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NEW MODELS OF SECURITY ANALYTICS

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Abstract: *Security analytics is primarily a practical activity of specialized services within the national security system (army, police, security services), which aims to obtain relatively true information about a specific security problem. In practice, security analytics takes place within a process that is termed the intelligence cycle. Although more or less different, services that use security analytics have a similar approach, focusing on analytics procedures. In recent times, security analytics in the world and partly in our country is taking on the character of a practical activity based on science.*

This paper is an attempt to approach security analytics from a scientific point of view. That is, to establish a general theoretical model of security analytics, which could be applied in practice. The essence of this new model of analytics is in its establishment in three spheres: doctrine; tactics, techniques and procedures and standards. These three spheres permeate the modern notion of security, ie its sectors: political, military (common security), economic, social and environmental. Thus, the security analytics model is, in fact, a matrix in which the rows are the security sectors and the columns are the analytics spheres.

Keywords: *Security analytics, model, spheres, sectors.*

INTRODUCTION

Security analytics is a relatively new concept in the theory and practice of the national security system of the Republic of Serbia. This term appears more in theory than in practice. In practice, primarily in the army and the police, there are the terms intelligence, intelligence analytics, criminal activity, criminal intelligence, criminal intelligence analytics, forensic analytics, and others. The theory tries to unite these practical forms of analytics in the army and police into one - *security analytics*.

Security analytics, as a unified term, in our theory and practice is understood, primarily, as a practical activity, or a practical activity based on science. In doing so, that analytics is established within a process called the *intelligence cycle*. Although there are minor differences in the understanding of the intelligence cycle in the army and the police, the approach is similar, in terms of its phases, ie steps. Also, in practice, the procedures for the analytical work of state organs within the intelligence cycle, as well as the analytics itself.

Where is the problem?

The problem, from a scientific point of view, is the unification of security analytics, which, in addition to the established procedures of analysts, would have a theoretically fundamental basis on which, on the one hand, the standard and standardization of the process, on the other hand. Theoretical elaboration of the mentioned problem is the subject of this paper.

1. CURRENT STATE

We have stated that the term *security analytics,* in our country, is used only in theory, while in practice the terms exists: 1) in the army - intelligence analytics and 2) in the police – criminalistic intelligence (KOR), criminalistic intelligence analytics (KOA) , criminalistic-analytical activity, criminalistic analytics and criminalistic-intelligence affairs (KOP). In what follows, except when it is necessary to state it differently, we use the term security analytics.

One of the definitions of analytics was given by Slavomir Milosavljevic, who says: "Analytics is primarily an intellectual, organized, systematic, targeted and purposeful activity aimed at gaining relatively true, relatively accurate and usable knowledge about mostly current events in various areas of human and social life" (Danilovic, Milosavljevic, 2008: 10). In that sense, "security analytics is a special type of analytics that is performed in various organizations and security services" (Termiz, Milosavljevic, 2008: 341).

In work practice of analytical organs in military and police definitions are appeared as:

- *Intelligence activity* - activity of intelligence and military intelligence services, institutions and bodies for the needs of state, political and military leadership. It includes planning, collecting, checking, **analyzing**, selecting and submitting processed data for use (Vojni leksikon, 1981: 336);
- *Criminalistic-intelligence work* - KOR is a dynamic activity, which implies a high degree of success and dependence of phases in the entire chain. KOR can be viewed as a process that has three key parts or phases: (1) collection of criminalistic intelligence, (2) processing of criminalistic intelligence and (3) use of criminalistic intelligence (Boskovic, Matijevic, 2007: 10) ;
- A simple determinant refers to KOR as a systematic procedure in order to collect information, classify and analyze it with the aim of planning police activities and allocating resources available to the police (Fatic, Korac, Bulatovic, 2013: 7);
- Under the name criminalistic-analytical activity, Manojlovic says that it is easiest to explain it through the work done by a criminalistic analyst, which includes: (1) observing a criminal phenomenon, activity, organization, crime

and participants in criminal activities, (2) observing criminal environment and participants, (3) require the application of operational techniques, (4) collect, (5) describe, (6) define, (7) check, (8) classify, (9) measure, (10) explain, (11) predict, (12) experiment, (13) generalize, (14) analyze, (15) evaluate, and (16) disseminate information, data, and analytical information relating to criminal activities, crime, and perpetrators. Manojlovic groups all these tasks of criminal analysts in several phases: 1) gathering knowledge, 2) describing the collected knowledge, 3) classifying the collected and described knowledge, 4) defining the collected knowledge, 5) explaining the collected data, 6) checking the collected knowledge and 7) criminalistic-analytical prediction (Manojlovic, 2008: 183-184);

