

Współczesne uwarunkowania edukacji dla bezpieczeństwa

Streszczenie: Współcześnie jesteśmy świadkami głębokiej i wielowymiarowej transformacji cyfrowej usług, produktów i modeli biznesowych, która w efekcie daje nową jakość życia, ale także potęguje istniejące lub tworząc nowe zagrożenia. Zmieniają się przez to zadania i możliwości edukacji dla bezpieczeństwa. Może ona korzystać ze sprawdzonych już koncepcji, realizowanych w przemyśle: poziomą i pionową integrację procesów i nowoczesne metody gromadzenia i analizy danych, by dostarczać spersonalizowane produkty szkoleniowe (spójne i interdyscyplinarne programy i kursy) decydujące o skuteczności kształcenia(szkolenia). Celem artykułu jest analiza zastosowania nowych rozwiązań w edukacji dla bezpieczeństwa z uwzględnieniem współczesnych uwarunkowań środowiska bezpieczeństwa. Autorka podjęła również próbę zdefiniowania sylwetki specjalisty w zakresie bezpieczeństwa, zadań, jakie przed nim stoją i umiejętności koniecznych do ich realizacji. Omówiła również przykładowe metody kształcenia (szkolenia) gwarantujące efektywność, czyli profesjonalnie wykształcone kadry/ wyszkolonych cywilów potrafiących reagować na zaistniałe zagrożenia używając odpowiednich do tego celu sił i środków.

Słowa kluczowe: zarządzanie edukacją, edukacja dla bezpieczeństwa, integracja, sztuczna inteligencja, Przemysł 4.0.

Contemporary Determinants of Security Education

Abstract: Nowadays, we witness the deep and multidimensional digital transformation of services, products and business models, which creates new quality of life but also strengthens existing threats or creates new ones. This results in changes in security education, its tasks and opportunities. It is possible to use already tested solutions offered by the business sector: vertical and horizontal integration of processes and new methods of data collection and analysis in order to deliver personalized training services (products) (coherent and interdisciplinary programs and courses) which determine effective teaching process. The aim of the paper is to provide the analysis of implementation of new solutions in security education considering also contemporary determinants of security environment. The author also attempts to define the profile of security specialist, their tasks and capabilities necessary to perform successfully and discusses the exemplary teaching (training) methods that could guarantee effectiveness, i.e. professionally educated staff/trained civilians who react to the threats using right means and capacity.

Key words: education management, security education, integration, AI, Industry 4.0.

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New technologies and digitalization of production processes have been the indicators of technological revolution since the 1970s. Nowadays, at the beginning of the 21st century we are entering the fourth industrial revolution (Industry 4.0, Factory 4.0)⁴⁶³ characterized by merging real and virtual worlds into cyber-physical production systems (CPPS). It has much wider scope than the subsequent previous revolutions. Technologies of Industry 4.0 are: cloud computing, Internet of things, augmented reality, autonomous robots (Fig.1).

Klaus Schwab divided technological megatrends of the Fourth revolution into three main clusters: physical, digital and biological.

Physical examples of implementing Industry 4.0 technology are: autonomous vehicles (e.g.: cars, unmanned aerial vehicles (UAV), advanced robots (working together with people in factories, caring for the elderly, cleaning) 3D print and new fabrics like: self-cleaning clothes, graphene.

