0.226   |
| Increase in environmental taxes     | 0.002 | 0.003 | 0.500 | 0.620 | -0.005 | 0.005   |
| The duration of a healthy life      |                  |                |       |       |           |          |
| The share of environmental taxes in tax revenues | -0.178 | 0.166 | -1.070 | 0.284 | -0.504 | 0.148   |
| The share of environmental taxes in GDP | -0.011 | 0.479 | -0.020 | 0.982 | -0.950 | 0.928   |
| Increase in environmental taxes     | -0.012 | 0.012 | -1.040 | 0.297 | -0.035 | 0.011   |
That is, the effectiveness of the performance of indicators of the share of environmental taxes in GDP and tax revenues and the growth of environmental taxes remains the same in relation to all parameters of a stable level of human existence, which again speaks of the significant impact of such indicators on the sustainability of human development in this sample of countries.

The results of the assessment of the impact of environmental revenues on the indicators of sustainability of environmental development indicate that:

- Emissions of greenhouse gases increase in the year of receipt of environmental taxes, and decrease with a lag in one year, and in the three-year perspective, this indicator is practically reduced to “0”;
- Renewable water resources remain at the same level in the year of receipt of taxes, but with the lag in one and three years the amount of renewals increases;
- the indicator of energy renewal decreases both in the year of receipt of taxes and with the lag in one and three years, that is, it has a positive dynamics;
- energy saving has the opposite dynamics, since with the lag in three years this figure reaches a critical point, unlike in the first year of tax receipts, where the indicator has a minimal value;
- the protection of biodiversity is similar to that of energy conservation, with a time lag of three years, although in the first two years this figure is decreasing;
- the indicator of biodiversity increases in the year of tax receipts and with the time lag in one year, and this indicator reaches the lowest point three years after the payment of environmental taxes.

The author’s vision of the formation of criteria for recognizing waste as economic resources in order to form the environmental safety management system, taking into account the main provisions of the concept of sustainable development and the need to introduce a circular economy, is as follows:

firstly, to group the criteria for control, disposal and use of the criterion - the existence of ownership of the economic resource. This criterion is economic and legal, because it determines the process of economic transactions, based on the legal form. It has a direct impact on the waste management of industrial organizations as a basis for ensuring their environmental safety. In addition, it determines the directions of formation of their reflection in the management system of both the industrial organization, the result of which is waste, and the waste-disposal organization, as well as the procedure for the interaction of these business entities;

secondly, based on the criterion of the ownership of an economic resource, the criterion of possibility of sale follows. In fact, this criterion is possible only with the right of ownership. In turn, all waste can be realized. However, the process of realization of waste is very specific, because this realization is not always associated with income. Thus, certain types of waste can be transferred free of charge to other organizations, including disposal organizations. In addition, there is waste, from which the organization seeks to get rid of in connection with its danger to the environment and human health. Therefore, the realization criterion should not be identified with the realization process at an industrial organization;

thirdly, the criterion for ensuring business processes / economic activities is quite wide, because it combines all types of activities (operational, financial, investment) and business processes (acquisition, production, sales). We propose to divide this criterion into two, namely: provision of types of economic activity and support of business processes, because these criteria determine the process of waste generation and the process of its use in the organization’s activities, and each of them is associated with a set of waste management operations that can be associated with various activities and business processes;

fourthly, the criterion for obtaining results in the scientific economic literature is associated with making a profit from the use of economic resources.

However, in today’s conditions, the economic component of the functioning of an industrial organization must be in harmony with the environmental one and, therefore, the enterprise should receive economic benefits and
an environmental effect. This indicates the need to single out two criteria, namely: obtaining economic benefits and obtaining an environmental effect, with the first and second criteria having both a positive value and a negative one. All this depends on the establishment of a waste management system. In turn, it should be noted that the criterion of the environmental effect follows from the limited resources.

In general, the proposed criteria for the recognition of waste as economic resources (the existence of right of ownership, the possibility of realization, the economic benefits and the environmental effect obtaining) is the basis of a new understanding of this economic concept and the basis for shaping the behavior of economic agents in waste management. Considering this, there is a need to form new approaches to waste management as a component of the environmental safety of industrial organizations and, accordingly, to develop organizational and methodological provisions for analytical support. Current tendencies in the formation of a sustainable development of the country’s economy and individual business entities lie in the rational use of natural resources and waste management. This significantly activates environmental activities aimed at ensuring the environmental safety of industrial organizations.

In addition to these sources of waste, it is necessary to allocate waste of an administrative nature at industrial organizations, that is, such that was generated in the departments of enterprise management, marketing service, and the like. Management of such waste is not of great importance in ensuring the environmental safety of an industrial organization. However, it may have an economic effect aimed at saving administrative costs. It should be noted that abnormal situations that may arise due to the instability of the external environment are of great importance in the economic activities management of an industrial organization. Such abnormal situations are emergency situations of a natural character, a technogenic character, a sociopolitical character.

The waste management system is manifested both at the internal level and at the level of economic relations between economic entities, in particular, between an industrial organization and a waste disposal organization. Thus, the main activity of the waste disposal organization is waste handling services, which include transportation, storage, recycling, disposal and dumping of waste. The interaction between these business entities leads to both material (movement of waste) and financial (payments for recycling services) flows. Thus, the place of waste in the system of management of economic activities of an industrial organization is determined by justifying the sources of its generation for all types of organization activities, business processes, conditions of operation and interaction with disposal organizations.

In particular, a determined process of waste generation is the basis for its identification by the place of origin in order to build the management information space. The mechanism for identifying waste depends on the management system, in particular in terms of production organization.

5. Discussion

The analysis made it possible to establish that the methods of expenses accounting and cost calculation of industrial products, which are used by industrial organizations of the engineering industry, are:

expenses accounting methods: actual cost (expenses are taken into account according to actual data obtained from primary documents) and regulatory method (expenses are taken into account in accordance with established standards provided by plans / budgets with subsequent recording of deviations in accordance with received primary documents on actual expenses incurred);

cost calculation methods: process method - when using a process method by enterprises of the industry, their technological process consists of stages. The positive point in the application of this method is that the collection of information on costs is less time consuming compared to the ordered method. In addition, the information reflected in the accounts is more transparent. The distribution of overhead costs for workshops is carried out more accurately (Tetiana, H., Chorna M., Karpenko L., Milyavskiy M. & Drobyazko S. (2018)). Accordingly, the disadvantages are the inability to group costs by product, a significant amount of accounting records and the lack of information on the causes of deviations of actual costs from the standard;

ordered method – one of the main methods of calculating the cost of the heavy engineering organizations,
where production costs are taken into account by individual or special orders. It involves treating each order as a separate accounting unit, for which direct material and labor costs are calculated, as well as overhead costs. At machine-building organizations, an ordered method is used with a semi-finished summary of foundry costs. According to the ordered method, due to the balance determination of the cost of finished products, if the loss of work in progress is not documented, it is automatically included in the cost of finished products of the enterprise, which leads to a simultaneous unreliability of the results of the calculation of the cost of production and expenses control;

and process and ordered method (integrated method, according to which the calculation is carried out on a separate order, within which the process stage is determined).

Thus, when using a process calculation method, waste is identified by its location, which will allow to manage separate technological cycles in the direction of reducing its volume and safe handling. According to an ordered method, you can determine the source - the product, which production leads to waste generation. Using the standard cost accounting method allows you to manage waste from the position of compliance with the standards of its generation. Considering the complexity of technological processes in industrial enterprises, we believe that it is advisable to allocate calculation areas for each process stage within individual workshops.

The calculation area is a conditional division of the technological process of a certain shop into separate subprocesses, which can be distinguished on the basis of a set of technological features, and the result of which is a certain semi-finished product. Waste is generated both in the workshops (stages) of the main production, and in the workshops of auxiliary production. In order to effectively manage waste in ensuring the economic and environmental safety of industrial organizations, it is advisable to identify the waste of both types of production. The stages of the main production characterize only the production process, in turn, the process of acquisition / receipt of tangible assets and the process of sale / disposal of tangible assets are provided by the auxiliary production workshops. In order to form a mechanism for identifying and recognizing waste, we suggest that industrial organizations should approve as an internal regulatory documents the following documents:

list of stages (workshops) at the whole enterprise and for individual orders in particular;
list of calculation areas according to the stages (workshops) of the main and auxiliary production;
classifiers of industrial production orders.