- Criminalistic-intelligence activities (KOP) include: 1) planning, 2) collection, 3) processing and analysis of data and information on crime and other security-threatening phenomena, on the basis of which 4) criminal-intelligence information / products are produced and 5) delivered to users (strategic and operational groups for leadership and management and operational units of the police) (Police Intelligence Model, 2017: 40).

Analyzing all the above definitions, Professor Forca concludes that, in essence, it is about security analytics, but by different subjects of the security system. Starting from the definition of analytics given by Milosavljevic, as well as the role, tasks and competencies of the subjects of the national security system, Professor Forca derived a preliminary definition of security analytics: "Security analytics is a special type of analytics which, by applying effective methods, acquires relatively true knowledge from various sources about security phenomena, necessary for the work of the subjects of the security system."(Forca, Anocic, 2018: 20).

1.1. Intelligence cycle

All previous definitions, although quite similar, but still different, indicate that analytics (intelligence, criminal…) takes place within one cycle, which is called the *intelligence cycle*. Although there are different views in theory on the structure of this cycle, in principle, it consists of four phases (Figure 1).

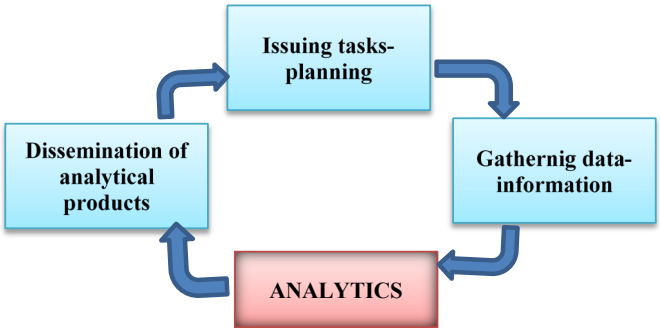

Figure 1: Intelligence cycle (Source: Forca, Božidar, 2016)

Although all phases of the intelligence cycle are important, we will only focus at the key phase - *analytics*, as seen by domestic and foreign theory and practice.

1.2. Analytics as a phase of intelligence cycle

In the military, analytics, as a phase of the intelligence cycle, is operationalized into several groups of activities, which in a general sense can be grouped into three phases (Table 1).

Table 1: Phases of security analytics

	PROCESSING OF INPUT DATA	TABLE OF INDICATORS AND WARNINGS	MAKING OF INTELLIGENCE-ANALYTICAL PRODUCTS
SECURITY ANALYTICS	Assessment of source reliability and data accuracy Sorting and comparing data Assignment of identity number and stacking in databases-information	Working document in which analysts, given their character and activity, on various issues of the data collection plan show their possession and character (no danger, dangerous and no data)	The last phase in which intelligence-analytical works are made on the basis of the conducted analytical procedure, using various methods

(**Source:** Forca Božidar, Anocic Branislav, 2018: 122-136)

Within the third phase - analytics, various methods and techniques exist and are applied depending on the character of the intelligence-analytical work. *Explanatory analytical documents* are suitable for production using the following types of methods: qualitative (document analysis, conversation analysis, and other methods

of content analysis); comparative; quantitative (statistical methods, surveys, tests). *Estimation (predictive) analyzes* require a large number of special methodological procedures that are used in scientific research in order to draw conclusions about the outcome of a process or phenomenon. All methods that can be applied in the process of preparing predictive analytical documents fall into one of the following three categories of general logical methods: induction; deduction; abduction (Forca, Anocic, 2018: 134).

If, on the other hand, we enter the sphere of police work, that is, criminalistic-intelligence work or criminalistic (criminalistic-intelligence) analytics, then we can notice several different approaches, of which we single out two.

