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Safety and Security Sciences Review

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Biztonságtudományi Szemle

a biztonságtudomány nemzetközi, lektorált, szakmai és tudományos folyóirata

ENGLISH SPECIAL ISSUE

ANGOL NYELVŰ KÜLÖNSZÁM

Prof. Dr. Jeffrey KAPLAN, Dr. habil BESENYŐ János, BEKE Éva

editors by special issue

a különszám szerkesztői

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ENGLISH SPECIAL ISSUE	ANGOL NYELVŰ KÜLÖNSZÁM
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AUGUSTYN, Duszan Józef

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Duszan Augustyn researcher at the Jagiellonian University in Krakow, Faculty of Management and Social Communication focused on the problems of social exclusion resulting from limited mobility in remote regions distant from the main traffic routes. He is working on solutions combining public transport, the sharing economy and the 4th industrial revolution. He one of the leaders of the international research project Transborder Carpooling Against Transport Exclusion in Lesko Municipality (PL) and Okres Snina (SK) within the framework of the Visegrad Fund. Duszan Augustyn spent a research exchange at the Óbuda University where he researched metasearch engine safety and ICT Security. He is a founder of the BUSBUS project (www.busbus.eu), a metasearch engine for the bus rental market.

Duszan Augustyn a krakkói Jagelló Egyetem Menedzsment és Társadalmi Kommunikáció Karának kutatója. Kutatása a társadalmi kirekesztettség problémáira összpontosít, melyek a korlátozott mobilitás következtében keletkeztek a fő forgalmi útvonalaktól távol eső régiókban. A tömegközlekedést, a közösségi gazdaságot és a 4. ipari forradalmat ötvöző megoldásokon dolgozik. Egyik vezetője a Visegrádi Alap keretében megvalósuló „Határon átívelő carpooling Lesko (Lengyelország) és Snina (Szlovákia) községekben a közlekedési kirekesztettség ellen" című nemzetközi kutatásnak. Duszan Augustyn kutatási csereprogramban vett részt az Óbuda Egyetemen, ahol a meta-keresőmotorok és az információtechnológia és távközlési technológia biztonságát kutatta. A buszkölcsönző piac meta-keresőmotor szolgáltatásának, a „BUSBUS" projektnek (www.busbus.eu) alapítója.

DÉVÉNYI Géza

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Géza Dévényi graduated in 2000 at Budapest University of Technology and Economy as electrical engineer. He graduated in 2002 at Budapest University of Technology and Economy as quality management specialist. He works in automotive safety critical system development in systems engineer as well as in manager positions since 2010. He's now Head of Quality and Safety at NNG Lld. He's PhD student at University of Óbuda since 2019.

Dévényi Géza 2000-ben végzett a Budapesti Műszaki és Gazdaságtudományi Egyetemen, villamosmérnöki szakon. 2002-ben minőségmenedzsment szakmérnök diplomát szerzett szintén a Budapesti Műszaki és Gazdaságtudományi Egyetemen. 2010 óta autóipari biztonságkritikus rendszerek fejlesztésén dolgozik rendszermérnöki és menedzsment pozíciókban. Jelenleg az NNG Kft. minőségügyi és funkcionális biztonságtechnikai vezetője. 2019 óta az Óbudai Egyetem Biztonságtudományi Doktori Iskolájának PhD hallgatója.

FILIP, Rebeca-Adela

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FILIP REBECA ADELA (1999) BA Law student at the Babeș-Bolyai University in Cluj-Napoca. In 2020 she attended the Jurist Case study Competition organised by the Mikó Imre Collegiate, where she earned the first place in Criminal Law section, and the second place in the Civil Law section. Furthermore she is a final year student of the Mathias Corvinus Collegium, studying International Relations and Economics. Fields of interests include ethnic minorities legal background and protection, the

FILIP REBECA ADELA (1999) harmadéves joghallgató a kolozsvári Babeș-Bolyai Tudományegyetem Jogi karán. 2020-ban a Mikó Imre Kollégium által szervezett Jogász Esettanulmány Versenyen elnyerte az első helyezetet büntetőjogi kategóriában, valamint a második helyezetet polgárjogi kategóriában. A Mathias Corvinus Collegium Kolozsvári Programjának harmadéves és egyben utolsó éves hallgatója, Nemzetközi kapcsolatok és Közgazdaság szakon. Érdeklődési területei között szerepel a

dinamics of thefree movement of people in the 21st century, financial crimes and law harmonisation technics.

nemzeti kisebbségek jogi háttere és védelme, az emberek szabad mozgalmának dinamikája a 21. században, gazdasági bűncselekmények, jogharmonizációs technikák.

JÓKAI Erika

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I've been working at Óbuda University since 2018. Education: adaptation of universal design accessible design in design process of products, environment, information and services; ergonomic design of assistive technologies for disadvantaged and disabled people to help their independent living and working. Research: supporting the complex rehabilitation process by technologies and ergonomic design; developing a worksimulator-based aptitude assessment which can be used in vocational guidance of students and youth and could increase the participation of disadvantaged and disabled young workers in the labour market.

2018 óta dolgozom az Óbudai Egyetemen. Oktatási területem az egyetemes tervezés és az akadálymentes tervezés alkalmazása a termékek, környezet, információk és szolgáltatások kialakítása során; a fogyatékos személyek és megváltozott munkaképességű személyek önálló életvitelének és munkavállalásának műszaki és ergonómiai megoldásokkal történő támogatásának lehetőségei. A Foglalkoztatási rehabilitációs humán- és műszaki szaktanácsadó, valamint a Rehabilitációs környezettervező szakmérnöki szakirányú továbbképzési szakok szakfelelőse vagyok. Kutatási területem a komplex rehabilitáció műszaki-ergonómiai támogatása és a hátrányos helyzetű, valamint fogyatékos fiatalok pályaorientációjának támogatása munkaszimulátoros felmérésekkel.

KOVÁCS Attila Máté

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With two university degrees in Management and Energy, Attila Máté Kovács now pursues a Phd at Óbuda University Doctoral School of Safety and Security Science while also working as a cyber security expert. He also deepened his knowledge in two proficiency fields of his interests, Artificial Intelligence and Machine Learning. At the start of his career he worked as a strategy consultant at Roland Berger Strategy Consultants and Accenture. Before starting to work at Cyber Services Plc four years ago, he worked as an IT strategy expert at energy and aviation companies, also contributing to air traffic management relate remote tower and unmanned aerial vehicle development and regulatory efforts at Hungarocontrol.

Menedzsment majd energetikai szakközgazdász egyetemi tanulmányok, több évi az energetikai, légiközlekedési és távközlési kritikus infrastruktúrákhoz kötődő munka majd további kiberbiztonsági képzések után Kovács Attila Máté jelenleg az Óbudai Egyetem Biztonságtudományi Doktori Iskolájában folytat PhD tanulmányokat, kiberbiztonsági szakértői munkája mellett a Cyber Services Zrt-nél. Korábban a Hungarocontrolnál dolgozva részt vett a magyarországi drón és remote tower fejlesztésekben.
Érdeklődési és kutatási területei a kritikus infrastruktúrák kiberbiztonsága és a mesterséges intelligencia és gépi tanulás kapcsolata és alkalmazhatósága a kiberbiztonság területén.

NAGY Sarolta

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I've been working at National Public Health Center's Department of Occupational Health (and its predecessors) since 1996. I've been working in occupational medical service and during working in OSH I got a Human and Technical Consultant in Vocational qualification. Research: Assistance in the integration of .Disabled People in the Labour Market, with Importance of Occupational Health Care and

1996 óta dolgozom a Nemzeti Népegészségügyi Központ Munkahigiénés és Foglalkozás-egészségügyi Főosztályán és jogelődjeinél. Foglalkozás-egészségügyi szakterületen dolgozom és mellette megszereztem a foglalkoztatási rehabilitációs humán és műszaki szaktanácsadó képesítést. A fő kutatási témám a foglalkozás-egészségügy szerepe a fogyatékos személyek munkaerő piaci integrációjában és a

developing a worksimulator-based aptitude assessment which can be used in vocational guidance of students and disabled young workers in the labour market.

fogyatékos fiatalok pályaorientációjának támogatása munkaszimulátoros felmérésekkel.

SZAKALI Miklós

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SZAKALI, MIKLÓS (1963) lieutenant colonel, currently he is serving at the Hungarian Ministry of Defense, as a senior defense planner. His responsibility is the harmonization of the national and the NATO's capability developments. He is a doctoral candidate of the Óbuda University Doctoral School on Safety and Security Science in Budapest. His field of research is the study of areas and interactions between security and defense planning. It includes new, complex forms of current security challenges and ways and possibilities to prevent and manage them. He also explores the applicability of NATO's defense planning system (and defense planning systems in general) to address the new types of challenges of our time.

SZAKALI MIKLÓS (1963) alezredes, hivatásos katona, jelenleg a Honvédelmi Minisztérium Védelempolitikai Főosztály teljesít szolgálatot, mint védelmi tervező főtiszt. Felelősségi területe a nemzeti és a NATO képességfejlesztési tevékenységek harmonizálása. Az Óbudai Egyetem Biztonságtudományi Doktori Iskolájában gyarapítja ismereteit, mint doktorandusz hallgató. Kutatási területe a biztonság és a védelmi tervezés területeinek és kölcsönhatásainak vizsgálata. A napjainkban megjelenő biztonsági kihívások új, komplex formáit és azok megelőzésének és kezelésének lehetőségeit vizsgálja. Kutatja a NATO védelmi tervezési rendszerének (és általában a védelmi tervezési rendszerek) alkalmazhatósági lehetőségeit korunk új típusú kihívásainak kezelésére.

SZILÁGYI Béla

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Béla Szilágyi is the President of Hungarian Baptist Aid, a relief, development and educational organization, and a doctoral student of Óbuda University Doctoral School of Safety and Security Sciences. He has 20 years of experience in humanitarian action and development, he has designed and directed many social, relief and development projects and has worked with thousands of refugees and IDPs in countries among others Afghanistan, North Korea, Cambodia, Vietnam, Haiti, Kosovo, Myanmar (Burma), Sri Lanka, Indonesia and Hungary. Szilágyi is a doctor of law, a visiting lecturer at the humanitarian action courses of Dallas Baptist University (NY, USA), Fordham University (NY, USA), and Pécs University Medical School (Hungary). He has been the member of the Baptist World Aid Executive Committee of the Baptist World Alliance for almost two decades.

Szilágyi Béla a Baptista Szeretetszolgálat elnöke, az Óbudai Egyetem Biztonságtudományi Doktori Iskolájának doktorandusz hallgatója. Húsz éves tapasztalattal rendelkezik a nemzetközi humanitárius tevékenység és fejlesztés területén, számos szociális, segélyezési, fejlesztési projektet tervezett és vezetett, sokezer menekülttel és belső menekülttel dolgozott többek között Afganisztánban, Észak-Koreában, Kambodzsában, Vietnámban, Haitin, Koszovóban, Mianmarban (Burma), Sri Lankán, Indonéziában és Magyarországon. Szilágyi jogtudományi diplomával rendelkezik, rendszeres meghívott előadó a Dallas Baptist University (TX, USA), Fordham University (NY, USA), Pécsi Tudományegyetem humanitárius tevékenység kurzusain, valamint közel két évtizede tagja a Baptista Világszövetség Baptista Világsegély Végrehajtó Bizottságának.

SZELÉNYI Gábor Zoltán

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The author is an agricultural engineer, renewable energy management specialist. He worked sixteen years as research engineer on R&D projects involving the fields of agricultural plant nutrition, waste management and decontamination of polluted soils.