Sources and places of waste generation is only one of the components of waste identification and recognition in industrial organizations. Waste properties are of great importance in the mechanism of identification and recognition of waste. For the purpose of practical application of the developed waste classification, we offer its approval in the form of a waste classifier, which provides not only its separation according to classification criteria, but also according to its origin, that is, stages and calculation areas. For each type of waste, we suggest defining a cipher that, in terms of computerization, will allow automating its management. To form a waste classifier, it is advisable to use a classification matrix (Table 3).

<table>
<thead>
<tr>
<th>Places of waste generation</th>
<th>Classification feature 1</th>
<th>Classification feature N</th>
</tr>
</thead>
<tbody>
<tr>
<td>Stage</td>
<td>Classification feature 1</td>
<td>Classification feature N</td>
</tr>
<tr>
<td>Workshop A</td>
<td>Site A.1</td>
<td>Type 1.1</td>
</tr>
<tr>
<td>Workshop X</td>
<td>Site X.1</td>
<td>...</td>
</tr>
</tbody>
</table>

Thus, the waste classifier built in such way is the basis for their identification and recognition by a management object. An identification mechanism that takes into account the type of waste, places and sources of its generation will allow to form an information space as the basis for making management decisions in the field of environmental safety of industrial organizations.
Conclusions

For effective waste management in ensuring environmental safety of an industrial organization, it is necessary to approve a list of places of waste generation with responsible persons for its generation within the norms. We propose to form such a list as follows: first, the identification of all possible waste sites at an industrial organization with simultaneous approval of its list in accordance with the classifier. These places are the calculation areas of stages (workshops) of the main and auxiliary production; secondly, the approval of responsible persons at the sites of waste generation, whose main duties will include monitoring compliance with the norms of waste generation at the enterprise.

The approval of the responsible persons is carried out by making the relevant provisions in the job descriptions of the workshop managers or those responsible for the calculation area; thirdly, the approval of the norms of waste generation for each waste generation site with the procedure of revision in accordance with the production volumes and existing orders; fourthly, the development of a mechanism for identifying deviations in waste generation and its approval.

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MIGRATION CULTURES AND THEIR OUTCOMES FOR NATIONAL SECURITY

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Abstract. International migration is a functional component of modern societies, both wealthy and poor. In a way, one can see that migration solves the unequal distribution of people and opportunities. Despite the political pressure to control immigration, almost all changes in politics have broadened the scope of legal immigration to allow for settlement by refugees, farm workers (in case of urban-rural migrations), “illegal” immigrants with long-term residence in the country, and workers in great demand to move around freely. Our main research objective is to demonstrate, using the available data as well as the analysis of the metadata and the research literature, that migration, especially labour migration, has a narrow connection with the issues of national security. Large outflows and inflows of people might bring about security threats linked to organized crime, terrorism and the spread of radical ideas. Moreover, migration is responsible for the brain drain of young and well-educated people who are searching for higher wages and better opportunities abroad depriving their own home country of valuable human capital. Our paper analyses the phenomenon of international migration perceived from the angle of migration culture that goes hand in hand with recent globalization trends all around the world. We come to a solid conclusion that migration policy should be treated as an important element in establishing well-balanced national security policy in the globalized world. It might be of a particular interest for the migration scholars, labour market economists and stakeholders and policy-makers dealing with the issues of national security, public and migration policies, as well as sustainable economic development.

Keywords: migration, security, labour market, cultural aspects, sustainable development


JEL Classifications: F22, F24, H56

Additional disciplines political sciences; sociology; cultural studies; international relations

1. Introduction

International migration is an essential part of human history. The process of leaving one country of economic and social incentives or being driven out (or even chased out) by unfavorable conditions at home (famous “pull” and “push” factors) has always been going hand in hand with human mobility and pursuing economic incentives. International migration has been on the rise in the previous decades and has evolved into a worldwide phenomenon. It has been an essential part of the history of humankind for centuries but the simplification of travel and the economic development in the new colonies overseas made it a very important element of the economic sustainable development. The mass migration one can witness today is not a state of emergency but the start of a new reality. The culture of migrations has become an integral part of the world’s culture and is not perceived as a consistent part of the human civilization being promoted in popular culture, films, books, and TV series (Cohen and Sirkeci, 2011; or Issa, 2016).
The culture of international migration is a part of both national and global security challenges, both directly and because of the effects of instability, such as Syrian and Iraqi conflicts, which increase mass migration and trafficking. In the same time, the ageing of the population in most of the developed Western economies is understood as a national challenge with a proposed way of tackling this issue by the means of the targeted immigration policies as well as strengthening the integration policies for preventing the emergence of extreme right-wing extremists, xenophobia and nationalism, which can put the social coherence at risk. As developed societies are ageing, and in some cases shrinking, they are increasingly turning to international migration to support economic growth, with a focus on knowledge-based activities. A significant change in the global demographic region, which was discussed, is China’s move from a demographic dividend to a country with a population deficit, and from an economy based on low-cost labour to a higher salary due to the development of high-tech and scientific industries (Wang, 2016; Cheung, 2017).

Migration cultures as we know them nowadays are being shaped up thanks to the ongoing globalization (Timur, 2000; Bilan and Strielkowski, 2016; Škuflić et al. 2018; Todorov et al. 2018; Lialina 2019). Traditionally seen as an economic phenomenon related to the growth of the global market, globalisation and its effects have begun to affect every aspect of social life, from culture to crime, finance and religion (Ali, 2007). Nowadays, globalisation is characterised by four major trends: rising commodity and human flow, expansion and diversification of financial activity, communication development of networks, knowledge and relationships, and growing differences. At the moment globalization is during its summit. Regarded as one of the benefits, it has led to the creation of employment opportunities that were numerous. In the real sense, it has not been able to reduce poverty.

In addition, globalization enhances the movement of goods, services and people across borders, as migrants benefit economies of reception countries through their research, while the implementation of climate change and mitigation measures promote sustainable development in domestic countries. In today’s burgeoning economic areas such as the Persian Gulf states, China and India, the private sector needs to move beyond the short-term profit focus and may require putting more emphasis on environmental and social issues in business models to achieve sustainable returns.

United States has always been a migration country which shaped up its culture and its unique identity (Hoschle et al., 2015). The well-known “melting pot” is however suffering some leaks due to racial tensions and economic situation. Nevertheless, it is the European Union (EU) that is one of the most effected areas in terms of migration inflows nowadays. Its considerable wealth as well as its social and welfare approach constitute a target for many migrants and asylum seekers from numerous countries. EU faces many issues connected to international migration and lots of them are not easy to be resolved or mitigated (Zaiceva, Zimmermann, 2008; De Luna Gallardo, 2016).

Our paper aims at studying the phenomenon of migration cultures and their impact on national security (defined as a given country’s economic and national security). We take the example of recent developments in the European Union to make our point. Moreover, we also focus on the issue of welfare and social aspects that are very important in today’s European Union.

We analyse the vast body of literature dealing with migration worldwide and in the European Union (EU). In addition, we make a particular focus on the Turkish and Ukrainian migrations in Europe as two valuable examples of unprecedented migration flows that carry all the characteristics of the cultural and economic issue that might shape up European security and sustainable economic development.

2. Literature review

It is quite obvious that there is a clear and distinguishable link between such issues as migration and war conflicts, corruption, organised crime or demographic changes. Global serious issues such as military and civil war conflicts, world poverty, terrorism and organised crime constitute global and transnational threats
to national security. Moreover, they are capable of increasing migration flows, which can in turn lead to the increase in illegal migration, human trafficking, modern slavery, or brain drain (see Estevens, 2018; Passiatore et al., 2019).