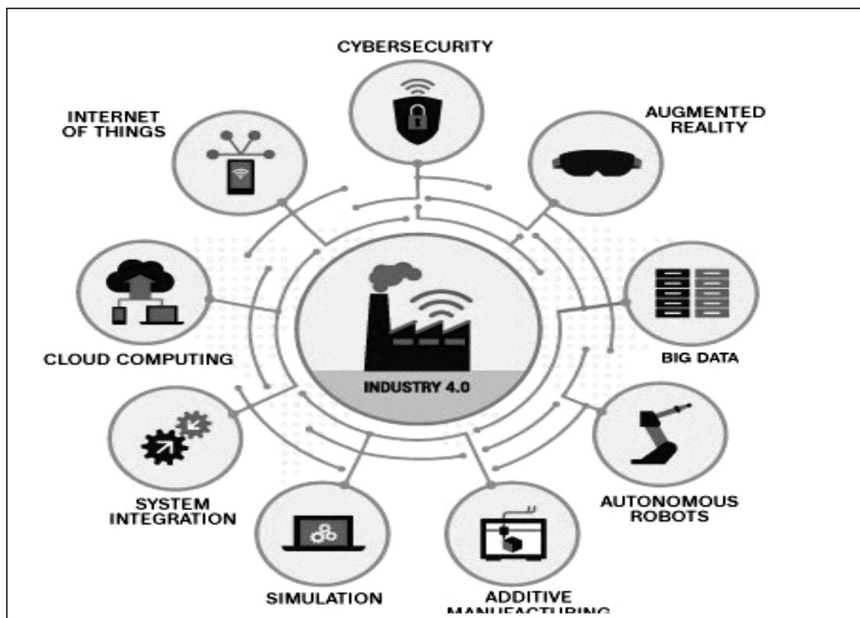


Figure 1. Technologies of Industry 4.0.

Source: G. Shearer, *SME Manufacturers Adopting Industry 4.0 Technologies*, <https://www.manufacturesalliance.co.uk/2018/03/08/sme-manufacturers-adopting-industry-4-0-technologies> [access on: 12.04.2018].

The second cluster – digital-means bigger computing power, data storing and processing (big data), mobile devices. The most important solution is Internet of things (IoT), the possibility to connect devices (household appliances, telephones, watches,

⁴⁶³ The term Industry 4.0 was coined in the project of high technology of German government, used for the first time (in original Industrie 4.0) by the representatives of Robert Bosch GmbH in 2011 at the Hanover trade fairs. In the USA and English-speaking countries, the terms the “internet of things”, the “internet of everything” or “industrial internet” are most common.

machines and technologies in factories) to Internet, access and manage these devices from any place: monitor, modify and service devices in a real time all over the world⁴⁶⁴. Thus, the new business models using only technology without material resources called *sharing economy* can be created on a global scale (e.g.: Uber). Digitalization fosters creating alternative coins, bitcoins based on *blockchain* – scattered databases networks.

The third cluster – the biological one is about understanding and working on modification of a human DNA. Other examples are the possibilities to monitor human organs functioning and technologies supporting the elderly and disabled in their daily routines (Polish scientists working on communication only with a chin or eyeballs).

The Figure 2. presents the increasing role of robotics in particular areas of human activity.

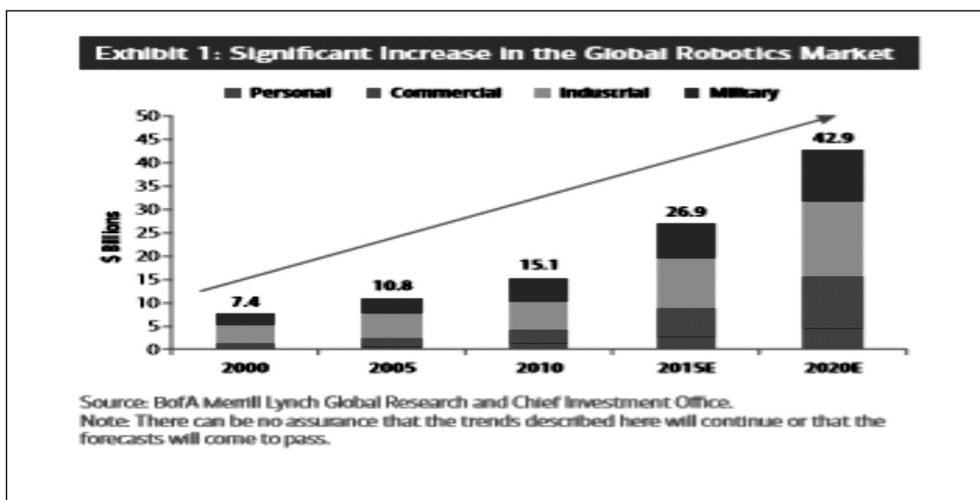


Figure 2. The increasing role of robotics in particular areas of human activity

Source: Raport *Przemysł 4.0 czyli wyzwania współczesnej produkcji*, pwc.pl/przemysl4.0 [access on: 12.04.2018].