A szerző agrármérnök, megújuló energia-gazdálkodási szakmérnök. Tizenhat évig dolgozott kutatómérnökként mezőgazdasági növénytáplálási, hulladékgazdálkodási és szennyezett talajok ártalmatlanításával kapcsolatos projekteken. A rákövetkező

In the following twelve years he participated in the design, implementation, monitoring and evaluation of humanitarian and regional development programs in a large variety of thematic sectors in Central Asia, the Balkans, Hungary and other Eastern European countries. At present he is preparing a PhD at the Research Institute for Bioengineering, Membrane Technology and Energetics of the University of Pannonia, Veszprém, Hungary. His focus of research keeps gravitating around bioconversion, more precisely, agricultural and energetic utilization of organic liquid and solid wastes, with the application of bio-electrochemical systems.

tizenkét év során széles tematikát átfogó humanitárius és területfejlesztési programok tervezésében, végrehajtásában, felügyeletében és utóértékelésében vett részt Közép-Ázsiában, a Balkánon, Magyarországon és Kelet-Európa egyéb területein. Jelenleg a Pannon Egyetem PhD-hallgatója a Biomérnöki, Membrántechnikai és Energetikai Kutatintézeténél. Fő kutatási területe továbbra is a biokonverzió, azon belül szerves folyékony és szilárd hulladékok mezőgazdasági, illetve energetikai hasznosítása, bioelektrokémiai rendszerek segítségével.

SZŰCS Endre

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Endre Szűcs (1963) PhD in Military Science, Certified Security Engineer, Mechanical Engineer, Teacher of Engineering. He is currently a topic leader at the Doctoral School of Security Sciences at Óbuda University and is a lecturer at the Institute of Mechanical Engineering and Security Sciences of the Donát Bánki Faculty of Mechanical and Security Engineering at the Óbuda University.

Szűcs Endre (1963) a hadtudomány PhD fokozatosa, okleveles biztonságtechnikai mérnök, gépészmérnök, mérnök tanár. Jelenleg az Óbudai Egyetem Biztonságtudományi Doktori Iskolájában témavezető, illetve az Óbudai Egyetem Bánki Donát Gépész és Biztonságtechnikai Mérnöki Kar Gépészeti és Biztonságtudományi Intézet óradója.

VALOCIKOVÁ, Cyntia

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VALOCIKOVÁ Cyntia graduated with a master's degree in business development at Keleti Faculty of Business and Management of Obuda University (2018) and is currently a PhD student at the Doctoral School on Safety and Security Sciences. During her master's degree, her research moved in the direction of social sciences, and her research experience elaborated. She improved her skills through several domestic and foreign conferences, academics trips and TDKs, and then at the OTDK in 2019 she took second place in the Sociology of Economics section. During her doctoral studies, her field of research changed; however, she continued her work in social sciences and economics. Research focuses on altruism and the dangers of selflessness. The current direction of research is the exploitation of selfless behavior on the Internet, through fraud and deception. However, the research deal with the traditional turnout of altruism, with its development, and incorporation into online interfaces.

VALOCIKOVÁ Cyntia okleveles közgazdászként végzett vállalkozásfejlesztés mesterszakon az Óbudai Egyetem Keleti Károly Gazdasági Karán (2018), jelenleg az Óbudai Egyetem Biztonságtudományi Doktori Iskola doktorandusza. A mesterképzés alatt kutatása a társadalomtudományok irányába mozdult, kutatási tapasztalatát széles körben hasznosította. Számos hazai és külföldi konferencián, tanulmányúton, TDK-n részt vett, majd 2019-ben az OTDK-n tanulmányával második helyezést ért el a Gazdaságszociológia szekcióban. A doktori képzés alatt kutatási területe változott, azonban továbbra is a társadalom és gazdaságtudományokra épül. A kutatás középpontjában az altruizmus és az önzetlenséggel járó veszélyek állnak. A kutatás jelenlegi iránya az önzetlen viselkedés internetes kihasználása, csalások, megtévesztések révén. A kutatás azonban foglalkozik az altruizmus hagyományos megjelenésével, fejlődésével és beépülésével az online felületekbe.

VELENCEI Jolán

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VELENCEI Jolán, PhD is an associate professor at Keleti Faculty of Business and Management of Obuda University. She is a supervisor at the Doctoral School on Safety and Security Sciences. Her research is focused on decision-makers behaviour and supporting business decision making by an Artificial Intelligence tool. In recent years building on her teaching and research experience, she has been working to develop online learning materials based on concept maps. She developed two Massive Open Online Courses for the Carpathian Basin Online Education Center (K-MOOC) delivered in Obuda University. She teaches at several Hungarian and foreign universities in bachelors, masters and PhD programs. Author of 5 books and over 100 conference papers and scholarly articles.

VELENCEI Jolán az Óbudai Egyetem Keleti Károly Gazdasági Karának habilitált egyetemi docense, a Biztonságtudományi Doktori Iskola témavezetője. Fő kutatási területe a döntéshozó viselkedése és az üzleti döntések mesterséges intelligencia alapú eszközzel való támogatása. Az utóbbi években oktatási és kutatási tapasztalataira építve fogalomtérképeken alapuló online tananyagok fejlesztésével foglalkozik. Az Óbudai Egyetem által működtetett Kárpát-medencei online Oktatási Centrum (K-MOOC) számára két online kurzus kidolgozója és vezetője. Több hazai és külföldi egyetemen tanít alap, mester és PhD képzésekben. Öt könyv és több mint száz konferenciaközlemény és folyóiratcikk szerzője.

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CONTENT | TARTALOM

Security Policy column | Biztonságpolitika rovat

Security Systems column | Biztonságtechnika rovat

Security Awareness column | Biztonságtudatosság rovat

CONTEMPORARY SLAVERY – THE HUMAN TOOL FOR VALIDATING POLITICAL AND ECONOMIC INTERESTS IN EUROPE

JELENKORI RABSZOLGASÁG – EMBERI ESZKÖZ EURÓPA POLITIKAI ÉS GAZDASÁGI ÉRDEKEINEK ÉRVÉNYESÍTÉSÉHEZ

FILIP, Rebeca-Adela[1]

Abstract

This article is meant to study the situation of refugees fleeing armed conflicts and persecutions in their homeland, based on racial, religious or ethnical factors. It also deals with migrants who are not threatened by death or persecutions – but because of the poverty, lack of employment, healthcare or any other reason – choose to move to a Western country by any means. Tempted by dreams about freedom of life, dignity, equality and conscience, they fall prey to human-traffickers, who exploit vulnerable people for financial gain, by forcing them to labour. Human trafficking can be considered as an "investment" that entails one of the lowest risks and highest profits. Following this statement, I shall present a general overview including the presentation of the main migration routes towards Europe and the emergencies occurring in the African continent. I shall highlight the European legislation and preparation tradition in order to combat this phenomenon.

Keywords

human trafficking, migrant routes, forced labour, labour market policies, agromafia

Absztrakt

Ennek az írásnak a célja azoknak a körülményeknek a tanulmányozása, amelyek hatására emberekből hontalanok és menekültek lesznek, arra kényszerülve, hogy saját szülőföldjükről elmeneküljenek, faji, vallási és etnikai megkülönböztetések miatt, vagy éppen a szegénység, a munkanélküliség, egészségügyi ellátás hiány által sarkalják arra, hogy egy nyugati országba meneküljenek egy jobb élet reményében. Gyakran a lehetőségek álcázott emberkereskedési folyamatok, a csempészek embertelen körülmények között munkára kényszerítve őket. A jelenséget felmérve könnyen megállapítható, hogy az emberkereskedelem az egyik legnagyobb profitot hozó és legkisebb rizikófaktorral rendelkező „befektetés". A kijelentésből kiindulva, ebben a tanulmányban alapvető bemutatásra kerül sor, a fő Európába irányuló migrációs útvonalakat, az afrikai konfliktushelyzetek, amelyek eredendőként szolgálnak a migrációs hullámoknak, valamint az európai biztonsági-és óvintézkedések, a válsághelyzet kordában tartásáért, valamint a saját értékeiknek megvédéséért.

Kulcsszavak

Emberkereskedés, migrációs útvonalak, kényszermunka, munkapiaci törvénykezések, agromafia

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INTRODUCTION

The paper will follow the structure of the so-called „human-trafficking" phenomenon from scratch. I will delineate the emergencies occurring in the African continent that are forcing migrants into Europe and their causes including the roots of conflicts in Burundi, South Sudan or Nigeria, for example. I also intend to analyze the main migration-routes, and pre-intermediate level of being a „human tool" for one's financial well-being by tricking and forcing people into recruiting and transporting them to the land of freedom.

Furthermore, I will present the distinction between human smuggling and human trafficking, since both of them can and are meant to result in forced labour. In the third part I will highlight some of the actions taken by the EU and other organisations in order to efficiently combat the flow of illegal labour done by refugees or migrants, namely some of the main protocols and treaties, including *the Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially Women and Children, Supplementing the United Nations Convention Against Transnational Organised Crime*[2], and *Directive 2011/36/EU*[3]. And last but not least I will introduce the target of these illicit activities, who are building flourishing industries on clandestine migrants by forcing them to work for the so-called „Agromafia", or known in Italy as „Caporalato". Reviewing the working environment of these people, all the hardships crossing their way during the transition to the target country only to face a cruel reality must be a warning sign to local authorities in order to confine the rate of illegal work in third nation countries.

Finally, the comparison of the regularizations of labour market policies for European citizens and the one illegally applied for migrants and refugees must be dealt with to lay down the facts that the treatment of the two kinds of employees are highly uneven.

PRESENTING THE CONCEPT OF HUMAN-TRAFFICKING

According to one of the most recent Directive issued by the European Parliament and the Council, 2011/36/EU: trafficking in human beings is a punishable, intentional act consisting of *the recruitment, transportation, transfer, harbouring or reception of persons, including the exchange or transfer of control over those persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation.*[4] In several cases this kind of humiliation results in forced labour, prostitution or even removing and selling organs. Theoretically, this statement was adopted in order to raise awareness, to fight against the main push and pull factors of smuggling people and human trafficking and to provide support for potential victims.

[2]Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially in Women and Children, Supplementing the United Nations Convention Against Transnational Organized Crime, 2000, accessed on 6th of July, 2020, <https://ec.europa.eu/anti-trafficking/sites/antitrafficking/files/united_nations_protocol_on_thb_en_4.pdf>

[3] Directive 2011/36/EU, accessed on 6th of July, 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0036&from=HU>

[4] Article 2 from Directive 2011/36/EU, accessed on 6th of July, 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0036&from=EN>

The directive states several rules, including the penalties, the prosecution and investigation method of this crime, the sanction on legal persons, the jurisdiction of countries, the protection of victims and prevention. All of the above-mentioned rules form the basis of the main polices for such cases.

The directive, in article 4 states a maximum penalty of 10 years of imprisonment if the offence was committed against child victims, within a criminal organization, *deliberately or by gross negligence endangered the life of a victim*[5], the person was abducted with violence that caused several injuries.

Article 12 expressly enunciates the fact that victims cannot be prosecuted because of criminal activities committed during their abduction, if it was committed as a direct and inevitable consequence of the offences committed against them. Furthermore, *Member States shall ensure that victims of trafficking in human beings receive appropriate protection on the basis of an individual risk assessment, inter alia, by having access to witness protection programmes or other similar measures, if appropriate and in accordance with the grounds defined by national law or procedures.*[6]In addition, the directive stipulates the right of the victims of human trafficking to solicit the access to witness protection programs, in accordance with the national law.

If trafficking in human beings was easier to project and overcome, Directive 2011/36/EU could be followed as it defines the trajectory of such cases, from prevention to prosecution, witness protection programs to child protection. However, in many situations, the hidden nature of this phenomenon excludes the possibility for authorities to proceed this way. The hardship of preventing human trafficking may be due to the fact that states are being chained to a theoretical solution, when it would require practice instead. The directives are obligatory to implement, but it should be done in such a manner that reflects the countries' possibilities.