A significant reduction in the number of immigrants from any given country should be viewed as an important element in the security of this country (Faist, 2000). Within this context, it is important to limit the process of economic migration among the group of migrants represented by young and educated people (Mertens et al., 2019). The brain-drain of the outflow of the potential personnel and valuable work capital might be perceived as an irreversible loss by the country’s economy, defence sector and armed forces (Kalyugina et al., 2015; Lazaridis, 2016).

Nowadays, immigration policy in most developed Western countries is in the middle of fiscal and political debates centring around many of the challenges and resources (Carling, Schewel, 2018). The governments have policies geared toward enhancing education for immigrants. The protests are unofficially permitted to continue though it had no role in it. A great deal of people came to be contingent on the government or charities to furnish them with food.

An interesting aspect worth studying is migration and remittances. Remittances constitute a value comparable to international aid and are often a considerable injection into the less-developed economies of sending countries (Stojanov et al., 2011; Rausser et al., 2018). Transferring money or goods from abroad to support their families and friends is an efficient tool of fostering economic situation at home, however it can also become a way of financing terrorism and organized crime (Strielkowski et al., 2017).

Creative people from all around the world are migrating to take part in the expanding medium. Countries target their net income to be produced by individuals. Some countries allow restrictions on movement. Every country is able to somehow, identify with its own culture, despite the fact that it is a fact diverse. Not every nation in the world is on equal footing in conditions of technological improvement and power. Thence, there is a difference between legal and illegal immigration (Horváth, 2008).

One would probably agree that migration is often a political issue, especially when it has to do with illegal immigration. Although migration is viewed by people from various perspectives, objective advantages are quantifiable and assessable. Even illegal immigration has a positive impact on the average taxpayer. Various considerable and massive immigration flows that happened throughout history (e.g. Irish and Cuban immigration to the United States, Russian immigration to Israel, Polish migration to the United Kingdom, etc.) has left an enduring impression the cultures of the origin and target countries.

3. Research objectives and methodology

Economists have recently recognised that, in addition to direct interaction with markets, prices and revenues, other social and cultural non-market interactions can also be a key factor in the social and economic integration of immigrants. For example, specific cultural patterns of immigrant groups can have a significant impact on their performance in the labour market. More generally, social scientists have made great efforts to ensure that immigrant integration patterns can radically change the design and political economy of public policy in a host society. Thence, cultural diversity brought about by migration can in fact influence the sense of community and social solidarity, which are the main pillars of democratic system welfare.

The research aim of the present study is to study the interconnectedness between the international migration (including the labour migration and asylum migration) and the threats to national security using the example of the European Union. Hence, we can formulate the research question as expressed by the two following research hypotheses:

H1: There is a link between migration-embedded cultures and economic and social prosperity in the receiving countries.
H2: International migration has a significant impact on the country’s security and thence should be treated with special targeted governmental policies and tools.

On the basis of standard measures of social and economic performance, place of residence and inter-marriage, children and grandchildren of the first wave of immigrants are almost completely integrated into the new country’s society. However, recent immigrants and their offspring, combined with other reform groups, also play a major role in the expansion of democracy in the target country society. For example, immigration, in particular clandestine immigration, is higher in the United States than in most other industrial countries, but the underlying dynamics are widespread for almost all industrial companies (Hirschman, Mogford, 2009).

Figure 1. International migration dynamics


One specific groups of migrants in asylum seekers. The case of asylum migration became notoriously known thanks to mass media that monitored the influx of hundreds of thousands of migrants from war-torn Syria seeking refuge in European Union countries, most frequently Germany (Yazgan et al., 2015). The “way of Syrian asylum seekers” became a part of the pop culture and is referred to very often.

Many people tend to think that asylum seekers mean a financial and security burden for the target (or host) country. While the issue of their impact of national security is arguable, many scientists found no proof of the financial burden and negative economic impacts on the host economy. For example, D’Albis et al. (2018) assess the fiscal and economic effects of inflows of asylum seekers into Western Europe with the information in 1985 to 2015 and estimating the macroeconomic consequences of structural shocks and policies. They discovered that inflows of asylum seekers did not deteriorate host nations’ financial performance or fiscal balance because of the increase in spending brought on by asylum seekers is paid for by a rise in tax revenues.

Figure 1 above shows international migration dynamics. The Figure covers the period from 1960 to 2015 and provides the data for several clustered regions of the world. One can clearly see that the largest increase in the total stock of international migrants can be attributed to Europe and Central Asia (with Europan Union countries representing the largest share in this rapid and shart upward slope).
Two interesting cases of migration cultures can be analysed here for better comparison: Turkish migration and Ukrainian migration in the European Union. Both are targeted at the most developed EU countries and both represent valuable examples of distinct migration cultures and possible economic and security threats.

Turkish migration to Europe started in the 1960s with Turkish “guest workers” or “gastarbaiters” being invited by the governments of the Federal Republic of Germany or the Netherlands who faced labour shortages (especially in low-paid manual professions). The Turkish government gladly responded to that call and thousands of Turkish workers started pouring into the EU countries. Within several decades, the Turkish diaspora in the EU has reached about 3-4 million people, most of whom are second-generation EU citizens of Turkish origin. Glazar and Strielkowski (2010), Strielkowski and Glazar (2014), or Sirkeci and Cohen (2016) describe the antagonisms and the conflicts that have been subjected to the issues of migration and integration. The issue of Turkish migration (possible incoming migration flows after the eventual free movement of labour granted to Turkey by the European Union) became the bargaining chip in the decades-long negotiations about Turkish EU accession that has never materialized).

On the other hand, Ukrainian migration in Europe is quite similar to Mexican migration into the United States (a special case, since migration is getting more diverse including the majority of the country involved in it with multiple U.S. destinations getting more dispersed and targeted by Mexican migrants) (see Kandel, Massey, 2002). One would probably agree that Ukrainian migration in the EU (and in some countries where it is particularly abundant, such as Poland, the Czech Republic, Italy, or Spain) signifies a significant occurrence and special implications for the labour market and national security (see Iglicka, Weinar, 2008; Strielkowski, Weyskrabova, 2014; Ambrosetti et al., 2014; Čajka et al., 2014; Ducháč et al., 2015; Strielkowski et al., 2015; or Van Mol et al., 2018). Moreover, Sanderson et al. (2014) focused on the construction sector, because of its significance in the process of new destination creation in the Czech Republic, also found that the Ukrainian migration into the Czech Republic is firmly channelled along occupational lines linking the Ukrainian and Czech construction sectors.

The two examples discussed above are very relevant for the current situation in the EU which should look to facilitate the UK’s exit from the European Union (the so-called “Brexit). In the end, EU has to be skeptical of a policy void after Brexit and the security vacuum it will cause. At the same time, it would need to stay willing and able to cooperate on areas of interest.

Britain and France, in addition to the EU collectively, will need to invest efforts to control the rest of the challenges in the area. Europe is in the midst of a very difficult economic and political situation at the moment. Moreover, it is in the middle of the largest refugee crisis since World War II. Therefore, EU will need to consolidate its approaches to migration and to steady its migration policies in order to deal with the growing number of migrants from the third countries, as well as with the UK citizens who are now residing in the EU countries (according to some estimates, there are about 2-3 million UK citizens in various EU countries at the moment of Brexit).

The processes of globalisation are not new or a recently invented brands, however. Though these forms of support attempt to alleviate a few of the issues related to a scarcity of growth they are often short-term fixes. Thus, while there are numerous kinds of globalisation, one of its most vital aspects is its dependence on free commerce. All of them serve to produce contacts with pieces of the entire world unobserved or normal and a routine part of life.

The racial and cultural composition of contemporary societies have dramatically changed in the last couple of decades since (and thanks to) a result of migration. It is very important to utilise present research structures and tools to encourage the evolution of a research agenda on migration and welfare, along with to find support for the evolution of dedicated research commissions on wellness and migration at multiple levels so as to harness evidence to induce policy-making and programme creation. This approach enables us to isolate the part of the correlation between diversity and monetary growth that’s due to the effect of diversity
4. Results and discussions

Our results show that migration is increasing worldwide, and migrants are increasingly diverse in terms of social and cultural characteristics. New advances in information and transport technology are increasing the number of temporary, repetitive and circular migration.