The projections about 2020 are that the value of the robots market will reach \$42.9 billion and defense, industry, trade and personal services will earn most profit. In defense sector, for example, the USA army is working on using Brigade Combat Team (BCT) of 2500 soldiers, unmanned robotic systems and Future Combat Systems (FCS). Single BCT will have its own computing power, common operational picture (COP) of a battle field, every soldier will receive information from different sources, virtual retinal display and direct neuroconnections in future. Applying new fabric and devices will reduce load of a soldier up to 20 kilograms and heavy equipment will be

⁴⁶⁴ <https://www.hbrp.pl/b/czwarta-rewolucja-przemyslowa-zmiana-juz-tu-jest-1/2/OmImRGYW> [accessed: 1.05.2018].

carried by robotic mules. Experts from the Military Institute of Nanotechnology are working on fabric “egzo muscle” that will increase soldiers’ strength while operating heavy equipment.

Nanotechnology enhance design of nanoweapon – microchips, which will detect and identify chemical or biological substances, nonsocialists for decontamination of an area.

Works on micro unmanned aerial vehicles in the size of a bird or bumblebee are in progress. These vehicles will imitate the organized behavior of a swarm and will be used on the land, at sea and in the air (the concept of a self-organizing swarm).

Robotics has also an impact on a job market. It will affect mainly low-paid and low-skilled workers. Simple and repetitive tasks will be performed by robots. Jobs which require cognitive skills (creative thinking, cognitive thinking, empathy, decision making, problem solving) will be still performed by people: nurse, cook, teacher, cybersecurity expert, Big Data expert. Control engineer, robot controller, software engineer, production engineer and mechatronics technician are prone to gain importance. New jobs will be created such as: IT controller as a connection of IT expert and controller, hyperphysian or cyberbiologists.

Ray Kurtzweil predicts that the border between learning and playing will be blurred. Playing is just another form of working and is tightly connected to creating knowledge (e.g.: simulation games) Virtual Reality will offer many environments difficult to distinguish from real ones and will involve all senses and even neurological functions similar to our emotions⁴⁶⁵.

These changes create new challenges and opportunities for security education. At this point it seems appropriate to define the education and the tasks⁴⁶⁶.

Security education includes mainly education of highly qualified civil servants and civilians who prepare themselves to perform tasks for national security, i.e. defense, crisis management in a dynamically changing international security environment⁴⁶⁷.

Thus, universities and other educational institutions need to be flexible to fulfill these tasks and meet expectations of students, employers, commanders and a society.

The flexibility i.e. ability to adapt to changing conditions and requirements of security environment can be achieved by applying technologies of Industry 4.0.: ver-

⁴⁶⁵ R. Kurtzweil, *Nadchodzi osobliwość*, Kurhaus, Warszawa 2016, s.334.

⁴⁶⁶ Education includes the components of learning (intellectual content) and bringing up (socializing and shaping independent, personal opinion). Defense education – preparing to face numerous threats which are difficult to predict. Security education is about dealing with challenges which can pose threats. It is not possible to fight threats only with a given attitude, but adequate skills, experience in that scope are required. Education relates to pedagogy as a set of means and methods applied by a teacher. Training – a process of developing general professional qualifications gained during formal education and career experience to match changing job requirements and personal ambitions.

⁴⁶⁷ D. Kaźmierczak, *Edukacja w zakresie bezpieczeństwa i obronności w ujęciu procesowym*, UP, Kraków 2018.

tical networking of smart teaching processes, horizontal integration via global value chain networks and through-engineering across the entire value chain.

Vertical networking of smart teaching process is a solution to provide fully customized products: courses, training programs or preventive programs. Cyber-physical systems enable autonomous organization of a teaching process management as well as other supportive processes. Resources are networked and all processing stages from recruitment through teaching (training), evaluation to completing diploma exams, issuing certificates and monitoring graduates' career path controlled. The processes are logged into the system then the discrepancies registered, amendments, fluctuation in quality dealt with more smoothly. The wear of all tangible and intangible assets (human resources, teaching materials, equipment and rooms) is monitored, effectiveness enhanced and waste reduced.

The vertically networked structure of teaching process itself aims at integrating subjects, showing connection between them and presenting knowledge as a whole, which is crucial considering interdisciplinary nature of security. The competences are gained and skills developed with all senses and by active involvement. Joining aims, content, methods, different scientific disciplines and forms of activities reduces gaps between subjects, fragmentation of information about the world, merges knowledge about culture, environment, society⁴⁶⁸.