Another international regularization similar to the Directive – but on a larger scale, would be the *United Nations Protocol to Prevent, Suppress, Punish, Trafficking in Persons, especially Women and Children, Supplementing the United Nations Convention Against Transnational Organized Crime.* The Protocol is meant to serve as a triple action program, not only by preventing and combating trafficking in human beings, but to ensure cooperation between states and to protect the abducted victims. The definition given by the protocol is very similar to the one later used in Directive 2011/36/EU: *trafficking in persons shall mean the recruitment, transportation, transfer, harbouring or receipt of persons, by means of the threat or use of force or other forms of coercion, of abduction, of fraud, of deception, of the abuse of power or of a position of vulnerability or of the giving or receiving of payments or benefits to achieve the consent of a person having control over another person, for the purpose of exploitation. Exploitation shall include, at a minimum, the*

[5]Article 4 from Directive 2011/36/EU, accessed on 6th of July, 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0036&from=HU>
[6]Article 12 from Directive 2011/36/EU, accessed on 6th of July, 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0036&from=HU>

exploitation of the prostitution of others or other forms of sexual exploitation, forced labour or services, slavery or practices similar to slavery, servitude or the removal of organs.[7]

MAJOR SOURCE COUNTRIES AND THEIR CONFLICTING SITUATION

Major source countries / Source countries' conflicting situation

According to several surveys the main push factor determining migration is fleeing war and persecution. In the lack of these patterns, other push factors are economical crisis, well fair and livelihood conditions. One of the top origin countries is Syria, due to social-political suppression, under the government of President Bashar al-Assad. The crisis followed by a civil-war, resulted in a massive migration flow to Europe. By December 2017, UNCHR estimated about 1.000.000 asylum applications for Syrian refugees in the European Union.

Afghan refugees account for the second largest refugee population. The push factors are the same as in the case of Syrian refugees, which are war and the fear of persecution. As a consequence there are as many as 2.5 million registered refugees from Afghanistan. The presence of the Taliban is a major source of migration, since the Taliban had been condemned internationally for massacres against Afghan civilians. One of the most radical actions taken by them was denying the UN's food supplies in 2001, starving to death almost 160.000 civilians, destroying thousand of lands and homes by burning vast areas of territories and cultural genocide. [8]

The third and the most disturbing category, the ISIL members, who are using fake Syrian documentations in order to avoid Greek government controls and to make their way into Europe. In 2017, *The Guardian* reported that ISIL is paying *the smugglers' fees of child refugees in a desperate attempt to attract new recruits, according to a report highlighting the potential vulnerability of unaccompanied minors to radicalisation.*

According to the UNHCR the main migration route would be the Mediterranean Sea, through which migrants would arrive from *Syria, Afghanistan, Iraq, Pakistan, Nigeria, Sudan, Somalia, Gambia and Mali.* [9]

The UNHCR follows nine main "emergency" countries, including some of the above mentioned. All of these countries represent the centre of the action programs driven by the organization. Humanitarian life-saving aid, including medicine, food, *stoves and fuel for heating, shelter kits as well as protection services and psychosocial support,* for those

[7]Article 3 of UN Protocol on Preventing, Suppressing and Punishing Trafficking in persons, especially Women and Children, accessed on 6th of July, 2020,<https://ec.europa.eu/anti-trafficking/sites/antitrafficking/files/united_nations_protocol_on_thb_en_4.pdf>

[8]*Taliban massacres outlined for UN*, by GARGAN, A. Edward, Chicago Tribune, 2001, accessed on 6th of July 2020,<https://www.chicagotribune.com/news/ct-xpm-2001-10-12-0110120312-story.html>

[9]Migration Flows to Europe – 2017, Quarterly Overview September, International Organization on Migration, accessed on 4th of July, 2020 <https://migration.iom.int/docs/Q3_Overview_Arrivals_to_Europe.pdf>

who decided to remain in Syria. Although a vast majority of Syrians remained in Lebanon, Turkey hosts a number of 3.3 million Syrians, being the largest hosting country. [10]

Yemen is facing a humanitarian catastrophe; too, due to the hardships in its homeland, as almost *2 million Yemenis* [11]need to find shelter in desperate conditions. In this case, the UNCHR not only provides humanitarian aid for those in foreign countries, but to those 280.000 Yemenis who decided to return home even though it was not safe. The protection action emerges with similar approaches as the Syrian one.

The latest updates on Iraqis show a significant number of 3 million people, who are in need to flee their homeland because of the massive spread of violence and constant attack on fundamental human rights. The UNCHR estimates that almost 1.5 million Iraqis seek shelter in the Kurdistan region of Iraq.

MIGRANT ROUTES TO EUROPE

In the spring of 2017 *Frontex*, the European Border and Coast Guard agency identified six main routes for irregular migrants to enter Europe, including sea and land routes.

The Western African and Central African route provide sea passages for Western Africans, mostly from Morocco and Senegal into the Canary Islands, which is under Spanish jurisdiction, according to Frontex Risk Analysis for 2019. This route gained popularity during 2019, with exactly +264% to around 1500.[12] This route has several difficulties and some of them are more critical than the others. Migrants have to endure crossing the desert, to shuffle in a convoy with 150-200 persons and Islamic terrorist groups such as AQUIM and MUJAO roaming the dessert[13]. The Eastern African route is mainly used by migrants from the Horn of Africa (Eritrea, Somalia, Djibouti and Ethiopia), traversing Sudan, Egypt and Libya to Northern African countries, for example Tunisia, or crossing the European border using the Central Mediterranean passage.[14] The main route is through Darfur and Chad, but it can alter due to the political situation of the regions. Not only passing 7000 km on a route reigned by smugglers, risking their life and health, these migrants have to pay approximately 1000 USD and 1000-2500 USD more if they want to cross the Mediterranean

[10] UNHCR emergencies, Syria emergency overview, accessed on 4th of July 2020, <https://www.unhcr.org/emergencies.html>

[11]UNCHR emergencies, Yemen emergenc overview, accessed on 4th of July 2020 <https://www.unhcr.org/yemen-emergency.html>

[12] Frontex Risk Analysis for 2019, page 17, accessed on 26th july 2020. <https://frontex.europa.eu/assets/Publications/Risk_Analysis/Risk_Analysis/Risk_Analysis_for_2019.pdf>

[13]János Besenyő, Security Preconditions: Understanding migratory routes 2016, page 6, accessed on 12th of July 2020. <http://jssidoi.org/jssi/uploads/papers/21/Besenyo_Security_preconditions_understanding_migratory_routes.pdf>

[14] János Besenyő, Security Preconditions: Understanding migratory routes 2016, page 22, accessed on 12th of July 2020. <http://jssidoi.org/jssi/uploads/papers/21/Besenyo_Security_preconditions_understanding_migratory_routes.pdf>

sea.[15] According to a study,[16] the Eritrean migrants are exposed to the sovereignty of the Rashaida Arab Tribe, who kidnaps them for ransom, and they can only continue their way if they pay. Furthermore, despite of the fact that they pay, each month some of them are killed.

The third route, which is the Western Mediterranean route, integrates sea passage from North Africa to the southern coast of Spain and the land route through the borders of Ceuta and Melilla. It is considered to be one of the most preferred routes, due to Mauritania poor border management. In order to suppress the growing migrant flow to the Spanish enclaves of Ceuta and Melilla, Spain made an agreement with Senegal, Mauritania and Morocco in 2005 to stop migration before reaching the Atlantic Coast in exchange of financial support. This agreement was followed by a repatriation accord between Spain and Senegal, Mauritania and Morocco, aiming to send back the illegal migrants to their homeland. Since then, according to IOM[17], the migration flow has changed and the nations need to take a new view in order to provide a viable solution.

The Central Mediterranean route – sea passage from North Africa, especially Egypt and Libya towards Italy and Malta – is the main trajectory for people smugglers. Several NGOs like *Save the Children* and *MSF* operate search and rescue vessels in this area. During the Kaddafi regime in Libya the country had flourished due to its economic and political security and it also enhanced several international relations. (*János Besenyő, Understanding migratory routes)*

Apulia and Calabria are parts of another Central Mediterranean route, the sea passage of migrants from Turkey and Egypt, entering Greece by crossing the Ionian Sea to finally arrive in Italy. This route is primarily used by Asian migrants, who are trying to reach Europe by the help of smuggler groups using different methods. Most of the time smuggling groups are in contact with Islamic radical forces that benefit from this activity for sponsoring their suppressing and terrorist acts.[18]

[15] János Besenyő, Security Preconditions: Understanding migratory routes 2016, page 7, accessed on 12th of July 2020.
<http://jssidoi.org/jssi/uploads/papers/21/Besenyo_Security_preconditions_understanding_migratory_routes.pdf>

[16] János Besenyő, Security Preconditions: Understanding migratory routes 2016, accessed on 12th of July 2020.
<http://jssidoi.org/jssi/uploads/papers/21/Besenyo_Security_preconditions_understanding_migratory_routes.pdf>

[17]*In 2018, the Western Mediterranean Route (WMR) – from West Africa towards Spain – became the most frequently used route into Europe with over 58,000 arrivals (compared to 5,300 in 2015 and 22,100 in 2017). Senegal was one of the top West African nationalities of arrivals in 2018, ranking behind Guinea, Mali, Côte d'Ivoire and The Gambia,* according to an IOM study on Migration trends in Senegal
<https://www.iom.int/news/latest-iom-study-migration-trends-senegal-explains-peak-arrivals-spain>

[18]For more information and an elaborate work regarding this issue, read more in PhD. János Besenyő study, *The Islamic State and its Human Trafficking practice 2016.*<http://real.mtak.hu/83721/1/the_islamic_state_and_its_human_trafficking_practice.pdf>

The Western Balkan route is commonly used by Asian immigrants – from Syria, Iraq and Afghanistan -, from the Greek and Turkish border to finally arrive in Hungary, Romania or Croatia.

The last one, the Eastern borders land route of almost 6000 km length is situated between the EU's eastern member countries and Russia, Ukraine, Belarus and Moldova. In 2018 a slight increase in interest was detected, mostly because of *migrants abusing the FIFA FAN ID, which allowed travellers visa-free entry in Russia, from where, coming also from Belarus and Ukraine, the migrants attempted to enter EU illegally.*[19]

According to the Frontex's database, the total number of irregular migrants in 2017 reached 500.248; the highest ranks being the Eastern and Central Mediterranean routes with 182.277 and 181.459.

TARGET COUNTRIES

Globalization and the growth of population require fast-forward solutions in order to provide the European retail section with low cost food. Even though the agricultural industry has developed in several aspects, cheap labour is still needed. Due to this situation, the countries in need of procuring solutions tend to choose irregular migrants, employing them as undeclared workers with low wages, in inhuman conditions and without due respect to their fundamental human rights.

According to the International Labour Organization 2012 Global estimate of forced labour Executive Summary[20] approximately 20.9 million people endure forced labour, against their will, without any rights. Data show that almost 90% of these forced workers are exploited in the private sector, while the rest of them do state-imposed forced labour in prisons. [21]

This "trend" is dominant in the Italian market, where there are undeclared workers, especially smuggled people from the African or poorer European region. These migrants fall for the recruiters' offer for a better life. In Italy, agricultural labour is normally temporary and requires workers to move from farm to farm according to seasonal farming demand. Most migrants end up working on the production of canned vegetables and fruits, including tomatoes, strawberries, grapes or olives, namely - Sicily tomatoes, Brescia green salad, Lombardy grape, Basilicata strawberry.

According to a survey, *the latest official figures show that in 2015 around 405,000 foreign people were regularly employed in this sector, 4 making up 48% of the total workforce in agriculture. Women comprised about 27% of the agricultural labour force in Italy*

[19]Frontex Risk Analysis for 2019, page 17, accessed on 26th of July. <https://frontex.europa.eu/assets/Publications/Risk_Analysis/Risk_Analysis/Risk_Analysis_for_2019.pdf>

[20] ILO 2012 Global Estimate of forced labour Executive Summary, accessed on the 24th of June, 2020,<http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_181953.pdf>

[21] ILO 2012 Global Estimate of forced labour Executive Summary, accessed on the 24th of June, 2020,<http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_181953.pdf>

in 2015. [22]The main problem with the estimation of a realistic number is the lack of regularization and recording of irregular workers, who are not employed with an official contract. This way, on the employers take a double advantage of the situation by avoiding paying taxes and social security for the authorities and ensuring that the workers can't defend themselves against the low wages and their treatment during working hours.