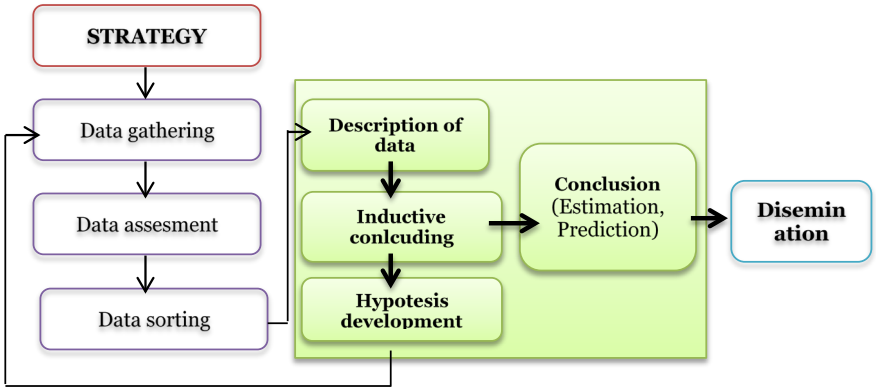

Figure 2: ANACAPA metod in criminalistic analyitcs (**Source:** Manojlovc Dragan, 2008)

Another approach to criminalistic intelligence analytics emerged in the process of introducing the Police Intelligence Model (POM) in Serbia. "*Criminalistic analysis* is procedurally and methodologically the most complex function of criminal intelligence, which collects and processes data and information, combines, structures, evaluates and interprets, on the basis of which relevant conclusions are made and recommendations necessary for making decisions to undertake operational and police activities. . The term criminal analysis (KA) has the same meaning as the term criminalistic intelligence analysis (KOA), which is equally used within the concept of POM "(*Police - Intelligence Model*, 2017: 50) (Figure 3).

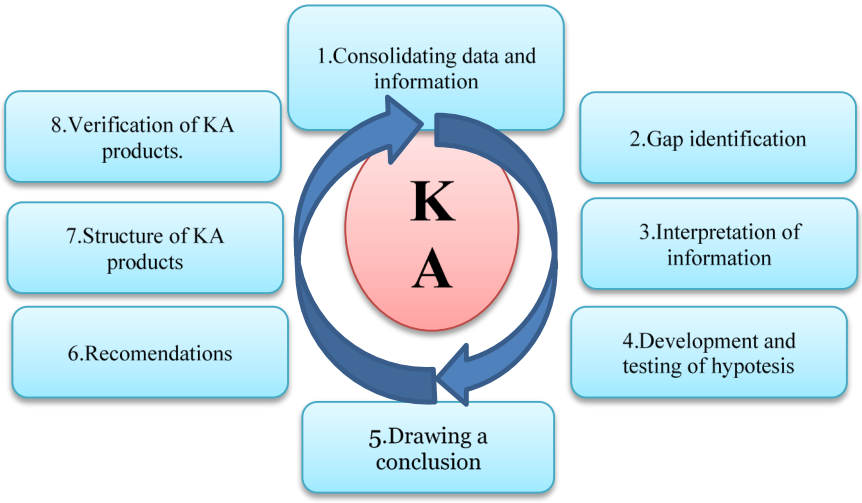

Figure 3. Police - Intelligence Model, 2017: 50

In a special document - Police-Intelligence Model, (Manual), all phases of criminal analytics are described in detail, as well as the actions of analysts, which is not the subject of this paper.

Figure 3 shows the process of criminal analysis (analytics) applied in the police in Serbia, is similar to the process applied in the Ministry of Interior of the Republic of Croatia (Figure 4), and in essence, is taken from the experience of the US Police - New York Training, 2011: 29).