Networking is a crucial element of Military Training Program. The integrated training of subunits produces a synergy effect – joined effects of operating of all possible elements of battle groups and tactics (movement, fire and information) to achieve the goal and bear the least costs. The commander of the armored brigade, the colonel Dariusz Parylak, claims that “the brigade integrated training run in that form meet the requirements of new Training Programs [...] The today training is to verify the solutions worked out during trainings in the past few months”⁴⁶⁹.

This form of training should prepare soldiers for network centric operations in which increased combat power is generated by networking sensors, decision makers, and shooters to achieve shared awareness (COP), increased speed of command, higher tempo of operations, greater lethality, increased survivability, and a degree of self-synchronization⁴⁷⁰.

Another crucial issue is the integration of academic programs for national security or internal security studies. The programs and the teaching processes vary signifi-

⁴⁶⁸ E. Gruszczyk-Kolczyńska, *O niektórych pułapkach zintegrowanego kształcenia*, [w:] *Edukacja zintegrowana w reformowanej szkole*, (red.) Moroz H., Kraków 2001.

⁴⁶⁹ *Świętoszowcy pancerniaczy przeszli zajęcia zintegrowane*, <http://www.defence24.pl/swietoszowcy-pancerniaczy-przeszli-zajecia-zintegrowane> [accessed: 12.06.2018].

⁴⁷⁰ David S. Alberts, John J. Gartska, and Frederick P. Stein, *Network Centric Warfare: Developing and Leveraging Information Superiority* (Washington, DC: C4ISR Cooperative Research Program, 1999), p. 2.

cantly in universities supervised by ministry of defense, ministry of interior affairs or ministry of science and higher education in terms of content, aims and resources.

The issue of integration is raised in the *National Security Strategy 2014, Education for security institutions*. Actions aimed to improve competences in the field of security require intensification and better coordination. More emphasis should be put on the quality of education in the areas important from the perspective of state and citizens' security within the framework of the general education and higher education systems, as well as on vocational training of soldiers, officers, civilian personnel of the army and services, public administration employees and security education teachers. It will require [...] the arrangement of higher education offered, in particular, by universities supervised by the Minister of National Defense and by Minister responsible for internal affairs [...] to create coherent curricula [...] In this context, it is worth considering transformation, with the use of existing capabilities and resources, of one or several of the universities into a new – in terms of quality – public high education institution providing education for the integrated national security system, implementing curricula on a transsectoral and supraministerial level, which would allow to obtain the quality of teaching meeting the needs of the state⁴⁷¹.

The thorough analysis shows that there is no legal basis for academic education in crisis management, defense or security. Education of adults in crisis management lacks planning and proper teaching processes. All information campaigns or cooperation with media are single actions at time of an upcoming threat or disaster, which results in mediocre preparation of people for crisis management and lack of coherent training processes on particular levels and elements of the system, and consequently lower effectiveness of crisis management⁴⁷².

Vertical integration embraces single educational entities and business partners into local, regional and global value chain⁴⁷³ networks. Educational entities are involved in numerous activities, projects converting inputs into outputs.

Key business partners in a chain value of security education are the Armed Forces, Police, the Fire Service, schools, universities, local authorities, nongovernmental organizations. They are suppliers of an input: intellectual assets, material and human resources for educational, training and prevention processes which convert this input into output, e.g.: the integrated comprehensive programs, a single citizen or a social

⁴⁷¹ *National Security Strategy 2014*, p.54.

⁴⁷² J. Falecki, *Dylematy zarządzania kryzysowego w Rzeczypospolitej Polskiej*, Oficyna Wydawnicza „Humanitas”, Sosnowiec 2016, s. 280.