The *Italian and international press* conducted several investigations on the treatment and living conditions of these workers. Although *European labour market policies*[23]limit the daily working hours to 8 – weekly 40 –, which can, in certain situations be altered, farm workers in Italian agriculture can work 10-12 hours a day. They also need to endure the heat or cold, depending on the region, breathing in the chemical materials used in agricultural activities and endangering their health. They are either kept in isolated inhuman living conditions or miles away from their workplaces.[24]

The Agromafia's pyramidal structure ensures the control on every level, usually referred to as "the Caporalato", where every field is supervised by 'caporalis'. They are usually Italian, Romanian or other European nationals, who often use power and violence to suppress the farmers. The main weapons of these gang master systems are intimidation and the exacerbation of workers.

According to an article written by Oxfam *estimates by the Italian trade union FLAI-CGIL show that of the 430,000 workers irregularly employed in the Italian agricultural sector in 2015, 42% were women.15 Data on the most affected regions indicates the prevalence of exploitation of women farm workers. Of the 45,000 women employed in Campania, contractual obligations were not respected in 80% of cases.*[25] Regarding the first part of this study (the presentation of migration routes, the correlation between target and origin countries and the push and pull factors for this behaviour) most of the time these illegal workers are crossing the borders by the help of the smugglers in exchange for debt-bondage. This can be categorized as a contract of consent up to a point, despite the dangerous conditions. They often have to perform inhuman tasks in very little time, without toilet or meal breaks in unbearable heat or cold.

The legal minimum daily wage in Italy, according to 2017 data, was 47 euros. However, a farmer ears 20-30 euros daily, which is almost 50% lower than the legal minimum.

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[22]< Human Suffering in Italy's Agricultural Value Chain, page 2, accessed on July 6th, 2020, https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620479/cs-human-suffering-italy-agricultural-value-chain-210618-en.pdf?sequence=4>

[23] EU's Working Time Directive (2003/88/EC) enunciates the primary regularization in this field, a directive, by its nature requires the member states to achieve the particular result without a mandatory trajectory to follow.
Directive 2003/88/EC of the European Parliamet and of the European Council concerning certain aspects of the organisation of working time of 4 November 2003, consulted on 6th of July, 2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003L0088&from=EN>

[24]*Workers are paid on average between 20 and 30 euros a day, and women get* 20% less than their male colleagues, […] and in some cases they have to pay for their gangmasters transportation and for different basic necessities like water or food.<https://www.fondazionemetes.it/agromafias-and-gangmasters>, English version of the Placido Rizzotto Observatory, accessed on 9th of July, 2020

[25]<https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620479/cs-human-suffering-italy-agricultural-value-chain-210618-en.pdf?sequence=4>, page 3, accessed on 6th of July, 2020

Of course this number only appears on paper in several cases; in real-life some of them worked straight 10-12 hours for 3 or 4 euro.[26]

The 'caporalato' system is not a novel phenomenon. Not only are the caporales taking care of the recruitment of local producers, they control the farmers daily life, including housing, meals, travelling to work or issuing the farmers' working pattern. The Italian Government concerns resulted in an investigation in 2018[27], which was conducted by the Chamber of Deputies' Joint Committees XI (labour) and XIII (agriculture).

In October 2017 the British newspaper 'The Guardian' issued an article – *The terrible truth about your tin of Italian tomatoes*[28] – which spread the horrendous death of the 47 years old legal Sudanese immigrant worldwide, who suffered a heart attack while working in the fields of Nardó. As later determined, Abdullah Muhammed's life could have been saved if he had been transferred to the hospital. This was the first red light to draw attention to the inhuman life of the farmers.

In order to combat labour exploitation and the caporalato, Italy introduced a legislative package in the autumn of 2016[29], including sanctions on employers, land requisition, enhanced protection for victims, organized labour inspections and an integrated approach to punishing and ending labour exploitation.[30] The kickback of the legislation is the same as in the case of the European Union's combating the labour exploitation of immigrants and the fight against human trafficking. It concludes the theoretical side of the norms, which are only applicable in the concrete case, once the situation occurs, based on the report of workers and employees.

The progression of this situation lays not only in the hands of the governmental actions and measurements, but in the main food chain markets, the costumers and small-

[26] *'In my payslip, the wage was €46 per day. But I've never seen that money. I only received €28 per day.'*
Woman farm worker, Campania

We were working from 6.00 in the morning to 6.00 in the evening, every day of the week, for €25 a day. We could just take 10-minute breaks for eating.' Aversa, a 24-year-old male agricultural worker from Mali. Ibidem, page 5, accessed on 6th of July, 2020

[27] https://ec.europa.eu/migrant-integration/news/italian-parliamentary-investigation-on-exploitation-of-migrant-workers-in-agriculture The first hearing held in January 2019 resulted in adopting Law No. 199 of 2016, which referred to the caporalato system as a crime and *imposes criminal penalties for intermediation and exploitation of irregular labour. Accessed on 17th of July, 2020*

[28] https://www.theguardian.com/global-development/2017/oct/24/the-terrible-truth-about-your-tin-of-italian-tomatoes, accessed on 17th of July, 2020

[29] *Law No. 1999/2006 in order to combat undeclared work and labour exploitation, providing victims with a long-term program of assistance and social integration, and a residence permit for social protection,*
https://www.opensocietyfoundations.org/uploads/ba12312d-31f1-4e29-82bf-7d8c41df48ad/is-italian-agriculture-a-pull-factor-for-irregular-migration-20181205.pdf, accessed on 5th of August, 2020

[30] These measures included several humanitarian actions, especially after the incident of the Lampedusa shipwreck of 3 October in 2013, which resulted in the death of 386 migrants after their boat failed to reach the Italian shores.

scale farmers. There should also be full transparency in regards to legally employed workers, not only on paper, but in real-life too.

EUROPE COMBATING ILLEGAL MIGRATION AND LABOUR
DIFFICULTIES OF ELIMINATING ILLICIT ORGANIZATIONS

In several cases the person concerned has no other choice than to accept the abuse from the traffickers. European citizens have freedom of movement and freedom of travel within the EU's internal borders, which ensures the chance to fulfil the labour shortages of certain sections.

When it comes to policies issued in order to combat illegal work, it can be said that they are often based on several factors and are often contradictory. It is because they are meant to welcome the migrants by promoting their integration into the society, as well as to cut off the chance of hiring unauthorized workers.

In 2005 the European Commission adopted a *policy plan on legal migration* based on the need of adopting a common set of rules in order to ensure the admission of legal economic workers, entitled *Green paper on EU approach to managing economic migration* [31].

Following the initiative of the European Commission in 2009 a program was developed that was later entitled the *Stockholm Program*[32]. It was a measurement which set out a line of rules for common politics on privacy, fundamental human rights, minority rights and additionally it defined the rights of groups of people in a need of special protection. After the *Tampere Program*[33]in 1999 and the *Hague Program*[34] in 2004 this is the third program that deals with the treatment of subjects such as homeland security and migration and methods of combating organized crime. Furthermore, the program debated delicate problems like the usage of military against migration, the expansion of EuroJust and Europol, police intervention outside the EU and the intensified cooperation of secret services. Among the three actions, the *Stockholm Program* emerged as the most practical five year guideline for justice and national problems for the years 2010-2014.

In the spring of 2015 the European Commission presented the *European Agenda on Migration*[35], in order to prepare the State members to tackle the challenges that occurred during migration management. It included regularization on irregular *migration, asylum, borders and illegal migration.* In 2017 the updated *Agenda* focused on matters like refugee crisis, common visa policy and Schengen. This measurement helped in providing safe pathways, integration programs for legally arriving migrants at both local and national levels.

[31]<https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52005DC0669&from=EN>, accessed on the 3rd of July 2020
[32]<https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:115:0001:0038:EN:PDF>, accessed on the 3rd of July 2020
[33]<https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:115:0001:0038:EN:PDF>, accessed on the 3rd of July 2020
[34]<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52005XG0303(01)&from=EN>, accessed on the 3rd of July 2020
[35]<https://ec.europa.eu/home-affairs/sites/homeaffairs/files/what-we-do/policies/european-agenda-migration/background-information/docs/communication_on_the_european_agenda_on_migration_en.pdf>, accessed on 23rd of June, 2020

Above the enunciated programs and objectives the European Union has prepared several *Directives* in order to harmonize the migration flow and the asylum seekers situation. They were intended to provide them with a chance of integration, to respect the inherent human rights and not only on international, but on regional and local levels too. It's worth mentioning Directive 2011/36/EU *regularizing the prevention and combating trafficking in human beings and protecting its victims.* [36]

Between 2007 and 2009 the European Union funded a project called the *Clandestino project*[37] with regard to the monitoring of undocumented migration. A database was created by the Hamburg Institute of International Economics and it collected data between 2001 and 2008. The estimated numbers are specifically divided between age, gender, nationality and the sector of economic activity.

Besides the European organizations, including the Commission, the Council and the Parliament, several other organizations are fighting against human trafficking. The Organization for Economic Cooperation and Development, for instance *works to build better policies for better lives goal is to shape policies that foster prosperity, equality, opportunity and well-being for all. We draw on almost 60 years of experience and insights to better prepare the world of tomorrow*. The OECD works on a different platform for procuring solutions facing the migration problems. It focuses on aspects like the economical aspects of the migration, integration policies and indicators, migration and development and monitoring migration.

To suppress human trafficking and labour exploitation diverse legislation systems must be established that can be held responsible for regularizing the situation of illegal immigrants who are seeking a better and healthier life in Western countries. However, focus should not only be placed upon third-world migrants. On top of that, creating safe border entry routes and providing solid assistance and protection for those in need improve the labour inspection, especially in the private industries, such as agriculture.

CONCLUSION

Pope Francis defined human trafficking as *'a scourge, a crime against the whole of humanity. It is time to join forces and work together to free its victims and to eradicate this crime that affects all of us, from individual families to the worldwide community'*[38]. In the 21st century, when the fundamental rights of human beings, freedom of movement, social security, equality and equity are theoretically provided for every human being, there are some regions, where these are still the least common values. It is a problem relevant for all the nationalities, countries and citizens, even for stateless persons. To tackle this problem, we need humanism, common sense, and cooperation above anything else. Suppressing this theft of human life could be the most significant moral calling of our time.