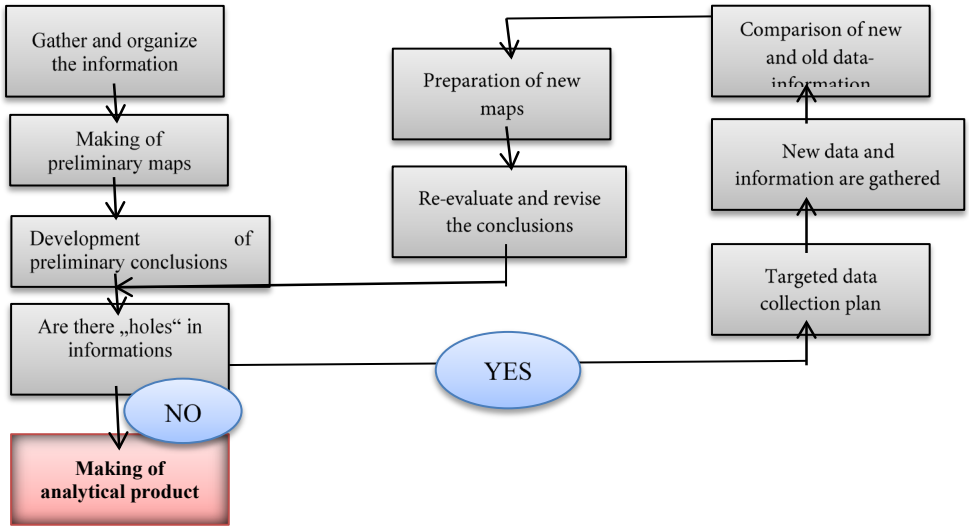

Figure 4. Detailed overview of the analytical process (Source: Kralj Robert, 2019:55)

In intelligence, and especially criminalistic analytics, both domestic and especially foreign, there are very detailed and meaningful descriptions of the requirements that a person must meet in order to deal with security analytics (Table 2).

Table 2. A comparison of the characteristics of security analysts

AUTHOR	ABILITIES, SKILLS, ATTRIBUTES, CHARACTERISTICS	ENVIRONMENT
(Clauser, 2008; Clauser & Weir, 1976)	Characteristics: reasoning ability, accuracy, intellectual honesty, openness, skepticism, separation, patience, diligence, perseverance, imagination	National security
(Katter et al., 1979)	Characteristics: Understanding of complex conceptual models, generation of conceptual models, knowledge, memory, mental flexibility	Military
(Fischl & Gilbert, 1983)	Attributes: High level of reasoning ability, inductive reasoning, intellectual flexibility, writing skills, memory, intellectual curiosity, intentionality, interpersonal skills, motivation for achievement, self-discipline, perseverance	Defence
(Schneider, 1995)	Attributes: intellectual curiosity, memory, rapid assimilation of information, perseverance, judgment making characteristics: wide range of interests, developed research ability, experience, initiative self-management, disciplined, intellectual courage skills: writing skills, oral communication skills	Law enforcement
(Wing, 2000)	Characteristics: knowledge, foresight, curiosity, innovation, determination, intuition, logic, imagination, inspiration	Military
(Wolfberg, 2003)	Attributes: Innovation, synthesis, learning, testing, pattern recognition, uncertainty adjustment, visual thinking, experimentation, metaphors, nonlinear systematic thinking	National security
(Moore, Krizan, & Moore, 2005)	Abilities: communication, cooperation, thinking Characteristics: insatiably curious, self-motivated, fascinated by puzzles, exposed to "aha" thinking, greedily observes, reads voraciously, takes changeable perspectives, creates creative connections, playful, sense of humor, sense of wonder, intensely concentrates,	National Security

	Knowledge: goal, community, policy, customer, resource skills: critical thinking, literacy, computer literacy, foreign language, research, information gathering manipulation, project management, visualization	
Allen, D. M. (2008).	Attributes: Order of information, pattern recognition, reasoning Skills: Technical expertise, target knowledge, analytical techniques of search and organizational skills, ability to synthesize data, inductive reasoning, expression of ideas	Defence
(Quarmby & Young, 2010)	Attributes: Communication, cooperation, critical thinking, Skills: creativity, expertise, process expertise, disciplinary expertise, generic knowledge	Compliance and management
(Richards, 2010)	Skills: Critical thinking, creativity, reasoning, communication	National security
(Evans & Kebbell, 2011)	Attributes: thinking, communication	Law enforcement
Corkill, (UnPub)	Attributes: Ability to diagnose and contextualize problems, communication, self-awareness	Law enforcement

(**Source:** J.D.Corkill, T.K. Cunow, E. Ashton, & A. East, 2015)

2. THEORETICAL MODEL OF SECURITY ANALYTICS

In order to shape the aforementioned analytical processes into a single theoretical model called security analytics, we started from three points of view. First, as Milosavljevic and Forca say, that the analytical product is new knowledge, that is cognition which was reached through analytical work. Second, that security, as a term, has long been extended from a purely military aspect to other sectors, such as political, economic, societal (social), and environmental (See: Buzan, 1983). Third, that in modern conditions there is an increasing emphasis on standards and standardization of processes, as a way of optimizing them.