⁴⁷³ The idea of the value chain is based on the process view of organizations, the idea of seeing a manufacturing (or service) organization as a system, made up of subsystems each with inputs, transformation processes and outputs. Inputs, transformation processes, and outputs involve the acquisition and consumption of resources - money, labor, materials, equipment, buildings, land, administration and management. How value chain activities are carried out determines costs and affects profits. <https://www.ifm.eng.cam.ac.uk/research/dstools/value-chain> [accessed: 09.06.2018].

group prepared to react to crisis situations, well trained soldiers or civilians for security services. This output should be properly stored, used or distributed. The graduates should find a job which fits in with their personal learning pathways, skills and motivation. At this point the marketing processes will play their role: the high score in the rankings on high quality of education, high effectiveness of prevention programs, or reputation in local communities. Monitoring the effects of the service offered (training or preventive program) or career path of an educated citizen fosters correction and optimization of the main operational processes. Another activity is to keep the product/service working effectively after it was sold. Additional professional courses would help a graduate adapt to the changing requirements of the job market or a position they hold, whereas the preventive programs can be extended, modified, enriched to the needs of the business partner or security situation.

The value of the chain activities (supplying input, operation, output delivery, marketing, after-sale optimization) increase if they are performed with low cost, high quality and in short time. Thus, they should be a responsibility of one entity but single activities performed in different parts of the region or even the globe by various business partners (horizontally integrated global value chain networks). There are several examples of the local, regional and global value chain networks. Youth drug prevention programs in Poland are addressed to a particular risk group and run by several entities: schools with their prevention and educational programs, Police, NGOs (associations, foundations), church organizations, families of the addicted, local community groups, mutual-aid associations and local authorities under the Voivodship and Local Drug Prevention Programs, psychological care centers, residential or nursing housing⁴⁷⁴. Integrating all these programs and activities into one coherent prevention program would guarantee consistent content, rich set of methods and more professional approach as it will be elaborated by the professional team of experts in various areas (education, security, medicine) under unified legal regulations. The person would be provided with holistic treatment from the identification of the problem, offering the treatment/course/training to monitoring their come back to the society.

This new model of cooperation definitely need coherent legal regulations and protection of intellectual property.

Decision No 187/MON of Ministry of Defense from 9th June 2009 on cooperation of ministry of defense with nongovernmental organizations and other social partners enables commanders of military units to cooperate with schools, military experts

⁴⁷⁴ *Ustawa z dnia 29 lipca 2005 r. o przeciwdziałaniu narkomanii* (Dz.U.2005.179.1485 z późn. zm.); *Rozporządzenie Ministra Edukacji Narodowej z dnia 18 lipca 2015 roku w sprawie zakresu i form prowadzenie w szkołach i placówkach systemu oświaty działalności wychowawczej, edukacyjnej, informacyjnej i profilaktycznej w celu przeciwdziałania narkomanii* (Dz.U. z 2015 r. poz. 1249); *Rozporządzenie Ministra Edukacji w sprawie szczegółowych zasad działania publicznych poradni psychologiczno-pedagogicznych, w tym publicznych poradni specjalistycznych* (Dz. U. z 2013 r., poz. 199).

to prepare school trainings, provide military equipment presentations, logistic support and venues for school activities (e.g.: gyms). Another law regulates disposal of redundant military movable property and teaching materials for the benefit of schools⁴⁷⁵.

The model of horizontally and vertically integrated global value chain networks are NATO education and training programs under Joint Force Trainer, using NATO national facilities. All the NATO centers – autonomously operating offices, located in different parts of the globe cooperate together performing specialized activities of the whole education value chain:

- The NATO School Oberammergau, Germany, is NATO’s key training facility on the operational level.

- The NATO Communications and Information Systems School, Italy, provides cost-effective highly developed formal training to personnel (military and civilian) from NATO as well as Non-NATO Nations.

- The College, Italy, is NATO’s strategic training center for senior officers and a major center of education, study and research.

- The NATO Maritime Interdiction Operational Training Centre, Crete, is the NATO center for maritime education and combined training for NATO forces.

- The Joint Warfare Center (JWC) provides NATO’s training focal point for full spectrum joint operational level warfare.

- The Joint Force Training Centre (JFTC) supports training for NATO and Partner forces to improve joint and combined tactical interoperability.

- The Joint Analysis & Lessons Learned Centre (JALLC) is NATO’s center for performing Joint Analysis of operations, training, exercises and experiments.

- The Centers of Excellence (COEs) are nationally or multi-nationally funded institutions that train and educate leaders and specialists from NATO member and partner countries. They offer recognized expertise, experience and support the transformation of NATO, while avoiding the duplication of assets, resources and capabilities already present within the NATO command structure.