BIBLIOGRAPHY

[36]<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0036&from=en>, accessed on 23rd of June, 2020

[37]<https://emnbelgium.be/sites/default/files/publications/clandestino-final-report.pdf>

[38]<http://www.vatican.va/content/francesco/en/messages/pont-messages/2014/documents/papa-francesco_20140522_messaggio-ilo.html>, accessed on 12th of June, 2020

ONLINE SOURCES:

Literature:

[1]*Trafficking for forced labour in Europe,* Report on a study in the UK, Ireland, and Czech Republic and Portugal, November 2016, http://www.antislavery.org/wp-content/uploads/2017/01/trafficking_for_fl_in_europe_4_country_report.pdf
[2] BESENYŐ, János, Security Preconditions: Understanding migratory routes, 2016, http://jssidoi.org/jssi/uploads/papers/21/Besenyo_Security_preconditions_understanding_migratory_routes.pdf
[3] *IOM study on Migration trends in Senegal Explains Peak Arrivals in Spain, 2019,* https://www.iom.int/news/latest-iom-study-migration-trends-senegal-explains-peak-arrivals-spain
[4] BESENYŐ, János, *The Islamic State and its Human Trafficking Practice, 2016,* http://real.mtak.hu/83721/1/the_islamic_state_and_its_human_trafficking_practice.pdf
[5] *Migration Flows to Europe – 2017, Quarterly Overview September, International Organization on Migration,* https://migration.iom.int/docs/Q3_Overview_Arrivals_to_Europe.pdf
[6]*UNHCR emergencies, Syria emergency overview 2019,* https://www.unhcr.org/emergencies.html
[7]*UNCHR emergencies, Yemen emergency overview 2019,* https://www.unhcr.org/yemen-emergency.html
[8] *Frontex Risk Analysis for 2019,* https://frontex.europa.eu/assets/Publications/Risk_Analysis/Risk_Analysis/Risk_Analysis_for_2019.pdf
[9]*ILO 2012 Global Estimate of forced labour Executive Summary*,http://www.ilo.org/wcmsp5/groups/public/---ed_norm/---declaration/documents/publication/wcms_181953.pdf

Legislation:

[10]*Protocol to Prevent, Suppress and Punish Trafficking in Persons, Especially in Women and Children, Supplementing the United Nations Convention Against Transnational Organized Crime, 2000,* https://ec.europa.eu/anti-trafficking/sites/antitrafficking/files/united_nations_protocol_on_thb_en_4.pdf
[11]*Directive 2011/36/EU of the European Parliament and of the European Council on preventing and combating trafficking in human beings and protecting its victims, of 5th April 2011*, https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32011L0036&from=HU
[12] *Directive 2003/88/EC of the European Parliament and of the European Council concerning certain aspects of the organisation of working time* , https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:32003L0088&from=EN
[13] *Communication from the Commission – Policy Plan on Legal Migration*,https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52005DC0669&from=EN,
[14] *The Stockholm Program – An open and secure Europe serving and protecting citizens (2011-C115-01*, https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:115:0001:0038:EN:PDF

[15] *The Hague Program – Strengthening freedom, security and justice in the European Union (2005-C53-01,* https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52005XG0303(01)&from=EN
[16] *Communication from the Commission to the European Parliament, the Council, the Economic and Social Committee and Regional Committee of the Regions – An European Agenda on Migration, 2015,* https://ec.europa.eu/home-affairs/sites/homeaffairs/files/what-we-do/policies/european-agenda-migration/background-information/docs/communication_on_the_european_agenda_on_migration_en.pdf
[17] *Clandestino Project – Final Report, 2009,*
https://emnbelgium.be/sites/default/files/publications/clandestino-final-report.pdf

Articles:

[18]*Human Suffering in Italy's Agricultural Value Chain, June 2018,* https://oxfamilibrary.openrepository.com/bitstream/handle/10546/620479/cs-human-suffering-italy-agricultural-value-chain-210618-en.pdf?sequence=4
[19]*Agromafias and Gangmasters - English version of the Placido Rizzotto Observatory,*https://www.fondazionemetes.it/agromafias-and-gangmasters
[20]*Italian Parliamentary investigation on exploitation of migrant workers in agriculture, 2019,* https://ec.europa.eu/migrant-integration/news/italian-parliamentary-investigation-on-exploitation-of-migrant-workers-in-agriculture
[21]*The terrible truth about your tin of Italian tomatoes – The Guardian article 2018,*
https://www.theguardian.com/global-development/2017/oct/24/the-terrible-truth-about-your-tin-of-italian-tomatoes
[22] *Message of Pope Francis on the occasion of the 103rd session of the Conference of the International Labour Organization (ILO), 2014, http://www.vatican.va/content/francesco/en/messages/pont-messages/2014/documents/papa-francesco_20140522_messaggio-ilo.html*
[23] *Taliban Massacres Outlined for UN, GARGAN, Edward A., Chicago Tribune, 2001,*
https://www.chicagotribune.com/news/ct-xpm-2001-10-12-0110120312-story.html

THE RAISON D'ETRE OF WORK DIAGNOSTIC TESTS IN THE WORK SAFETY OF DISABLED EMPLOYEES

ELENGEDHETETLEN MUNKAALKALMASSÁGI VIZSGÁLATOK FOGYATÉKOSSÁGGAL ÉLŐ MUNKAVÁLLALÓK MUNKABIZTONSÁGÁBAN

JÓKAI Erika[1] – NAGY Sarolta[2]

Abstract

According to the Hungarian Act on Occupational Safety and Health (Mvt. 50/A § 63), workers from vulnerable groups should be protected from the risks specially affecting their health. The requirements and suggestions of safe and healthy working environment are determined by occupational safety and health (OSH). Workers from vulnerable groups are assessed differently from healthy workers in terms of occupational risks, because occupational health professionals are underinformed about their mental and psychical abilities, special needs and the assistive technologies they use. The OSH and occupational health professionals are under-informed about the comprehensive safe employment of workers from vulnerable groups. During profession or career choice guidance the assessment of the student's or candidates' fitness for the job is harder due to the lack of information, so it is necessary to develop professional guidelines based on ability tests and job simulator surveys.

Keywords

work simulator, ability test, work diagnostics, occupational health, career choice

Absztrakt

A Mvt.50/A. § 63. alapján a sérülékeny csoportba tartozó munkavállalókat óvni kell az őket különösen érintő egészségkárosító kockázatoktól. Az egészséget nem veszélyeztető és biztonságos munkavégzés követelményeit és ezek biztosítására javaslatokat a munkavédelem határoz meg. A sérülékeny munkavállalók esetében a testi, lelki adottságaik, speciális igényeik, az általuk használt segítő technológiák miatt a többi munkavállalóhoz képest eltérően kell felmérni, értékelni a munkahelyi kockázatokat. A munkavédelemben és a foglalkozás-egészségügybe dolgozó szakemberek alulinformáltak a sérülékeny csoportba tartozó munkavállalók mindenre kiterjedő biztonságos foglalkoztatása terén. A pályaválasztás és foglalkoztatás során az információhiány következtében a tanuló munkavállaló alkalmasságának megítélése nehezebb, ezért szükséges képességvizsgálatok és munkaszimulátoros felmérések alapján kidolgozni szakmai útmutatókat.

Kulcsszavak

munkaszimulátor, képességmérés, munkadiagnosztika, foglalkozás-egészségügy, pályaválasztás

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INTRODUCTION

The disabled persons' equal opportunities, independent living, participation in social life can be realized by the regulated complex rehabilitation process. The disabled persons are preferably employed in integrated employment; in the absence of such employment, they are entitled to sheltered employment. [1] According to the Optional Protocol and Convention accepted by the United Nations on the Rights of Persons with Disabilities, in New York on 13th December 2006, Disabled Persons have the right to seek employment in the open and accessible labour market. [2] The prohibition of discrimination is required in order to realize equal opportunities, which is enshrined in the law: „In particular, it infringes the principle of equal treatment if the employer discriminates directly or indirectly against the employee." [3] The law on the promotion of the right to free choice of employment and occupation also regulates the support of labour market programs. [4]

The workers from vulnerable groups, including people with disabilities should be protected from the workplace risks especially affecting their health [5], physical, mental, psychological, chemical, biological, psychosocial and ergonomic hazards and should minimize the presence of risk factors, wherever possible. The requirements of safe and healthy work conditions and recommendations to ensure these are defined by OSH (OSH includes Workplace Safety and Occupational Medicine, Occupational Hygiene) (Figure 1.)

Figure 1. Ensuring requirements for safe and healthy work (source: authors)

Workers from vulnerable groups are assessed differently than healthy workers in terms of their physical, mental abilities, special needs, the assistive technologies they use and occupational risks. The person's health status, individual abilities, assistive technologies used by them, special needs and job expectations (and experiences) should be all taken into account during the adaptation of the work environment and the job, or the assessment of fitness-to-work. The internationally accepted approach to work ability, the "Work Ability House Model" is the best illustration of the factors affecting work ability, which are represented as superimposed levels. [6] (Figure 2.) Following this model, it is easy to identify the levels of intervention required to achieve successful workplace integration, also for people with disabilities. The bottom two levels are skills, abilities and health, evaluation, assessment, and the development of the required skills that are essential for the employment and successful integration of people with disabilities (foundations of the higher levels of the Work Ability House).

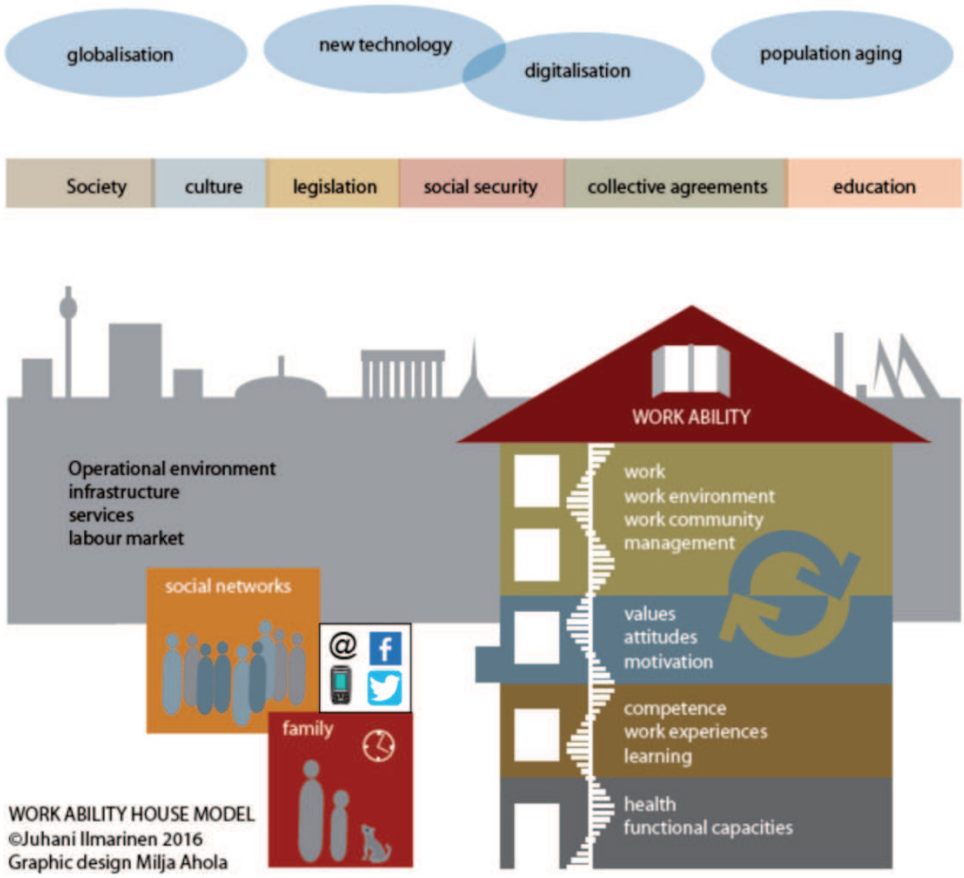


Figure 2. Work Ability House Model (Ilmarinen, 2011) [6]

During career choice, vocational training and employment, the lack of information makes it very difficult to assess the suitability of a student or employee and the OSH professionals are usually uninformed about the comprehensive safe employment of workers from vulnerable groups. Therefore, it is necessary to develop professional guidelines based on aptitude and ability tests, work simulation surveys and research. The occupational health professionals in Hungary greatly need professional guidelines that provide concrete assistance in realizing the assessment of the occupational and vocational medical fitness of persons with disabilities and placing disabled persons into new positions. Preparing such professional materials and standards is worthwhile, because professions and jobs by occupational sectors can be grouped this way. It is subservient to determine which risks factors must be considered so that a person with disability can be employed under generally defined or special conditions, or not employed. [7].