2.1. Analytical product as knowledge-cognition

In the previous text, in essence, we have presented only one part of the analytics process, ie the work of analytical bodies. However, this process, in the application of the IDF methodology, looks like in the figure 4.

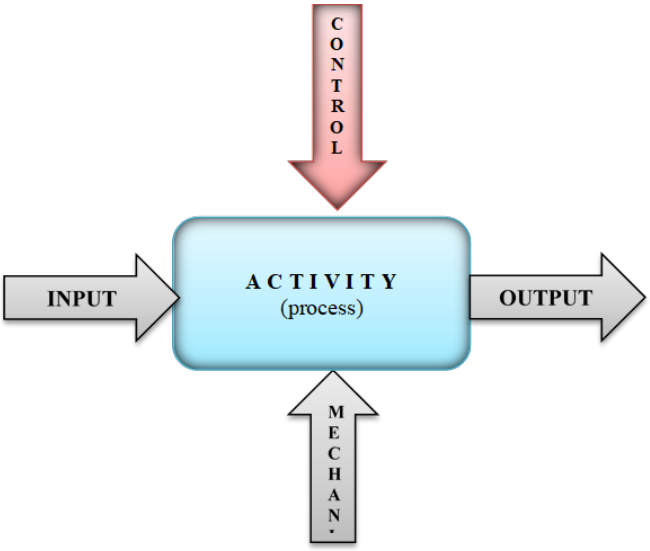

Figure 4. Basic concept of IDF methodology (Source: Forca Božidar, 2003:245)

Thus, (Figure 4), the input to the process (activity) of analytics is data and information. Exit from the process (activity) is intelligence information, ie input data and information converted into an intelligence-analytical product. The mechanisms of analysts' work are the methods, techniques and standards used in analytics. We are interested in CONTROL, on which the analytics process is based.

The control on which the analytical process is based is the total knowledge (cognition) about the subject matter. So, it is cognition that reaches into the sphere of security, ie a specific security phenomenon that is subjected to analytics, as well as cognition about the methods and techniques used in the work of analysts.

Cognition is a product of the process of cognition. Learning is a process that can take place in many ways. According to the theory of logic, cognition can be common sense and scientific. Common sense knowledge is based on sensory experience and spontaneous rational reasoning in which elementary logic is present but not brought to consciousness, it is not "learned from books". Scientific knowledge is characterized by greater criticism and systematicity. Example: sensory experience can deceive us. Observing the Sun and the stars, we experience with our senses the illusion that they revolve around the Earth, when in fact the Earth revolves around them. Using various instruments, we discover that celestial bodies, especially planets and moons, are significantly different than they look to the naked eye. It takes the accumulated experience of many generations, it takes a whole technology of observation and experimentation in order to overcome the initial misconceptions of common sense

knowledge and reach scientific knowledge. It is a natural way in which science develops (Forca, Anocic, 2018: 14).

According to Danilovic and Milosavljevic, cognition can be 1) personal-experiential, 2) a combination of personal-experiential and acceptance of other people's knowledge (especially those that have been tested), 3) product of education (general and professional) and 4) product of system-critical study objective reality, which has a scientific or professional (operational) character. Thus, in accordance with the stated ways (models) of acquiring knowledge, they more precisely define analytics and say: "According to the above, analytics is the activity of acquiring (and using) true, for certain purposes usable knowledge systematically and continuously, using proven, fruitful, primarily scientific method "(Danilovic, Milosavljevic, 2008: 12).

Total cognition, as a control mechanism of analytics, will be called DOCTRINE. This cognition is recorded and remembered in various forms of scientific and professional observations, laws and regulations and other forms of the process of scientific and professional cognition.