- The Partnership Training and Education Centers (PTECs) are nationally or multi-nationally sponsored education and training institutions which offer courses, seminars, and workshops to both military and civilian personnel consistent with the objectives and priorities of NATO’s policy on partnerships. They also provide a platform for operational training by offering both classroom and field venues for exercises.

The Institutional Accreditation validates the Education & Training mission of an Institution and its relevance to NATO, its effectiveness and contribution⁴⁷⁶.

Industry 4.0 educational products and services are engineered through their full life-cycle. It is possible by implementing data analysis applications and AI. The lear-

⁴⁷⁵ *Współpraca ze szkołami*, <http://www.wojsko-polskie.pl/pl/articles/wspolpraca-wojska-z-partnerami-spolecznymi-j/wspolpraca-ze-szkolami-f2016-05-18> [accessed: 12.06.2018].

⁴⁷⁶ NATO Allied Command Transformation, <http://www.act.nato.int/e-nato> [accessed: 12.06.2018].

ning management systems (LMS) (e.g.: by Docebo) with AI shape learning style of the near future by suggesting content and learning style based on a set of criteria like:

- Learning objectives
- Skills data: Suggesting what has worked in the past to increase specific skills in similar roles
- Performance Data: Suggesting what has worked in the past to increase specific KPIs (Key Performance Indicator, e.g. reach 80% from Test on strategic decision making)
- Learning style: e.g. a full course or a collection of small content pieces
- Preferred channel: use of mobile for people that are constantly on the go or full desktop for technical and detailed instructions
- Personal preferences
- Organizational behavior/ the traits of the organization the learners are a part of
- Learning interventions: a change in regulations, compliance, or in company policy⁴⁷⁷.

Knewton Alta is another learning system engaging AI. It supports teaching students with varying degrees of college readiness ensuring that every student learn at their pace and succeeds. Alta's learning technology can also diagnose knowledge gaps and suggest relevant teaching, revision and consolidation content, bridging the knowledge gap. The alta dashboard provides teachers with transparent information how all students are progressing towards assignment completion, their strong and weaker points⁴⁷⁸.

Introduced to the market in 2015 IBM cognitive technologies enables teachers to find similarities between students, analyze the students' achievements and curriculum content to obtain personalized recommendations and assistance for a student as well as data for improvement teaching processes and programs.

Cognitive technologies can be helpful with defining a student profile and a graduate career profile. The analysis of job advertisements in media and dedicated information services, the career path of people who successfully completed recruitment process helps to define key competences, create statistics of applicants, employment trends and labor market by sectors and regions. This platform users receive personalized recommendations about the studies, apprenticeship, training to choose⁴⁷⁹.

⁴⁷⁷ M. Canonico, *Emerging Trends: L&D and the Arrival of AI*, Docebo.

⁴⁷⁸ <https://www.knewtonalta.com/> [accessed: 09.06.2018].

⁴⁷⁹ P. Pietrzak, *Sztuczna inteligencja w edukacji - czyli o personalizacji uczenia*; <http://piotrpietrzak.innpoland.pl/125161,sztuczna-inteligencja-w-edukacji-czyli-o-personalizacji-uczenia> [accessed: 12.06.2018].

The experts in the Institute of IT Systems in the Department of Cybernetics of Military Technical University design one of the most advanced simulators in Europe. They are:

- Simulators for the Armed Forces of the Republic of Poland (Simulator for Support of Operational Training “Złocień”, Simulator of Optional Tactics SWD-T),
- Simulator for security services:
- Simulator for combat vehicle driver of the State Fire Services,
VR System of State border defense tactics development and border movement control for Border Guard of the Republic of Poland,
- Systems to support simulation training and improvement of sanitary control procedures for food poisoning and infectious diseases for sanitary services of the Republic of Poland,
- Simulators for civil railway vehicles drivers.

These solutions are the examples of practical use of knowledge and help reduce field training costs⁴⁸⁰.

Ray Kurtzweil predicts that it is just the beginning. The nature of education will dramatically change when we download knowledge and skills like the computers do at present. If we want a computer with the function of speech recognition, translation or Internet browsing we download the patterns (applications). Unfortunately, for the time being we are limited in this functionality since we do not have ports in our brains to download applications – patterns of interneural connections and neurotransmitters that follow the human learning path⁴⁸¹.