The Hungarian Province of the Piarist Order has established the "Kilátó" PiaristCareer Guidance and Labour Market Development Center (in the following: Kilátó Center), which is a new methodological and research centre. Between January and December 2018, our research team participated in the development of the professional protocols of Kilátó Center, including a methodology for instrumental work diagnostic surveys. [8] Our

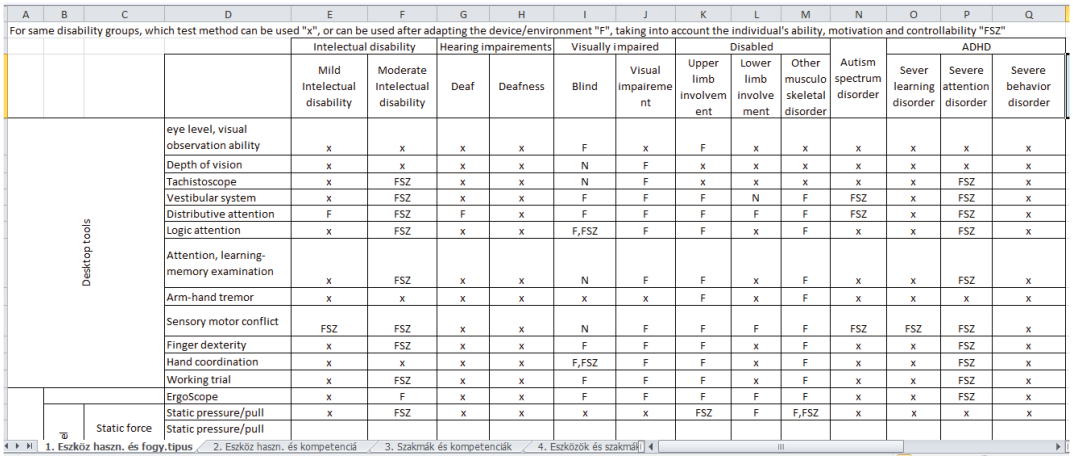
research team performs gap-based job diagnostic tests for the Kilátó Center, which form the basis for the routine introduction of ability measurements into career guidance counselling and into the examinations performed during employment.

OBJECTIVE

During our work diagnostic measurements, we aimed to optimize the measurement processes, developing a database for younger age groups and a disability specific measurement methodology. We sought to determine whether there was a significant difference in performance between male/female test subjects and which measured parameters differed by disability categories. We also compared the results with the reference values for the healthy population. The requirements for the competencies and abilities of the professions were reviewed in the available literature and we compared that data to the competencies measured by work diagnostic tests. [9] This way we set up a system of criteria for assessing fitness for profession and for work. [10]

METHODOLOGY

Most of the tests were conducted with youngsters between the age of 13 and 30 years, with SEN (Special Education Needs). Participants in the study had applied for the survey through partner organizations and schools. The tests were performed on the ErgoScope work simulator which consists of three measurement panels, which were developed in Hungary, and on 9 different portable desktop aptitude measurement devices according to our measurement instructions. [11, 12] The work simulator survey took 1.5-3 hours for each person and 1.5-2 hours for work psychological abilities. It was determined for each device and subtask whether it can be used, partially used, or cannot be used for measurement by certain disability groups. (Figure 3.)



For same disability groups, which test method can be used "x", or can be used after adapting the device/environment "F", taking into account the individual's ability, motivation and controllability "FSZ"

		Intelectual disability		Hearing impairements		Visually impaired		Disabled				ADHD		
		Mild Intelectual disability	Moderate Intelectual disability	Deaf	Deafness	Blind	Visual impairement	Upper limb involvement	Lower limb involvement	Other musculo skeletal disorder	Autism spectrum disorder	Sever learning disorder	Severe attention disorder	Severe behavior disorder
Desktop tools	eye level, visual observation ability	x	x	x	x	F	x	F	x	x	x	x	x	x
	Depth of vision	x	x	x	x	N	F	x	x	x	x	x	x	x
	Tachistoscope	x	FSZ	x	x	N	F	x	x	x	x	x	FSZ	x
	Vestibular system	x	FSZ	x	x	F	F	F	N	F	FSZ	x	FSZ	x
	Distributive attention	F	FSZ	F	x	F	F	F	F	F	FSZ	x	FSZ	x
	Logic attention	x	FSZ	x	x	F,FSZ	F	F	x	F	x	x	FSZ	x
	Attention, learning-memory examination	x	FSZ	x	x	N	F	F	x	F	x	x	FSZ	x
	Arm-hand tremor	x	x	x	x	x	x	F	x	F	x	x	x	x
	Sensory motor conflict	FSZ	FSZ	x	x	N	F	F	F	F	FSZ	FSZ	FSZ	x
	Finger dexterity	x	FSZ	x	x	F	F	F	x	F	x	x	FSZ	x
	Hand coordination	x	x	x	x	F,FSZ	F	F	x	F	x	x	FSZ	x
	Working trial	x	FSZ	x	x	F	F	F	x	F	x	x	FSZ	x
	ErgoScope	x	F	x	x	F	F	F	F	F	x	x	FSZ	x
Static force	Static pressure/pull	x	FSZ	x	x	x	x	FSZ	F	F,FSZ	x	x	x	x
	Static pressure/pull													

1. Eszköz haszn. és fogy.tipus | 2. Eszköz haszn. és kompetencia | 3. Szakmák és kompetenciák | 4. Eszközök és szakmák

Figure 3. Applicability (usability) of ErgoScope Dashboards and Desktop Capacities to Different Disability Categories – detail from the original table (Jókai, Nagy [10])

During the work diagnostic measurements partial abilities were examined: static/dynamic effort, wrist effort, hand/finger effort, hand/finger skill, keyboard manage-

ment, pencil use, eye-hand coordination, depth perception, eye level, tactile perception, logical ability, concentration, short-term memory, reflex time, observability, pace of work, organization of work. We determined which sub-capabilities can be tested by which device. [8, 10]

In each case a measurement identifier was created to ensure anonymity. After the tests, the measurement data were stored electronically, and we used IBM SPSS Statistics 23 for analysis. The results of the surveys and the methodological manuals were documented in detail for the Kilátó Center. [10, 11]

RESULTS

In our study we processed the measurement data of 150 people with the ErgoScope work simulator, 13-30 years old, most of them with SEN. We classified disabled people into 7 categories, based on different disability groups: mild mental retardation, moderate mental retardation, attention deficit, disability, autism spectrum disorder (ASD, Asperger syndrome), visually impaired, hearing impaired. We examined 100 persons with the help of the ErgoScope work simulator: 46 students, 16 jobseekers, 30 actively employed persons with disability and 8 healthy persons. (Figure 4.) Another 50 persons were tested and evaluated with the help of desktop aptitude tests: 34 person with disability and 16 healthy person. (Figure 5.)

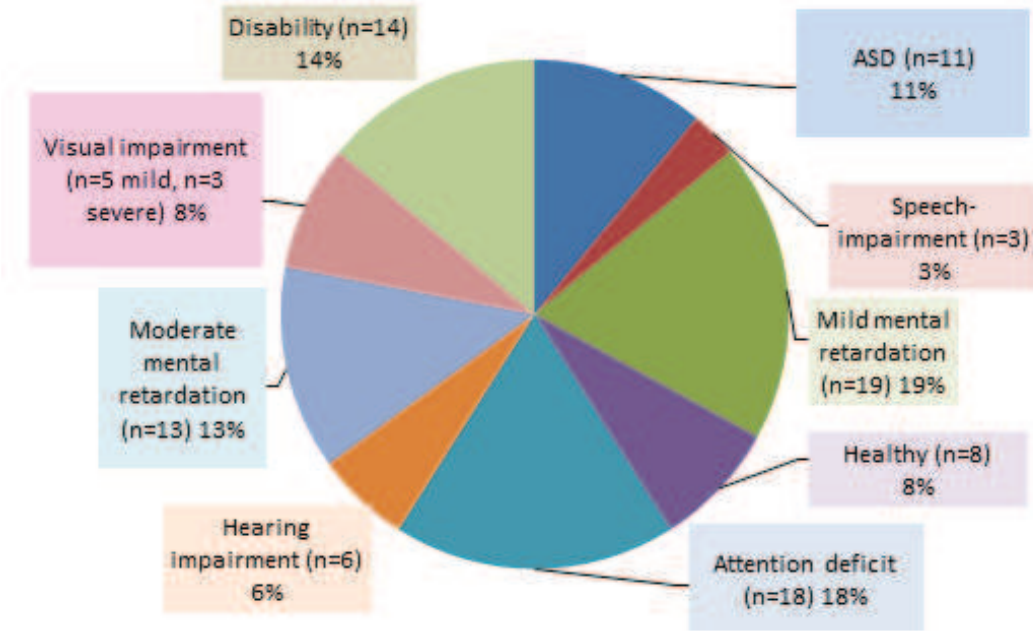


Figure 4. Distribution of persons tested by ErgoScope work simulator (Jókai [10, 13])

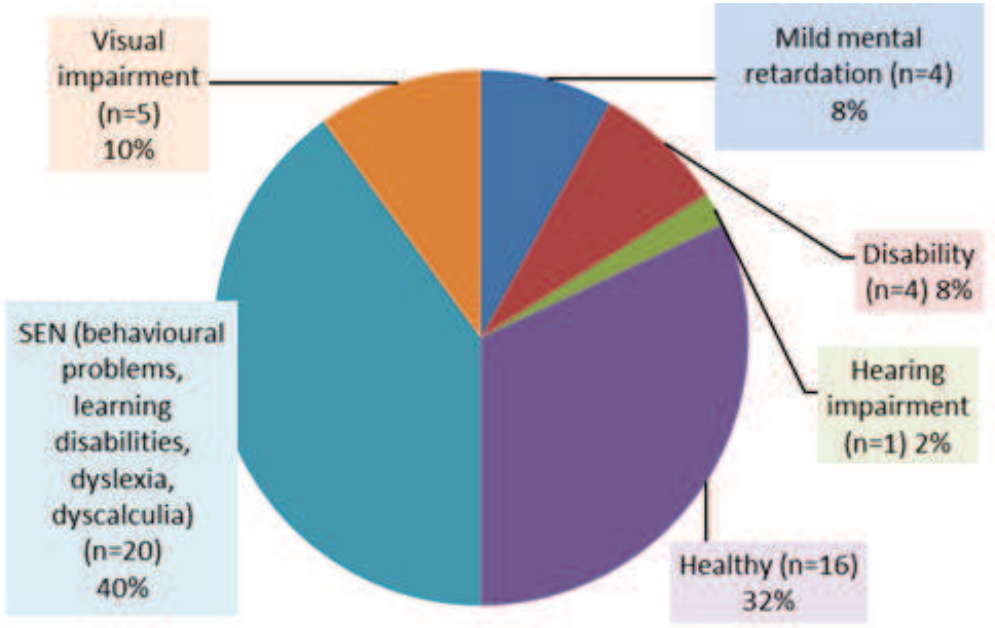


Figure 5. Distribution of persons tested with the help of desktop aptitude tests, devices by affinity (Jókai, Nagy [10, 13, 14])

The results showed a significant difference between male and female results in two-handed effort, hand and finger grip strength and reaction time. The Asymp. Sig. (2-tailed) value in regard to the grip strength of hand with the Mann-Whitney test in the case of men was 0.000, and in the case of women was 0.252. No significant differences were detected between male and female results in regards to touch, keyboard management, pencil use, using rotary knobs and switches, workload and monotony tolerance measurement tests.

The ErgoScope Work Simulator studies show that the best results were found in the case of people with attention deficit, autism and hearing impairment, after that in the case of disabled persons and in some tests (keyboard management) the visually impaired persons were better. The simplest and shortest test, the „button management" was performed by people with moderate mental retardation with a good average score (19/20 hit). Visually impaired young people generally performed better in the keyboard management and tactile exercise. In the rotary knob controlling/using (attention, eye-hand coordination) persons with attention deficit achieved the best scores and young people with intellectual disabilities performed the worst. (Table 1.)