2.2. Extending the concept of security

For a long time, the key security threat was war. Over time, first in theory, and then in the official documents of all countries, the concept of security, as a state, has spread to other spheres, such as: political, economic, social (social), environmental and others. The greatest credit for such an approach to security goes to the Copenhagen School of Security and Professor Barry Buzan.

Thus, in the general model of security analytics, we extend the aspect of that process from military and police intervention to the political, economic, social, environmental and other spheres, depending on the subject of the paper. Thus, in the new model of analytics, security as a subject (object) appears as: 1) knowledge (cognition) about the subject and 2) the object of analytics.

Security as a subject requires analysts to master a huge set of knowledge (knowledge), from the general point of view, but also from the aspect of a special sector that is the subject of analytics. It is an extremely demanding endeavor, for which one article is a small space to describe. Hence, in this paper it is only cited as the subject of work on establishing a new model of analytics. At the same time, the fact is that in theory there is this fund of knowledge, which is selectively incorporated into the official documents of all countries, which have legal, political and other aspects of their own security, or security in the broadest sense.

2.3. Standards and standarisation

The third aspect of the new model of security analytics includes the standards and standardization of that process. Standards and standardization encompass both the security sectors and analytics as a process.

Standard, in a general sense, is defined as a norm and a criterion. A standard is a repeatable, harmonized, agreed and documented way in which something needs to be done. Standards contain technical specifications or other precise criteria designed to be used consistently as a rule, guideline, or definition. They help simplify life and increase the reliability and efficiency of many goods and services we use (https://project-management-srbija.com/upravljanje-kvalitetom/standardi-i-standardizacija).

Basically, process standardization describes the establishment of a set of rules that regulate the way people in a company should perform a particular task or series of tasks. The most well-known form of standardization is ISO standards. Standardization is a framework of agreement that must be adhered to by all parties in the company to ensure that all processes related to product creation or service performance take place in accordance with the set guidelines (https://project-management-srbija.com/upravljanje-kvalitetom / standards-and-standardization).

In the previous text, we presented one type of standardization of the analytics process, known as the ANACAPA methodology. The task of the new model of security analytics is to determine the standards in all security sectors, as well as the general standard of security analytics, which can be applied (porilagoid) in special forms, depending on the sector in question.

Just as an example, we cite the standard in certain security sectors (environmental security) that are currently applied in EU member states and introduced in the Republic of Serbia. (Table 3).

Table 3. Standardization – areas and indicators of ecological security

AREA	INDICATORS
A: Air polution, transportation and training	
Air polution	Emissions of major air pollutants
	Exceeding the air quality limit value in urban areas
	Exposure of ecosystems to acidification, eutrophication and ozone
Transportation	Demand for passenger and freight traffic
	Use of cleaner and alternative fuels

Industry	Polluting waste from industrial facilities released into the air and water
Noise	Population exposed to noise exceeding the limit values (for road traffic)
B: Climate change and energy	
Climate change mitigation	EU and national overall greenhouse gas emission trends and projections
	Concentration of atmospheric gases with a greenhouse effect
	Production, consumption and emissions of fluorinated gases
Impact of climate change	Global and European temperatures
	Melting trends of European glaciers and sea ice
Energy	An overview of the European energy system
	The share of renewable energy sources in final energy consumption
C: Freshwater resources	
Water resources / water scarcity and drought	Use of fresh water resources
Freshwater ecosystems	Trends and ecological status
Water pollution and quality	Oxygen-consuming substances in rivers
	Nutrients in fresh water
Water and health	Bathing water quality
Impact of climate change on water	Impact of climate change on water
Pressure on water resources	Pressure on water resources
D: Marinas and the maritime world	
Transitional, coastal and marine water quality	Nutrients in transitional, coastal and marine waters
	Chlorophyll in transitional, coastal and marine waters
	Hazardous substances in marine organisms
Fishing	Marine fish stock status
	The quality of the fishing fleet
Climate changes	Sea surface temperature
	Global and European sea level rise
E: Biodiversity and ecosystems	
Component status and trends	Species and habitats of European importance

Biodiversity	Protected areas
	Abundance and distribution of selected species
Biodiversity threats: habitat loss and degradation	Loss of land
	Habitat and ecosystem fragmentation
Agriculture and forestry sectors	Agricultural land under Natura 2000
	Forests: wood stocks, increments and dead forests
F: Waste and resources	
Waste production	Waste production
Waste recycling	Waste recycling
Landfill diversion / disposal	Landfill diversion / disposal
Household consumption	Intensity of household pressure on the environment
Energetic efficiency	Intensity of total primary energy
Separation of environmental pressures	Separating resource use from environmental pressures
Separation of environmental impacts	Separating the use of resources from the impact on the environment

(**Source:** Digest of EEA indicators 2014. Luxembourg: Publications Office of the European Union, 2014, p.29-31.)