The above described technologies create the optimum educational environment to train experts for security services. Thus, the question about the profile of the security expert arises.

To create the profile, it is necessary to consider the working conditions, tasks and then knowledge, attitude, values and competences.

The security environment is shaped to much extent by technological advances, which besides the positive changes strengthen existing and newly occurring threats. These threats will overlap, intermingle and the resultant will be an instability of global society. The experts of the World Economic Forum defined 13 trends that trigger threats and/or change their correlations:

1. Ageing population in developed and developing countries driven by declining fertility and decrease of middle- and old-age mortality.
2. Changing landscape of international governance (e.g. UN, IMF, NATO, etc.), agreements or networks.

⁴⁸⁰ *Nowoczesne symulatory do zastosowań wojskowych i cywilnych*, <http://www.wat.edu.pl/rozwoj/wat-fabryka-wynalazkow/nowoczesne-symulatory-do-zastosowan-wojskowych-i-cywilnych/> [accessed: 12.06.2018].

⁴⁸¹ R. Kurtzweil, *Nadchodzi...*, op.cit., s.330.

3. Changing climate attributed to human activity, that alters the composition of the global atmosphere, in addition to natural climate variability.

4. Growing middle class in emerging economies.

5. Deterioration in the quality of air, soil and water from ambient concentrations of pollutants and other activities and processes.

6. Increasing national sentiment among populations and political leaders affecting countries' national and international political and economic positions.

7. Increasing polarization of societies Inability to reach agreement on key issues within countries because of diverging or extreme values, political or religious views.

8. Increasing rates of non-communicable diseases, leading to rising costs of long-term treatment and threatening recent societal gains in life expectancy and quality.

9. Rising cyber dependency due to increasing digital interconnection of people, things and organizations.

10. Rising geographic mobility of people and things due to quicker and better-performing means of transport and lowered regulatory barriers.

11. Rising income and wealth disparity in major countries or regions.

12. Shifting power from state to non-state actors and individuals, from global to regional levels, and from developed to emerging market and developing economies.

13. Rising urbanization⁴⁸².

Changes and threats are multidimensional, they will grow in strength and transform creating very often unpredictable crisis situations. Security experts should possess skills which, in spite of the area, economy sector they operate in, enable them to manage these situations: predict, identify, eliminate and mitigate. Actually, to fulfilling these tasks requires the full set of skills:

- a security expert should access information from various sources, media, Big Data tools, process, analyze and estimate its credibility, draw apt conclusions to finally make right decisions,

- a security expert should have an ability to work in a team to complete successfully tasks and projects (e.g.: managing crisis situation, mitigating their effects, run prevention programs),

- security is interdisciplinary by nature, relates to all spheres of human activity, that is why a security expert should understand ideas and concepts from various areas and disciplines, be creative, open to changes both in the area and the team they work in,

- the technical knowledge is also crucial: knowledge of information/analysis systems and cybersecurity,

- new ICT and social media create a new working environment of VR and multicultural teams, which requires interpersonal skills: ability to communicate ideas effectively, to persuade, motivate and explain unpopular decisions.

⁴⁸² The Global Risks Report 2018, World Economic Forum, Geneva, s.70.

Concluding, a security expert should have a “global mindset”, which requires:

- Intellectual capital: Global business savvy, cognitive complexity, cosmopolitan outlook,
- Psychological capital: Passion for diversity, quest for adventure, self-assurance,
- Social capital: Intercultural empathy, interpersonal impact, diplomacy⁴⁸³.

This profile of a successful leader was elaborated on the basis of the research in which 200 global leaders and 6000 regional managers were asked to list characteristics the successful leader of the future should possess.

Contemporary educational environment is equipped with new technologies that favor both traditional and modern teaching methods. The traditional methods can be equally or even more effective than modern ones, which has been proved by achievements of Chinese students in international tests (PISA, TIMSS and PIRLS) measuring competences in science and problem solving⁴⁸⁴. The Chinese schools advocate the direct method of “chalk and board” with a teacher as a master. In the Report on effective teaching by Sutton Trust and Durham University the experts claim that teaching effect depends on two factors: a teacher as an expert, who can identify students’ weaker points and clear instructions and an evaluation system⁴⁸⁵.