Exercises	Healthy	Visually Impairment	Attention Deficit	Mild Mental Retardation	Down sy.	Challenges
Touch (righht hand, 20 objects, error-free, pieces)↑	**19.70**	13.86	**13.33**	**7.55**	**4.86**	Knowledge of mathematical concepts, coordination with unseen hand
Rotary knob operation at breast height, with dominant hand, recording the degree of deviation, (absolute error)↓	**25.69**	**81**	**35**	**173**	**187**	Attention, eye-hand coordination ability , motivation
Keyboard management with both hands, left sign+space, 100 times, (keystroke average time)↓	**21.87**	14.63	**26.65**	**40.87**	**54.96**	Attention, eye-hand coordination ability , motivation

Table 1. Results of some partial ability tests by the disability groups (Jókai [10, 13])

We could not calculate disability-specific measurement differences because only a few people with disabilities were tested with the help of the desktop aptitude tests. 32% of the people tested were healthy and 40% had behavioural problems, or learning disabilities, dyslexia, dyscalculia. (Figure 5.) There was no significant difference between the results of these persons except for one or two cases. This way these data will also be used in conjunction with the data recorded with the help of other desktop aptitude tests that are still being processed to form new reference values. Establishing reference values is one of the main goals of our ongoing research, because no international reference values are available for the Hungarian work diagnostic tools we used in our study.

For the ErgoScope work simulator, we had a measurement reference database, based on performance data for healthy and tested people, and we created 3 categories (under 50%, between 50-80% and above 80% performance). In the case of desktop aptitude tests, the standards developed by the manufacturer were used (V – excellent, IV – good, III – average, II – poor, I – very poor). Now, we are currently in the process of developing an evaluation system based on our own performance averages, which evaluation system is similar to the 3 result categories used for the ErgoScope work simulator.

Based on our measurement and testing experiences, we have processed and tabulated the complex analysis of 30 professions, 22 parameters from work situations measured with the help of the ErgoScope work simulator, 12 test methods with the help of desktop aptitude tests and 6 groups of disabilities. [10, 14]

The tables include:

- Usability and conditional usability of measurement/test methods for certain disability groups;
- Which competencies and abilities can be measured by which measurement/test methods;
- What competencies and abilities are needed to get certain professions and later to work in that profession;

- Which test method is worth using for the chosen profession. It was an important aspect that the results obtained during the examination could facilitate the work of the school doctor/occupational physician during occupational/professional medical fitness tests.

CONCLUSIONS

Work diagnostic tests are adequate for measuring objective and reliable performance survey. However, currently there are not available normalized and standardized reference metrics. Thus in our future research, we aim to collect more large amounts of data to create reference values.

The ErgoScope work simulator and portable aptitude testers provide objectively measurable data on certain ability and capacity parameters of the tested person, thus these work diagnostic tests can be used effectively in professional/occupational medical fitness tests. In the case of persons with disabilities, the work-related diagnostic measurements can provide particularly important information. These cases are: assessing fitness-for-profession (pre-school), fitness-for-work (pre-employment), and, in the context of occupational rehabilitation, persons with disabilities returning to work or entering the labour market.

Based on our experiences of this research we found that we can develop guidelines and policies for the professionals of occupational safety and health professionals and employers. These measurement protocols for ErgoScope Work Simulator and Desktop/Portable Ability Testers [10], can facilitate the assessment process and safe employment of vulnerable workers, including people with disabilities.

BIBLIOGRAPHY

[1] 1998. évi XXVI. törvény a fogyatékos személyek jogairól és esélyegyenlőségük biztosításáról. 1.§, 15.§. http://njt.hu/cgi_bin/njt_doc.cgi?docid=34535.370305 (downloaded: 2019.10.05.)
[2] 2007. évi XCII. tv. a Fogyatékossággal élő személyek jogairól szóló egyezmény és az ahhoz kapcsolódó Fakultatív Jegyzőkönyv kihirdetéséről. 27. cikk. http://njt.hu/cgi_bin/njt_doc.cgi?docid=110932.266681 (downloaded: 2019.10.05.)
[3] 2003. évi CXXV. tv. az egyenlő bánásmódról és az esélyegyenlőség előmozdításáról. 21.§. http://njt.hu/cgi_bin/njt_doc.cgi?docid=76310.366950 (downloaded: 2019.10.05.)
[4] 1991. évi IV. tv. a foglalkoztatás elősegítéséről és a munkanélküliek ellátásáról. 19/B §. http://njt.hu/cgi_bin/njt_doc.cgi?docid=14929.367061 (downloaded: 2019.10.05.)
[5] 1993. évi XCIII törvény a munkavédelemről. Mvt.50/A. § 63. http://njt.hu/cgi_bin/njt_doc.cgi?docid=19510.362712 (downloaded: 2019.10.05.)
[6] ILMARINEN, J.: From Work Ability Research to Implementation Int. J. Environ. Res. Public Health 2019, 16(16), 2882;https://doi.org/10.3390/ijerph16162882 , https://www.mdpi.com/1660-4601/16/16/2882/htm (downloaded: 2019.10.05.)
[7] ZAWIESKI, M.W. (2014): Projektowanie objektów, pomieszczeń oraz przystosowanie stanowisk pracy dla osób nipełnosprwnych o specyficznych potrzebach – ramowe wytyczne. (Objects and Room Design and Adaptation of Workstations for Persons with Disabilities with Special Needs - Framework Guidelines) CIOP-PIB, Warszawa. pp. 19-32.

[8] JÓKAI, E.: Munkaszimulátorok alkalmazása sérülékeny munkavállalók munkahelyi biztonsága és egészségvédelme érdekében. Bánki Közlemények (2019)
[9] CSEH, K., NEMESKÉRI, Zs., et al: Kézikönyv a foglalkozások egészségi szempontjainak meghatározásához. PTE Emberi Erőforrás Fejlesztési Kar, 2014.
[10] JÓKAI, E. (edit.) (2018): Munkadiagnosztika – módszertani kézikönyv műszeres munkadiagnosztikai felmérésekhez, Kilátó Piarista Pályaorientációs és Munkaerőpiaci Fejlesztő Központ, p.150.
[11] MÉSZÁROS, G. (2018): Módszertani kézikönyv az asztali mérőeszközök használatához, Kilátó Piarista Pályaorientációs és Munkaerőpiaci Fejlesztő Központ, p.39.
[12] JÓKAI, E. (edit.) (2018): Mérésvezetői instrukciók az ErgoScope munkaszimulátoros méréssorozat levezetéséhez – módszertani kézikönyv, p.96.
[13] JÓKAI, E.: Munkaalkalmasság-vizsgáló eszközök és szimulátorok használata a pályaorientációs tanácsadás támogatására - kutatási tapasztalatok (2018)
[14] NAGY, S.: Pályaorientációs központ fejlesztése során végzett munkadiagnosztikai mérések tapasztalatai és módszertana, Tavaszi Szél Konferencia (2019) p. 456

INTERPRETATION OF SECURITY IN RELATION TO THE CORONA-VIRUS EPIDEMIC

A BIZTONSÁG ÉRTELMEZÉSE A KORONAVÍRUS JÁRVÁNY KAPCSÁN

SZAKALI Miklós[1] – SZŰCS, Endre[2]

Abstract

In this article, we would like to draw the attention for the importance of the comprehensive approach of security. The ongoing coronavirus epidemic has already proven that there is an equal need for the military and the non-military security sectors for coping with a complex crisis. From a national point of view, we consider inevitable the elaboration of a National Civil Security Strategy and its inclusion into the system of the national security strategies. We also suggest systematic and forward-looking planning of the civilian capabilities (critical infrastructure) in close coordination with the military capabilities. Finally, we propose a structural framework for the coordinated strategic planning.

Keywords

coronavirus, security, strategic planning, civil security, critical infrastructure

Absztrakt

A cikkben szeretnénk felhívni a figyelmet a biztonság komplex értelmezésének fontosságára. A koronavírus járvány bebizonyította, hogy a katonai és a nem-katonai biztonsági szektorokra egyaránt szükség van egy komplex válsághelyzet elhárításához. Nemzeti tekintetben elengedhetetlen egy Polgári Biztonsági Stratégia kidolgozása és beemelése a nemzeti biztonsági stratégiák rendszerébe. Javasoljuk a polgári képességek (kritikus infrastruktúra) fejlesztésének szisztematikus és előrelátó tervezését a katonai biztonsági szektorral összhangban végrehajtani és erre egy strukturális keretet ajánlunk.

Kulcsszavak

koronavírus, biztonság, stratégiai tervezés, civil biztonság, kritikus infrastruktúra

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INTRODUCTION

The world is at war, from China and to the United States, every nation is fighting in this particular war, in which not a single shot has been fired yet, but it has caused so much losses in human life, economic and social values that it can rightfully be measured against a devastating war conflict. The number of people infected with the new coronavirus is approaching to three million; death tall has exceeded 200,000, according to the daily report of the Johns Hopkins University (Index-I, 2020). These figures are just for information, since they significantly change from day to day. However, we should also be aware that the number of reported cases does not accurately reflect reality, since the protocol for testing and the criteria for accounting and reporting are different in each country.

In addition to human losses, the epidemic is also severely hit the economies throughout the world. Setback is already felt after the temporary shutdown of companies, and the negative trend may increase in the future if many production and service companies are unable to restart and contribute to the economic growth, which is essential for the recovery of economies in every country. Another serious consequence of the pandemic is that great number of masses lose their jobs and this "jump" in the rate of unemployment may generate social tensions and finally ending up in a social explosion. The new coronavirus pandemic could lead to the loss of nearly 25 million jobs worldwide, according to a report published by the International Labor Organization. The Geneva-based organization estimated that in the worst-case scenario, 24.7 million jobs could be lost. By comparison, according to the organization, this number is higher than the number of registered unemployed (22 million) in the economic crisis began in 2008. (Határátkelő, 2020)

The global epidemic was very ruthless with Europe as well; almost half of the infected people and 60-65% of death cases are coming from here, according to current data. In addition to the loss of human lives, life in Europe has completely changed, almost all the usual activities stopped, on individual and social levels too. The current situation is deteriorated by the fact that we do not know the "enemy", the development of an efficient vaccine or antibody is now in an experimental stage, currently there is no generally proven medicine or professionally agreed protocol for treatment. In this way, of course, it is impossible to predict the end of the struggle, which may result growing public uncertainty and impatience, greatly reducing the tolerance against the restrictive rules. However, it is clear that the longer it takes to overcome the epidemic, the greater losses we can expect.

Among other sectors, Europe's leading economic sectors, which greatly contributed to the economic growth of Europe and the prosperity of individual nations, tourism and car manufacturing have also got to crisis. International and national traffic of passengers and together with it the tourism have also come to an almost complete halt, and as a result of it, the revenue coming from these sectors has almost fallen to zero. However, not only the tourism has collapsed, but its related services such as the hotel industry, restaurants, cafes and the entertainment industry are also struggling for survival. For example in Italy, the European center of the virus, nearly 128 million trips were registered each year, half of them made by foreign tourists. Foreigners spent nearly 50 billion EUR in the country in 2018, according to the estimation of the Bank of Italy. Now, with the absence of tourists, perhaps the weakest financial year ever will come in the Italian tourism. This is a great damage since the added value of the tourism is about six percentage of the Italian GDP. Therefore, this sector is more important for Italy than for example to France or Germany.