It appears that globalisation, defined as the spread of cross-border and transnational networks, has changed the context of migration. Globalisation is not only an economic phenomenon: the influx of capital, goods and services cannot happen without a parallel flow of ideas, cultural products and people.

Scientists must focus on the growing importance of migration as key figures for the protection of culture and society in the present, not only by understanding the trends and changes, the consequences and differences in behaviour and experience of migration in the past.

Migration historians also examine the migrant agency in migration processes (such as motivation, networking, impact on structures such as family and state) under certain structural limitations. It is important here that the whole range of migration processes in a given field, including the interaction between all identifiable patterns of migration and their specific socio-economic, demographic and political position.

One very pressing issue that coincides both with migration culture in Europe and its security and economic sustainability is that of refugees and asylum seekers. It appears that not all asylum seekers will end up as refugees granted residence in the EU. It often happens that the terms asylum seeker, refugee and migrant are many times used interchangeably which results in confusion with regard to the status of particular individuals. Those countries which might be in warfare could technically be announced safe in case the war does not undermine each and every region and most of its citizens. They must get a way to move forward in these conditions. Thus, many neighbouring states beyond the EU that do not have the capacity to supply the protection and support required to refugees would be legally made to take asylum seekers back from the European territory.

The worldwide community should make sure about where the genuine crisis is. You could also locate local non-profit organizations in your area which are helping immigrants and also ask their own referrals. Once it seems the EU leaders have started to grapple with the specific situation in a realistic fashion, much damage is already done. Leaders in Germany and other European countries say they are ready to award asylum to valid refugees from countries including Syria, Iraq, or Eritrea. However, they are issuing more rigorous warnings they are going to reject a number of the financial migrants flowing over their boundaries.

The European migration debate is not new, and it can look upon the examples of other nations like the United States, Argentina, or Brazil which always comprised large immigrant populations. Commitment to certain values and ideas is paramount, citizenship in these countries is based not on ethnic grounds, but on another kind of identity. But the nation is defined ethnicity, heritage, and a language. This raises important questions for nations that don’t have long traditions of immigration. How long can an immigrant need to live in Germany becoming a German? Can someone be without speaking French? Should immigrants be forced to take? Indeed, matters are a factor in Europeans reaction to migration.

Fear of immigration stood behind the success of several nationalist or even right-wing political parties in various European Union countries. Some of those politicians or parties used unemployment and crime as their political slogans blaming migration for them. Several subsequent European Union enlargements that started in the 1980 have streamlined internal migration policy in EU Member States. As a result, EU citizens can now move relatively freely across national borders inside the European Union. The Schengen agreement allows this and also ensures the exchange of security information on border violators or extradited third country citizens.

However, even inside the EU itself, Member States carry out inconsistent policies concerning the third country nationals (aka citizens of non-EU nations). The number of immigrants from outside the EU varies with years.
and territories. This implies the fact that unemployment rates caused by the recent financial crisis had the effect of stripping migrants of their immigration status. In most EU countries, including Sweden, Britain, Denmark, or Italy, just to name a few, migration became a central issue in elections. France, a second most important EU economy has also followed suit.

The examples of the above troubling issues are quite numerous: for example, Dutch new Interior Minister proclaimed that he wanted to get rid of the most of the country’s controversial immigration policies. The Interior Minister wants to re-centralize decision making on naturalization in order to keep one policy used for all immigrants. Nevertheless, in 2013, former French Prime Minister Francois Fillon has spoken out against what he believed was an excess of immigrants in France and the financial difficulties and lack of federal cohesion in the country it caused in his opinion. These political steps are against the accepted beliefs that migration brings in young talents, reduces the costs of labour and generally helps the economic growth and development. However, the political side in the EU often outweights the economic (and rational) one. Unfortunately, migration is one of these cases.

Furthermore, there is an issue of sustainable economic and balanced development that migration might ensure. One would probably agree that for sustainability to turn into a reality, humanity should earn a quantum shift in consciousness. It is a broad topic that describes whether a practice can be done indefinitely without harming people or society or the environment in such a way that the practice must be stopped. It is not a passing fad or a marketing gimmick, it is a worldwide movement that is changing the way we do business. It is a great way to improve efficiency. Building sustainability is an increasing industry in many developed nations, like the United States or the European Union. Clearly, without the load of having to manage the menace of terrorism, global financial growth and development might be significantly greater. Sustainable development does not mean raising the whole world as individuals to the identical degree of consumption.

Conclusions

Overall, our results show that the European Union migration policies demands initiative, but inclusion is necessitated by certainty. The government today does not possess a crystal-clear plan of activities in the field of market development or migration policy generally.

We find that the massive migration of people around the world is a characteristic feature of the modern world, and the European Union has long been at the forefront of such a complex, global dynamic. In fact, immigration is a key feature of the way Europeans see their national history and the evolution of European identity - an important part of the history of what it means to be European.

Our research showed that there is interconnectedness between the international migration, labour migration and asylum migration, and the threats to country’s economic and national security in the European Union Member States. Furthermore, it becomes apparent that there is a link between migration-embedded cultures and economic and social prosperity in the receiving countries represented by the EU Member States.

With regard to refugee and immigration policy, it is important to ensure a fair European tax division, while at the same time developing viable solutions through dialogue with the countries of origin, the countries of origin and transit. Security threats combine migration with drug trafficking, but the migration is self-examined, as it can pose public and national security threats.

Internal migration to the EU occurs for a variety of reasons, such as response to political conflicts, environmental or economic pressures, which can create new challenges for the host and target countries. Migration problems are usually investigated according to feedback, as demographic changes, a shortage of natural resources, conflicts or poverty can lead to increasing migratory pressure.

While scientists, civil society groups, governments and international NGOs are studying, hiding and discussing
the movements of millions of people every year, migration in European Union has long and well-studied history that can help formulate healthy policies at local, national and international level. However, as the number of migrants increased, several EU countries began to address certain groups of immigrants as undesirable and, in some cases, threats to social welfare and state security. This is an adverse effect of migration when favourable economic opportunities might be eroded and flowed to specific places because of specific economic conditions.

Migration and welfare policy and priority setting processes need to be directed by multisectoral and interdisciplinary believing as a means to attack the determinants related to the wellbeing of both internal and cross-border migrants. Integration is a procedure that involves social, economic, cultural and mental domains of people’s lives. Worldwide development or development that is worldwide is a broad notion concerning level of development on a global scale. An intriguing method of seeing growth in Third World countries is via modernization. Every development project involves a part of education as development by its very nature demands a shift in how people live.

All in all, we might conclude that international migration comes through as a significant factor for any given country’s security and therefore special care and attention as well as targeted economic, social and welfare policies should be attributed for treating it as such. It is obvious that migration contributes significantly to the trend of urbanisation, as people are looking for better social and economic opportunities and away from the deterioration of the environment. Migration and climate change objectives to be integrated into national development and poverty reduction programmes, including risk reduction and crisis planning, as well as agricultural policies and practices aimed at increasing resistance. Host countries can maximize the potential of migrants by engaging productively, educating, developing opportunities and integrating opportunities into society.

Last but not least, we should remark that it seems important to build upon the unique European culture of migration and use it to tackles the economic and security threats that EU faces today with such serious threats as the impending Brexit that might cause unexpected changes to the geopolitical situation not only at the European continent but also worldwide.

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INNOVATIVE PERFORMANCE AS PRECONDITION OF SUSTAINABLE AND SECURE DEVELOPMENT

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Abstract. The experience of developed countries regarding the peculiarities of investment in innovative projects, in particular the EU, USA, Japan, was analyzed. It has been proved that the strategic predicate of ensuring the country’s economic security is the promotion of a favorable economic and legal, financial and resource-based support for the development of scientific and innovative activity. The tools of activation of innovative activity of organizations and corresponding regulatory mechanisms of influence of the state policy were determined. A system of critiques and factors was developed for the recognition of the innovative activity of subjects of the basic structure of ecology in five groups of types of innovations: social-economic, marketing, market-oriented, government, technical. It was revealed that the main risk factor for the development of innovations, which objectively precedes the institutional-independent activity of economic entities, is to motivate the owners of organizations for their activities. This factor acts on the social and psychological level, since, their application is a key importance, including the fact that their monitoring does not require significant expenditures.