New methods engaging students help build key skills of decision making. One of these methods is a decision-making game. Prepared as a simulation game it can be most effective, cheapest and prospective teaching tool for public administration, army and authorities⁴⁸⁶.

Decision game (tactic, training or educational) are about the solving conflicts where every participant strives to achieve their goals (goals) with maximal benefit and minimal loss⁴⁸⁷. The participant considers how to reach the goal while the goals of others differ and actions influence everyone⁴⁸⁸.

⁴⁸³ M. Javidan, *Bringing the Global Mindset to Leadership*, HBR, 19 May 2010, <https://hbr.org/2010/05/bringing-the-global-mindset-to.html> [accessed: 12.06.2018].

⁴⁸⁴ PISA - Programme for International Student Assessment, TIMSS - Trends in International Mathematics and Science Study -TIMSS is a series of international assessments of the mathematics and science knowledge, PIRLS - Progress in International Reading Literacy Study, PIRLS is an international study of reading (comprehension) achievement in fourth graders. K. Donnelly, *What's the best teaching method*, *World Economic Forum*, <https://www.weforum.org/agenda/2014/11/whats-the-best-teaching-method/> [accessed: 12.06.2018].

⁴⁸⁵ R. Coe, C. Aloisi, S. Higgins, L. E. Major, *What makes great teaching? Review of the underpinning research*, CEM, Durham University, The Sutton Trust 2014.

⁴⁸⁶ J. Zych, *Gry decyzyjne w zarządzaniu kryzysowym* [w:] E. Sobczak (red. naukowa). Nowe wyzwania i wykorzystanie współczesnej nauki w zarządzaniu kryzysowym, Wydawnictwo Politechniki Warszawskiej, Warszawa 2010.

⁴⁸⁷ Ibidem.

⁴⁸⁸ Ibidem.

The games can be classified by the parties:

- one sided games when the party is nature, threats created by human development or a legal system, which have conflicting goals; the party is not a person (a group of people),
- bilateral or multilateral games, when at least one adversary is a person (a group of people)⁴⁸⁹.

In a decision game the participant can approach the problem in an unusual and creative way without following common reasoning patterns and finally elaborate expert alternative solutions to make optimal decision at every stage of achieving a goal⁴⁹⁰. The effectiveness of the teaching methods depends on training objectives and aptitude of participants, qualifications of instructors, quality of teaching material and organization⁴⁹¹.

Development of new technologies has brought about changes in all areas of human activity. In defense the new weapon fosters new combat methods different from those in the past epoch whereas in economy new technologies have change the employment structure and consequently quality of life and interpersonal relationships. It is difficult to clearly state if benefits outweigh newly occurring threats. However, experts conclude that integration that is possible with new technologies strengthens complexity of connections between humans, things and institutions. The quality and scale of these connections determine cohesion of the society and this cohesion determines the resistance to threats⁴⁹². The factors discussed in this paper which determine the security environment determine the environment of security educational at the same time. Security education can benefit from new opportunities to enhance the quality of the service, professionalization of the trained soldiers and civilians which is indispensable considering the nature of threats⁴⁹³ and task to be fulfilled. Coherent, interdisciplinary (integrated) curricula and training programs, cooperation of security experts and institutions from various sectors will certainly support education of professional personnel, experts with required skills and competencies to face challenges of the contemporary security environment. New tools and technologies and well-matched methods are another advantage to increase effectiveness of security education. Implementation of suggested solutions and their evaluation are a long-term and time-consuming initiative that requires many administrative efforts of experts and decision makers.

⁴⁸⁹ J. Halik, *Zastosowanie gry kierowniczej w działalności szkoleniowej*, Akademia Obrony Narodowej, Warszawa 1990, s. 12.

⁴⁹⁰ J. Falecki, *Gra decyzyjna elementem doskonalenia w systemie zarządzania kryzysowego*, Oficyna Wydawnicza Humanitas, Sosnowiec 2015, s.64.

⁴⁹¹ A. Andrzejczak, *Projektowanie i realizacja szkoleń*, PWE, Warszawa 2010, s.96.

⁴⁹² The Global Risks Report...op.cit., s.70.

⁴⁹³ Z. Ścibiorek (red.), *Bezpieczeństwo wewnętrzne*, Adam Marszałek, Toruń 2017, s. 39.

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