2.4. General model of security analytics

General national model of intelligence process (National Intelligence Model – NIM) is known in the world (Figure 5) and is applied in many European countries.

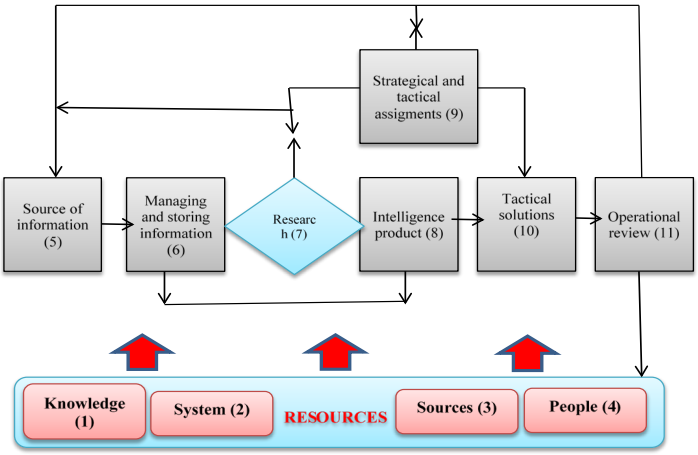

Figure 5. National Intelligence Model (Source: Guidance on The National Intelligence Model, National Centre for Policing Excellence (NCPE) on behalf of the Association of Chief Police Officers (ACPO), Bedford, UK, 2005., p. 14)

The main intention of this article is to direct research towards the development of its own model of security analytics, which, in accordance with the above, is shown in Figure 6.

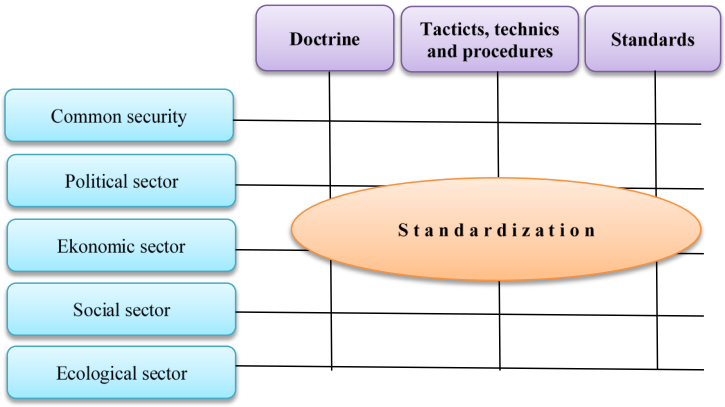

Figure 6. New model of security analytics (Source: Authors)

CONCLUSION

Security is a precondition for the survival and development of man, his communities and his environment. Hence, security analytics is one of the very important and primary tasks of all security entities towards the correct (re) assessment of the situation and taking measures and activities to achieve the optimal level of security.

Security analytics is recognized primarily as a practical activity, or a practical activity based on science, (more recently) in the military (armed forces), police and security services. At the same time, the work procedures of analysts have been developed with exceptional quality and detail.

In theory, more than in practice, there are initiatives to build the current intelligence, criminal and other aspects of security analytics, as a single approach called security analytics. This approach, based on science, is presented in this article.

The Research Centre for Defence and Security - ICOB, from Belgrade, has been organizing numerous security training workshops for young people in recent years. The experiences of ICOB show that the participants of the workshops, mostly, know the procedures of analysts, but that there is a lack of theory (knowledge) and standards and standardization in that area. In that sense, the Faculty of Business Studies and Law, in cooperation with ICOB, at the Ministry of Education, Science and Technological Development has launched a project - New Model of Security Analytics, and this article is the initial text for that purpose.

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