Keywords: economic security; investments; strategic priorities; state policy; innovative activity


JEL Classifications: F52, O39

1. Introduction

Stable and secure economic growth in all sectors of the economy of any country directly depends on the dynamics and the extension level of the innovation sector, knowledge-intensive industries and technologies. Ensuring rapid and dynamic economic development requires an appropriate level of technology; respectively, high-skilled staffing is necessary for the development and implementation of new innovative projects. Highly innovative activities, being precondition of sustainable and secure development, require additional efforts directed to the appropriate protection of scientific, innovative, intellectual and informational property, protection of their infrastructure (Tvaronavičienė 2018). Ensuring sustainable innovation development is one of the goals of the safety of scientific and technological progress and the economic security of enterprises. Innovation security is to ensure a high level of security for sustainable innovation and scientific and technological development of enterprises. The issue of innovation security from the point of view of intellectual property protection, the results of scientific research and industrial designs is extremely urgent since the results of the innovation activities of an enterprise have to be legally and physically from any kinds of infringement (Limba T. Plėta T. Agafonov K. Damkus, M. (2017); Mikhaylov, A.S.; Mikhaylova A.A.; Savchina, O.V. (2018); Korauš, A. Gombár, M. Kelemen, P. Backa, S. (2019).
The state policy in each sphere, and especially in ensuring the development of system-functional complexes aimed at supporting basic economic activities or sectors of the economy, the real sector, should be carefully planned, calculated and implemented in the future in a strictly defined sequence, with the use of appropriate means, tools and mechanisms to achieve intermediate and final goals. This, to a large extent, recognizes its effectiveness and the achievement of targets of state regulation of the economy. Moreover, strategic planning is necessary not only for the setting of a “road map” of reform and the relevant processes, but also for monitoring how reforms in one area will affect the functioning of others, what structural changes will occur in the socio-economic system of the state as a whole and what consequences they will have (Fabuš, M. Csabay, M. (2018); Finogentova, O. Tokarev, V. Petrenko, M. Primak, T. (2018)).

Therefore, a special relevance at the present stage of social and economic development of the state acquires the problem of determining and justifying the strategic priorities of improving investment and innovation to ensure economic security of the national economy, forecasting positive results and their achievements, the impact on the dynamics of the main macroeconomic and social parameters of the functioning and development of the state. At the same time, these guidelines should be consistent with the basic priorities of the state’s economy, especially such as inclusive growth or the focus of economic development results on improving the quality of life of citizens and overcoming social inequality and injustice, building an open competitive economy based on improving the level of technology, ensuring the appropriate level of economic security of the state and its components, diversification and active development of international cooperation, improving the place of the state in the system of international division of labor (Tetiana, H., Karpenko, L., Fedoruk, O., Shevchenko, I., & Drobyazko, S. (2018), Tetiana, H., Chorna M., Karpenko L., Milyavskiy M. & Drobyazko S. (2018), Wu, J., Wang, C., Hong, J., Piperopoulos, P., & Zhuo, S. (2016); Eddelani, O.; El Amrani El Idrissi, N.; Monni, S. (2019); Smaliukiene, R.; Monni, S. (2019)).

It is worth adding that the formation of the state set policy priorities in general should ensure the achievement of a certain generalizing complex effect. It is a general policy objective. Nowadays it is almost axiomatic, and we also adhere to this opinion, there is a thesis of non-alternative innovative way of development in order to ensure the competitiveness of the national economy (Hilorme, T., Nazarenko Inna, Okulicz-Kozaryn, W., Getman, O. & Drobyazko, S. (2018); Prakash, R.; Garg, P. (2019)). The innovation factor and the application of modern and up-to-date technologies become more and more significant factor in the growth of sales and distribution of products on domestic and foreign markets. Nevertheless, we recognize that the innovative activity is based on all-in-one financial and resource-related security. Consequently, the rationalization of its volume and an increase of economic activity of the objective is based on the investment support system.

The aim of the work is the developing methodological and methodical support and practical recommendations for improving the assessment of innovative potential for the formation of an enterprise strategy. To achieve the goal, the following tasks were set and solved: to generalize the methodological approaches to justify the main point of the innovation potential as a background for strategic innovative development of an enterprise; develop the methodological research base, justify the methodological approach and develop a model for evaluating the process of innovative potential; form a scientific basis for dimension and synthesize a method for quantitative assessment of the components of the innovation potential; explore the factors influencing the formation of each group of indicators of the properties of the innovation potential (susceptibility and realization), creating a background for quantitative assessment; develop methodological support for determining the levels of properties of the innovation potential to identify areas of potential benefits and risks of innovation; justify the toolkit for selecting an innovation strategy for the enterprise; to develop measures to improve the assessment of the innovative potential of an enterprise.

The dependence of the formation of the economic security strategy of an enterprise on its ability to perceive innovation and realize it, is required an in-depth theoretical substantiation.

The task of methodological support of a comprehensive assessment of the innovation potential, as a condition for the introduction of innovations in the strategic planning period, which determined the choice of the topic
of a scientific article, determined its logical structure, goal, object, subject and research objectives, is relevant. Based on this, the task of providing methodological support for an integrated assessment of the innovation potential, as a condition for the introduction of innovations in the strategic planning period, becomes relevant, which determined the choice of the topic of a scientific article, determined its logical structure, goal, subject and research objectives.

2. Literature Survey

The third aspect, which is important to take into account in the formulation of the general purpose of public policy in the analyzed area, is the need to ensure a comprehensive impact of increasing volumes (Lazaridis, G. (2016)), as well as the introduction of the innovation results in all spheres of public life, real sector of economy and the phases of the reproductive process for levelling or at least minimizing the negative impact of risks and threats to social and economic development of the country, such as deepening of the recession of the national economy, increasing the economic gap in comparison with other countries, reducing export potential, deepening stagnation in the investment sector, aggravation of the problem of physical and moral depreciation of fixed assets, reducing the domestic market (Zhou, Y., Chow, N., & Xu, Y. (2017), Lee, C. (2017)) Based on the above arguments, the general goal of the state policy is to improve the investment and innovation support of the state’s economic security. We are able to determine the formation of an effectively functioning independent and protected system of investment and innovation support for inclusive growth, realization of the economic potential, stable supply and strengthening of the structural and functional components of the country’s economic security.

The achievement of an appropriate investment and innovation support of economic security includes the achievement of clear goals, including in terms of information transparency, ease of search and attraction of high-tech innovations in all levels of management, institutional and structural changes in the development of the national economy, the formation of intellectual and personnel support for the implementation of investment and innovation. Beside the main purpose of investment and innovative activity, of course, there is another priority task - to go through all the steps from the origination of innovative idea to sales of products to consumer with a high innovativeness content. For example, it should be noted that in the EU countries indirect investment of innovative projects is widespread, and, first and foremost, in the form of institutional platforms for the integration of scientific, research and investment activities, improvement of intellectual and personnel support of investment and innovation activities, as well as management consulting in this area. As for the forms of direct financing sources, the preference is given to venture investment and, in general, to the progress of the investment market. Along with this, the EU innovation went beyond national frames that give you the opportunity to combine the intellectual, technological and financial resources (Collins, A. (2016), Stejskal, J., Mikušová Meričková, B., & Prokop, V. (2016)). For example, in France, innovation policy is aimed at supporting innovative small and medium-sized enterprises, removing restrictions on venture capital investment, promoting cooperation between research institutions, universities and industrial structures. There are more than fifty technical industrial centers, contract research organizations, regional centers of innovation and transfer technology, which are engaged in organization of scientific research in the country (Robson, W. A. (2018)).

In particular, in Japan, the system of management of investment and innovation ensuring economic security of the state and performs the following functions: integration of organizational and resource capabilities of the state for the support of investment and innovation activity, the active role of corporations in supporting the activities of small innovative firms and the formation of high-quality staffing investment and innovation security. Innovation financing is mainly carried out through the Japan Development Bank, the accelerated depreciation schemes are used, so-called “soft” loans for the development of new technologies are given (one-half of interest rates), import of high technology is stimulated, protection of new industries is carried out (Geng, Y., Fujita, T., Park, H. S., Chiu, A. S., & Huisingh, D. (2016), Jan, S. R., Shah, S. T. U., Johar, Z. U., Shah, Y., & Khan, F. (2016)). There is a tradition of gradual innovation “Kaizen” In the country, when enterprises deduct 8,0-10,0% of gross value added for research and development, as a result of the cost of NDR exceeding investment in new equipment (Cavelty, M. D., & Mauer, V. (2016)).
Venture type of financing is widely used among European countries. The highest development of venture financing are in the Great Britain, where Investment Innovation Fund is operated. The Fund’s aim is the investment of technological competitive enterprises, stimulating economic growth and increasing high qualified employees (Pottier, C. (2018)). So, in Finland the technical breakthrough occurred due to the development of the venture state-funded countries for the development of the production. Conditions were created for direct investment in risky investment projects, a state investment company was founded, which invests the proceeds from the privatization of enterprises in the economy by direct investment, including the investment through venture funds. The object of investment is enterprises that are created or operate for a short time in the market. In such projects, the investment company acts as a co-investor, and active participation in such projects is implemented by industrial technologies, biotechnology, services, cellular communication (Mårtensson, K., & Westerberg, K. (2016)).

In Israel, there is a program to support innovative business called “Уozma”, which has two venture funds Yozma I and Yozma II. As a result of the investment of public funds Yozma Group in investment companies that operate in areas of technology, communication and medical fields, the country became one of the leaders in high-tech exports (Ratten, V. (2016)).

To improve the competitiveness of products, ensure its novelty and knowledge-intensive, in foreign countries scientific and industrial parks and technopolises are created. For example, in the EU there are more than a thousand units of technoparks (for example, Cambridge University, UK), in the US there are more than a hundred (in particular – silicon “Valley), more than fifty in China (in particular – Beijing experimental zone of new technologies) (Park, 2016).

3. Methods

The theoretical and methodological bases for the study are: the dialectical method of knowledge, the provisions of modern economic theory, system basic principles of innovation management and economic analysis.

To solve the tasks of the study were used: abstract-logical method - in assessing the innovation potential; analytical - when analyzing the economic basics of innovation, including to define the concept of “assessing the innovative potential of an enterprise on the basis of susceptibility and realization; system and situational analysis - to determine the factors influencing the decision-making regarding the choice of indicators for assessing the innovation potential; matrix modelling method - to determine the levels of properties of the innovation potential and to justify the strategy of the enterprise; correlation and factor analysis - when establishing the functional relationship between the indicators of innovation; expert method - to assess the properties of the components of the innovation potential.

This approach to the identification purpose of public policy in the analyzed field of activity is characterized by a number of features and differences in comparison with the most important targets of innovation and investment development of the country, which are determined by the authorities at the latest stage of the state, and, through this, the advantages and expectations for the best results. In our opinion, such differences are primarily:

firstly, strengthening the efficiency and capacity of subjects and participants of investment and innovation activities (which now in our country do not have the appropriate capabilities and competencies);
secondly, ensuring proper motivation, on the one hand of investors and other subjects of the financial services market, and on the other – the subjects of innovative business and enterprises of basic economic activities in relation to the production and active implementation of the results of investment activities;
thirdly, the creation of institutional infrastructure (in particular clusters, technical and implementation zones, various kinds of investment and innovation “platforms”) to support and implement investment and innovation projects by all participants in this process;
fourthly, awareness of the advantages and formation of investment and innovation support of the national economy as a system that allows you to establish effective and quality interaction of all subjects of this process,
to create an environment of irreversibility factors of activation and implementation of the results of investment and innovation;

fifthly, the focus of investment and innovation activities is not so much on development, but on ensuring the economic security of the national economy, which means the highest priority of using the achievements of investment and innovation in the basic (the most important in terms of the formation of conditions of competitiveness of the economy) economic activities, in order to strengthen export potential, protection of strategically important economic activities and business entities, sustainable, economically safe and sustainable development of the territories of the state.

Strategically, the activities should be carried out in parallel in the following areas: the formation of investment potential for the development and modernization of the national economy and the activation of innovation, increasing the use of its results in the real sector. But, we emphasize that this should not be separated from each other directions, but, on the contrary, – to develop in concert. It is appropriate to identify the common economic interests of the subjects of the system of innovation and investment support of the economy.

It is clear that on the part of the educational and research sector, venture capital organizations-a large number of orders and a high effective demand for research by business entities of the real sector of the national economy. For the subjects of the investment sector – promising profitable projects the investment in investment attractive, financially and economically effective projects, territorial economic complexes.

4. Results

However, the scale of such interests, their innovative specialization and strategies for further development, time guidelines, resource and infrastructure support should be defined and balanced now. The appropriate balance sheet and its structural characteristics should be guaranteed in the following time periods.

As a result of implementation of this toolkit, it is aptly to determine the creation of a national database with information on prepared and implemented investment and innovation projects, research and development work. Along with this, a separate aspect of the proper development of investment and innovation security of the state economic security should determine the coordination of national, regional and local investment innovation policy, improving the efficiency of existing tools and the formation of new (improved) ones for investment and innovation development at the local level (Chen, H. (2017)).

However, in the practice of economically developed countries, this component plays one of the decisive roles. In fact, its activities are aimed at strengthening the action of certain factors that are not a manifestation of the implementation of the actions of clearly defined entities are regulated by legislative norms, but are perceived in a certain environment and encourage its subjects to certain actions, even if not spelled out in one regulatory act. These factors operate at the social and psychological level, therefore, their introduction is very important, including the fact that their control does not require significant costs.

International experience has proven and confirmed that these measures should focus on improving the investment and financial ability of business entities to support the technical and technological modernization of their own production facilities, reducing the tax burden on micro, small and medium-sized innovative and technologically active organizations. As for the tools for this matter, we define the following measures of the targeted impact:

- providing small business entities, as well as residents of technical and implementation special economic zones and technoparks with additional benefits for mandatory social payments;
- direction of tax advantages on the formation of investment support for the introduction of all types of innovations (social and economic, marketing, technological, managerial, technological, technical, etc);
- creation of a favorable tax regime for venture investment;
- provision of tax benefits on mandatory social payments for engineering business and business in the field of
information technology.

The structure of the innovative potential of an industrial enterprise is determined by determining the features of the susceptibility (S) and realizability (R) and the indicators of their estimation (S_i and R_i).

We recognize susceptibility and feasibility as the main properties of the innovation potential. Nowadays, in most studies, innovation potential is considered as an integral object, for example, a low or high innovation potential on properties and their components.

The properties of the enterprise’s innovation potential (susceptibility and feasibility) are rather difficult to measure directly because they are some of the scrolls of signs or indicators, while the latter can be quantified. So, to make measurements, it is necessary to find out which values these indicators can acquire and which scales correspond to them. Therefore, one of the objectives of the research is to add the character of the ordinal or interval scale to the estimated innovation potential, that is, to move to more developed scales regarding the measurement of innovative potential, which will give more meaning to the concept of innovative potential.

Table 1 contains elements of the structure of the innovative potential of an industrial enterprise, implemented through a system of key indicators. The list of these components was developed on the basis of a survey of experts made by managers and business managers. The authors of the research developed worksheets and asked to answer the questions of experts. For the purpose of the study, the experts were selected based on the consideration that the highest degree of awareness in the question under study is held by the top and middle enterprises managers. As experts, we selected 10 officials from different control links of the management of enterprises: Private Partnership «Krivoy Rog Iron Ore Plant; Limited Partnership «SPETSRESURSY»; Limited Partnership «Metinvest» - Krivoy Rog mechanical-repair plant.

Table 1. Specification of the structure of the features of the innovative potential of an industrial enterprise and the indicators of their evaluation (author’s development)

<table>
<thead>
<tr>
<th>Item No.</th>
<th>Ingredients</th>
<th>Designation of indicators</th>
<th>Table of contents of evaluation indicators</th>
<th>Measurement scale</th>
<th>Value range</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Personnel component (s_k)</td>
<td>X_{Sk1}</td>
<td>The share of engaged in study and development in the total number of personnel of the enterprise</td>
<td>ratio</td>
<td>[0,1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X_{Sk2}</td>
<td>Highly qualified personnel reserve - the share of highly qualified personnel in the total personnel of the enterprise</td>
<td>ratio</td>
<td>[0,1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X_{Sk3}</td>
<td>The wage level of scientific and technical specialists - the ratio of the volume of the wage fund of specialists engaged in innovative activities to the volume of the wage fund of all employees</td>
<td>ratio</td>
<td>[0,1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X_{Sk4}</td>
<td>The total number of innovative ideas put forward by employees of the company during the last periods</td>
<td>order</td>
<td>[0,1, ..., k]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X_{Sk5}</td>
<td>Labor productivity index - the ratio of the average output per worker to the maximum achieved output in the industry or group of enterprises</td>
<td>ratio</td>
<td>[0,1]</td>
</tr>
<tr>
<td>2</td>
<td>Information component (s_in)</td>
<td>X_{Sin1}</td>
<td>The ratio of expenditures on information activities to the total expenditure of the enterprise for the year</td>
<td>ratio</td>
<td>[0,1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X_{Sin2}</td>
<td>The ratio of the number of personnel engaged in information activities in the total personnel</td>
<td>ratio</td>
<td>[0,1]</td>
</tr>
<tr>
<td>3</td>
<td>Organizational component (s_o)</td>
<td>X_{So1}</td>
<td>The level of maturity of the enterprise</td>
<td>ordinal</td>
<td>[1, 2, 3, 4, 5]</td>
</tr>
<tr>
<td>4</td>
<td>Motivational component (s_m)</td>
<td>X_{Sm1}</td>
<td>The ratio of the average salary of personnel engaged in innovation in the enterprise, to the maximum achieved in the industry or group of enterprises</td>
<td>ratio</td>
<td>[0,1]</td>
</tr>
<tr>
<td></td>
<td></td>
<td>X_{Sm2}</td>
<td>The ratio of the amount of bonus payments for the ideas presented, innovation proposals, new solutions to the total amount of bonus payments for the company in recent years</td>
<td>ratio</td>
<td>[0,1]</td>
</tr>
</tbody>
</table>
This made it possible to improve the efficiency of the evaluation and its practical value. Quantitative and qualitative indicators are presented in the proposed list of indicators. The quantitative indicator can be assessed in kind or in value terms. The determination of the values of quality indicators, expressed in points, was also made on the basis of expert evaluation.

The third stage: obtaining the values of individual features used for the economic evaluation of the innovation potential of the enterprise \( s_i \) and \( r_i \).

In the fourth stage, the information is converted into another scale if the values obtained \( s_i \) and \( r_i \) are not values of the ordinal scale of the type \([1, \ldots, 5]\).

If \( 0 \leq s_i \leq \frac{k}{5} \), then \( s_i = 1 \); if \( \frac{k}{5} < s_i \leq \frac{2k}{5} \), then \( s_i = 2 \);

if \( \frac{2k}{5} < s_i \leq \frac{3k}{5} \), then \( s_i = 3 \); if \( \frac{3k}{5} < s_i \leq \frac{4k}{5} \), then \( s_i = 4 \);

if \( \frac{4k}{5} < s_i \leq k \), then \( s_i = 5 \); if \( 0 \leq r_i \leq \frac{k}{5} \), then \( r_i = 1 \);

if \( \frac{k}{5} < r_i \leq \frac{2k}{5} \), then \( r_i = 2 \); if \( \frac{2k}{5} < r_i \leq \frac{3k}{5} \), then \( r_i = 3 \);

if \( \frac{3k}{5} < r_i \leq \frac{4k}{5} \), then \( r_i = 4 \); if \( \frac{4k}{5} < r_i \leq k \), then \( r_i = 5 \).

The selection of threshold values for dividing a range into intervals was carried out by an expert using unequal intervals. The fifth stage: evaluation of the significance of features with their constituent elements of susceptibility \( S \) and realizability \( R \) and indicators of their evaluation \( s_i \) and \( r_i \) are assigned specific weight. To determine the resulting ranking, the use of the Kemeny median is recommended, and to determine the coefficients of comparative importance, it is recommended to use the arithmetic average taking into account
the statistical values corresponding to the gradations of the Harrington scale. In determining the coefficients of comparative importance of indicators characterizing the innovative potential of an enterprise, the results of both data processing methods are taken into account. At this stage, the preliminary ranking ends. The results of the evaluation of the components and their indicators in terms of their significance for calculating the potential are given in Table 2.

Table 2. The specific weight of features, components and their indicators in the structure of the innovative potential of the enterprise (author’s development)

<table>
<thead>
<tr>
<th>Components of innovative potential</th>
<th>Weight of component</th>
<th>Designation of evaluation indicators</th>
<th>Weight of indicator</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Susceptibility of innovative potential (S)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Personnel component (sₖ)</td>
<td>0,4</td>
<td>Xₛₖ₁</td>
<td>0,2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xₛₖ₂</td>
<td>0,1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xₛₖ₃</td>
<td>0,2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xₛₖ₄</td>
<td>0,3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xₛₖ₅</td>
<td>0,2</td>
</tr>
<tr>
<td><strong>Total weight of the evaluation indicators</strong></td>
<td></td>
<td></td>
<td>1,0</td>
</tr>
<tr>
<td>Information component (sᵢₐ)</td>
<td>0,2</td>
<td>Xₛᵢₐ₁</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xₛᵢₐ₂</td>
<td>0,6</td>
</tr>
<tr>
<td><strong>Total weight of the evaluation indicators</strong></td>
<td></td>
<td></td>
<td>1,0</td>
</tr>
<tr>
<td>Organizational component (sₒ)</td>
<td>0,2</td>
<td>Xₛₒ₁</td>
<td>1,0</td>
</tr>
<tr>
<td>Motivational component (sₘ)</td>
<td>0,2</td>
<td>Xₛₘ₁</td>
<td>0,3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xₛₘ₂</td>
<td>0,7</td>
</tr>
<tr>
<td><strong>Total weight of the susceptibility components</strong></td>
<td></td>
<td></td>
<td>1,0</td>
</tr>
<tr>
<td><strong>Realizability of innovation potential (R)</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Financial component (rᵢ)</td>
<td>0,4</td>
<td>Xᵣᵢ₁</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xᵣᵢ₂</td>
<td>0,1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xᵣᵢ₃</td>
<td>0,25</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xᵣᵢ₄</td>
<td>0,25</td>
</tr>
<tr>
<td><strong>Total weight of the evaluation indicators</strong></td>
<td></td>
<td></td>
<td>1,0</td>
</tr>
<tr>
<td>Material and technical component (rᵣ)</td>
<td>0,2</td>
<td>Xᵣᵣ₁</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xᵣᵣ₂</td>
<td>0,4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xᵣᵣ₃</td>
<td>0,2</td>
</tr>
<tr>
<td><strong>Total weight of the evaluation indicators</strong></td>
<td></td>
<td></td>
<td>1,0</td>
</tr>
<tr>
<td>Market component (rᵣ)</td>
<td>0,4</td>
<td>Xᵣᵣ₁</td>
<td>0,3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Xᵣᵣ₂</td>
<td>0,15</td>
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<td></td>
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<td></td>
<td></td>
<td>Xᵣᵣ₅</td>
<td>0,2</td>
</tr>
<tr>
<td><strong>Total weight of the realizability components</strong></td>
<td></td>
<td></td>
<td>1,0</td>
</tr>
</tbody>
</table>

So, in the course of study, the system of elements of the internal composition of the features of the innovation potential and the indicators for their evaluation was further developed, which, unlike the existing systems, allows the analyst to apply one or several methods for assessing the level of innovation potential in the complex (linear convolution, matrix, graphics, the method of qualitative assessments).

Regarding the spread of market models for the development of innovation infrastructure, that is about the positive world experience in the functioning of innovation centers, science and technology parks and other technopark
structures. For these entities to have their own market incentives for the creation and further functioning, it is necessary to create a favorable economic and legal environment for these processes. That is about the presence of sufficient volumes of the state order for their services, tax and other benefits and preferences, staffing and etc.

Effective state policy in this area should, of course, focus on stimulating the growth of investment and innovation activity of the subjects of the real economy sector, but also take into account the importance and priority of both sources of attracting investment resources for these purposes, and directions of development of innovative activity. That is a rational use of the state support resource and its direction for the implementation of projects with the highest level of investment and innovation attractiveness.

Table 3 presents the types of innovation selected for the survey and the corresponding indicators of innovation activity assessment.

Table 3. Criteria and indicators of evaluation of innovation activity of the real sector of the economy

<table>
<thead>
<tr>
<th>Criteria (types of innovation)</th>
<th>Evaluation indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>Socio-economic</td>
<td>The share of innovation due to the effective use of intellectual, human resources and capital of organizations</td>
</tr>
<tr>
<td></td>
<td>Level of direct and indirect motivation of personnel for the intellectual creative activity</td>
</tr>
<tr>
<td></td>
<td>Implementation of innovations that improve the quality of life</td>
</tr>
<tr>
<td></td>
<td>The level of innovations implementation aimed at reducing the cost of goods (works, services)</td>
</tr>
<tr>
<td>Marketing</td>
<td>Diversification of forms and methods of sale goods stimulation (provision of services)</td>
</tr>
<tr>
<td></td>
<td>The level of information and analytical support for the promotion of innovative products (works, services)</td>
</tr>
<tr>
<td></td>
<td>Introduction of innovations in market research and segmentation</td>
</tr>
<tr>
<td></td>
<td>Innovativeness of payment systems for goods (works, services)</td>
</tr>
<tr>
<td>Market</td>
<td>Influence of investment activity on changes in purchasing power of the population</td>
</tr>
<tr>
<td></td>
<td>Measure of functional integration of business in the sector of investment and innovation</td>
</tr>
<tr>
<td></td>
<td>Influence on the formation of new markets or their segments</td>
</tr>
<tr>
<td>Managerial</td>
<td>Formation of internal organizational and management system of innovation development</td>
</tr>
<tr>
<td></td>
<td>Implementation of innovative approaches to business management and development</td>
</tr>
<tr>
<td></td>
<td>Availability of internal financial and resource support of innovative activity</td>
</tr>
<tr>
<td></td>
<td>Formation of the internal infrastructure of innovation and its integration into the external system of investment and innovation</td>
</tr>
<tr>
<td></td>
<td>The prevalence of innovations in the system of information and analytical support of business</td>
</tr>
<tr>
<td>Technological</td>
<td>Business process modernisation</td>
</tr>
<tr>
<td></td>
<td>Active implementation of new technological solutions in the promotion of goods (services)</td>
</tr>
<tr>
<td></td>
<td>Level of implementation of new production methods</td>
</tr>
<tr>
<td></td>
<td>Availability of security documents for intellectual property objects in relation to new technologies</td>
</tr>
<tr>
<td></td>
<td>Level of modernity of applied technologies</td>
</tr>
</tbody>
</table>

We emphasize that these results are obtained empirically using the method of the main components, the method of which replaces the expert assessment and, accordingly, this data indicates the highest dependence of the efficiency of the state policy of investment and innovation formation to ensure economic security of the national economy on the types of innovation with the highest levels of importance. This does not deny the importance of other types of innovation. However, the creation and promotion of innovative products, which have fundamentally new and better quality characteristics, is much more important to ensure the proper efficiency of investment and innovation. This is also confirmed by the close correlation between the declining in investment and innovation activity and the share of sold innovative products.

The authors are convinced that the orientation of innovation in various fields of entrepreneurship provides progressive changes not only in the production and marketing of innovative products, but also in technologies (the use of new technologies and means of production), organizational processes (new methods and forms of
organization of all activities of companies and other elements of social production), the economy (new methods and functions of economic management through forecasting and planning, efficiency evaluation), social (new forms of human factor activation) and legal (modern advanced approaches to institutional, legal, institutional and organizational support for financial and economic activities of economic entities) spheres. And, accordingly, all these factors have a positive effect of strengthening the competitiveness of products and enterprises, increasing the efficiency of their management, readiness to respond to external and internal challenges, risks and threats and, accordingly, strengthening economic security. Moreover, it is in ensuring economic security that innovation activity is essential as a purposeful activity to create, introduce into production and promote product, technological, organizational, managerial and other innovations to the market.

5. Discussion

Since the objective of our study is to determine the nature (and, accordingly, the weight of the impact) of investments and innovations in the system of national economic security, on the one hand, it somewhat limits the approaches described above, and on the other - imposes additional functions. Regarding restrictions, in this area, it is the purpose and aims of investment and innovation. And in the field of security it is an ensuring a sufficient level of competitiveness of products (goods, works, services), creating conditions for economic self-sufficiency, prerequisites for development, strengthening economic stability and viability of enterprises.

As for the features, these are the tasks that need to be implemented to ensure the product, financial, technical, technological, organizational and other components of economic security for economic entities.

In our opinion, the volume and effectiveness of research activities carried out by the organizations of the national economic complex and there are the non-alternative conditions for the proper restoration and long-term retention of their competitive positions in the foreign and domestic markets. Innovations give an opportunity to carry out financial and economic activity in a new and more rational, perfect way, to increase administrative and organizational, economic aspects of its efficiency, to modernize technical and technological base and business processes, to create better and more unique products. As the authors admit, the systemic risks and threats objectively hinder the investment and innovation activity of the country’s economic entities, affecting mainly the motivation of the heads of organizations to such activities. However, attention is also required by another group of risks and threats that directly hinder the organization and implementation of investment and innovation activities.

These are the so-called process risks and threats that affect all stages of its business processes, that is, decision-making regarding the implementation of investments and innovations, planning of such activities, determining their scope and sources of financing, organization of cooperation with the subjects of investment and research, innovation sectors, preservation and protection of investment and innovation activities’ results, their commercialization, use and economic effect.

According to this classification of threats, first of all, we pay attention to the resource and psychological prerequisites of investment and innovation activity. Thus, at the present stage of development of the national economy there is quite a significant human and institutional capacity of educational and research activities, which is positive in view of the initiation by the subjects of the real sector of measures to create and implement innovations. Note that the achievement of this actually needs the above-mentioned diversification of innovative activity of enterprises by types of its results.

Conclusions

Thus, based on the identification of innovation and the implementation areas of the objectives of investment and innovation, as well as the structuring of the security component can be argued about the complexity and importance of the task within the framework of the state policy on the formation of investment and innovation to ensure economic security of the national economy. From this, we note that most of the functional components of the security of economic entities that form investment and innovation activity, has a positive impact on
strengthening the economic component of the security of the state, primarily macroeconomic, industrial, financial, investment, scientific and technical, foreign trade, energy, environmental protection.

Accordingly, there is every reason to state and recognize an extremely important and establishing role of investment and innovation support in the system of economic security of the each state’s national economy. However, its implementation requires an effective and balanced state policy.

It is concluded that given the limitations of public and private resources, government support for investment processes and specialization of innovation should be selective and directed primarily to attract high-quality investment resources and its effective use, as well as to stimulate innovative activities with a high level of priority. In order to identify such areas, an expert sociological survey of managers and specialists of the real sector of domestic economy was conducted. The higher priority of commodity, technological, technical and marketing innovations has been established, to stimulate of which it is appropriate to attract investment resources from such sources as internal investment opportunities at own subjects expense of the real economy sector, accumulation of investment resources of integrated economic systems, subjects of the financial services market, investment state and budget support, external financial and investment resources.

References


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