The European Automobile Manufacturers Association (ACEA) has made an estimate in its latest paper on how many workers could be affected by a forced break in each country, and how much redaction in the car production can be expected due to the coronavirus. They estimated that 1,087,293 workers would be affected by the outbreak of the epidemic in the EU, which were about 40% of the 2.6 million people directly employed in the car industry. The shutdown could be the most painful for Germany: affecting more than 568 thousand workers and decreasing the production with more than 359 thousand vehicles. (Portfolio, 2020) It is understandable that a leader of the Volkswagen's Board of Directors stated that the current situation could not last longer than this summer because neither society nor economy would be able to tolerate it. Germany, the strongest economy of the EU is already facing with serious problems, more than 470,000 German companies requested wage subsidies from the federal government due to the crisis. (Index-2, 2020) Volkswagen, Daimler, Puma, Deutsche Bank and several highly rated companies also applied for support as well as other mid-, and small companies. The German government is trying to mitigate the impact of the crisis with a 750 billion EUR financial package, which means that more than 21% of the German GDP in 2019 will be spent on crisis measures. Nations follow the same way in order to overcome the crisis and recover their economy as soon as possible, almost all European governments try to keep their economies alive and prevent national tragedy with economic rescue packages. It is clear that, the epidemic is not just a current threat affecting our present life, but it will certainly have a serious impact on our future, determining long-term safety and security of our life.

ROLE OF INTERNATIONAL ORGANISATIONS

Taking into consideration all of this, the role of international organizations can be considered, as they have a decisive role in forecasting the epidemic and in coordinating or leading the preparations against the crisis in time by developing unified responses, measures and proposals. On 22 January 2020, the Chinese authorities announced the closure of Wuhan, which was considered the center of epidemic in China; meanwhile, the World Health Organization (WHO) in Geneva announced that the spreading of the coronavirus could not be considered as an international health emergency. There is no doubt that the accuracy and the timeliness of information provided by some nations were questionable and these facts significantly hampered the recognition of the epidemic and the introduction of the necessary preventive measures. On 11 March 2020, after lengthy discussion, the WHO took a decision and declared "pandemic situation", at that time the chief of the WHO, Tedros Adamon Gebreesus was optimistic on the possibilities to control the epidemic. However, a few days later, on 25 March 2020, he already expressed in dramatic sentences how serious the situation is. "This virus is the public enemy number one. A month, two months ago, it would have been time for action ..." (Index-3, 2020)

At the time of the first Chinese reports, the epidemic was still considered in Brussels and most part of Europe as a distant risk factor. This confidence was because previous health threats such as SARS, Ebola or MERS had not spread and caused epidemic in Europe or worldwide. On 27 January 2020, the President of the German Centre of Epidemiology assessed that, single cases may occur in each country, but they were not expected to spread (Politico, 2020). Thus, EU leaders still spent February 2020 with global diplomacy. Even on 26 February 2020, the threat posed by the virus was assessed as "low to moderate" and

the focus remained on diplomatic relations with regions and countries outside the EU. The President of the EU Commission, von der Leyen met with leaders of the African Union in Ethiopia, the Commissioner for Health went to Rome and the Commissioner for Crisis Responses had a meeting in Burkina Faso. This was in line with the priority of the President, to lead an EU Commission which is more focused on geopolitics. Meanwhile, there has been a serious incident, a bomb attack killed more than thirty Turkish soldiers in Syria. As a consequence of it and referring to the increased burden on his country the Turkish president announced that he could not keep the refugees back from migrating into the EU and he would open the borders to Greece and Bulgaria. This announcement previewed the emergence of a refugee crisis that caused more headache for the EU leaders than the coronavirus. Thus, negotiations have been launched with stakeholders to address the potential refugee crisis, which diverted again the attention from the epidemic, while it silently spread and infected up and down in the EU.

NATO, as the guarantor of security in the Euro-Atlantic area, is a politico-military organization with the primary goal to protect against military threats. Therefore, it cannot be expected from this organisation to monitor and respond to a health epidemic situation. The Alliance primarily focuses on developing its military forces and capabilities, rather than building civilian/civil defense capabilities. Even in the framework of civilian preparedness, it expects nations to maintain and develop their civilian capabilities and may be required to support joint allied operations. NATO's reliance on civilian assets and services is a prerequisite for the success of Allied operations. In case of large-scale operations, almost 90% of military deliveries are made using civilian means provided by the civilian sector. More than 50% of military communications are carried out via civilian satellites and networks. The Host Nation Support (HNS) approx. 75% is provided by local commercial infrastructures and services. (Lasconjarias, 2017) After all, it is clear that NATO counts on the civilian capabilities of nations and not the other way around, the Alliance will not provide these capabilities to its members. In line with it, NATO does not even provide its members with prognosis on epidemics and preventive measures. It organized the health protection of personnel in close cooperation with the national regulations of the local authorities and the Allies.

INTERPRETATION OF SECURITY

This crisis caused by the emergence and spread of coronavirus should draw our attention to a systemic security problem. There are serious shortfalls in forecasting and preventing of crises. There was not any international organizations that could warn the European nations in time and could lead preventive actions in a coordinated way. The epidemic has ruined the security of countries, individuals as well as the security of societies and economies across Europe and all over the world. At present, the caused damage cannot be estimated, but we must be prepared for the extended and long-lasting impact of the crisis in the economic, social and political spheres worldwide. How could it happened that the attention of the developed Western-world has slipped over recognizing and preventing or slowing down a security threat of this magnitude? However, the question can continue, is it possible that the developed West is not prepared to deal with this type of non-military security threat? It seems that we have returned to the old approach of security (or not moved away from this point) which was defined after the World War II., and remained the base of the security

theories until the end of the Cold War equaling the security challenges only with military threats. In the following decades of the Cold War, a broader understanding of security has been developed, and the military security was complemented by non-military sector including political, economic, social, and environmental security dimensions. (Dr. Vida, 2009) Now it seems that the expanded approach of security has not taken root in security policy thinking and therefore, it has not been put into practice. It is clear that, the current international organizations involved in the European security are not able (perhaps unwilling) to consider and manage the non-military security dimensions with the same weight than the military dimension and to extend their role to them.

A generally returning statement in the security policy papers is that current security challenges are extremely complex and they change rapidly, so we can only meet the challenges through the development of common capabilities and joint actions. However, if we leave the challenge of such magnitude and complexity as the epidemic and its aftermath to individual nations, then the nice and continuously repeated principles of cooperation, unity, joint actions etc. will not prevail. In our opinion, after the 2015 migration crisis, the current epidemic is the next challenge that affects the whole of Europe, while there is no common response led by any organizations, the solution and the crisis management left for individual nations to deal with. This inevitably raises the need to review the role of international organizations involved in the security business of Europe. Jaume Duch, a spokesman for the European Parliament, also echoes this idea in his statement: "I think this crisis clearly shows that we are stronger together. The virus crosses borders and unfortunately affects all countries. If we face to such common challenges or any type of crisis, it is clear that the answer must also be common. After the crisis, if we want the EU to respond more strongly, we must also discuss the possibility of giving the EU the necessary means and powers to do so. " (Index-4, 2020) At present, both the EU and NATO are focusing on maintaining military security, encouraging member states to increase their military forces and capabilities, in this way the military dimension of security can only be addressed adequately, the management of other dimensions (and there are more from these) remains for nations. Nations cannot consider suitable the value for their money that they spent for military capabilities, since they only receive a "small slice" of security for a large financial investment. Meanwhile, the expensive military forces and capabilities cannot, or just partially, be used to cope with non-military crises.

It is not a surprise that the non-military security dimension has not gained ground and deep-rooted in the policy and practice of security. Besides traditional and historic reasons, even the recent changes in the military security dimension (the occupation of the Crimea and the emergence of hybrid warfare) have given a hard push to bring collective defense and related strategies back to the front of the security thinking. In response to the challenges, it was necessary to develop a defense strategy that includes not only military forces but also civilian capabilities, governmental bodies and key players from the private sector, this strategy used a holistic approach involving the entire society.

I would like to draw the attention to critical infrastructures and resilience, because in addition to the above-mentioned NATO approach, these areas ensure the minimum level of socially required security for each society. These infrastructures provide survivability, operability for economy, services for public health and protection of environment in all type of crisis regardless its origin or link to any of the security dimensions. We have seen several

examples for this practice during the crisis management caused by the epidemic; some nations (Italian, Spanish and Hungarian) decided to shut down all factories, plants and services, which are considered "non-primary" for the current situation. They defined those vital sectors that are crucial for daily life, these were usually the same or very similar in each country. In general, health services, agriculture, food production, transportation, electricity, gas, water, pharmaceutical industry and service, telecommunications, and the press were designated as crucial, which are in line with the NATO's Baseline Requirements. In Hungary, a special action group has been established to assist and ensure the operation of the defined critical infrastructures under the leadership of the Minister of Defense.

DOMESTIC APPROACH AND REGULATION OF THE MAIN QUESTIONS OF CRITICAL INFRASTRUCTURE

The Hungarian regulations are closely related to the EU regulations on the identification of critical infrastructures and the possibilities for their protection. Following the terrorist attacks in Madrid in 2004 and in London in 2005, the European Council called on the Commission to develop a comprehensive strategy for the protection of critical infrastructures. In this context, the Commission first adopted a Communication on "Critical Infrastructure Protection in the Fight against Terrorism" and then set out the general objectives of the European Program for Critical Infrastructure Protection in a Green Paper (EU Commission, 2005).

The Community Directive served the purpose of complementing the nations' existing programs for the protection of critical infrastructures. However, at that time, the regulation of activities related to critical infrastructures was still lacking in the Hungarian legal system, as in most member states of the European Union. In order to ensure a common understanding of critical infrastructures and to facilitate national legislation, a Recommendation on sectors, products and services of the critical infrastructures has been issued as an annex to the Green Paper. In Hungary, the Act on the Identification, Designation and Protection of Vital Systems and Facilities was adopted in 2012. (CLXVI.tv., 2012) This law has been prepared in accordance with the recommendations issued in the EU Green Paper, but differs from it in some respects due to different national legal and structural environment. The regulation includes the 2008 (EU 2008) EU's directive on identification and designation of the European Critical Infrastructures and to enhance their protection, and the 2016 (EU 2016) directive published later on the measures to ensure the equally high level security for network and information systems throughout the Union.

	SECTOR	SUB-SECTOR	SECTOR ACCORDING TO THE GUIDELINE OF THE EUROPEAN PARLIAMENT Nr. 2016/1148	EQUIVALENCY
1	Energy	Facilities of Electric System (exept those elements that fall under the regulation of the nuclear power plant's security, phisical defence, radiation protection.)	Electricity	Yes

	SECTOR	SUB-SECTOR	SECTOR ACCORDING TO THE GUIDELINE OF THE EUROPEAN PARLIAMENT Nr. 2016/1148	EQUIVALENCY
2		Oil industry	Oil	Yes
3		Gas industry	Gas	Yes
4	Transport	Road transport	Road transport	Yes
5		Rail transport	Rail transport	Yes
6		Air transport	Air transport	Yes
7		Water transport	Water transport	Yes
8		Logistic centers		
9	Agriculture	Agriculture		
10		Food industry		
11		Distribution networks		
12	Health	Active inpatient-care	Facilities of health-care (including hospitals, private clinics)	Yes
13		Control of rescue		Yes
14		Reserves of health and blood products		Yes
15		High-level security bio-laboratories		
16				
16a		Medicine-distribution		
16b	Social Insurance	Information systems and networks related to the service of Social Insurance.		
17	Finance	Infrastructures and systems of financial means, commercial and citizen payments	Infrastructures of financial market	Yes
18		Security of Banks and Credit Institutions	Bank services	Yes
19		Provision of cash		
26	Technologies of Info-communications	Infrastructures and services of internet	Digital infrastructures	Yes
27		Fixed and mobile networks of electronic and telecommunication services		
28		Radio telecommunication		
29		Space telecommunication		

	SECTOR	SUB-SECTOR	SECTOR ACCORDING TO THE GUIDELINE OF THE EUROPEAN PARLIAMENT Nr. 2016/1148	EQUIVALENCY
30		Broadcasting		
31		Postal services		
32		Governmental info-communication and electronic networks		
33	Water	Provision of drinking water	Provision and distribution of drinking water	Yes
34		Quality control of surface and under- surface waters		
35		Waste-water disposal and cleaning		
36		Defence of water-bases		
37		Dams and flood-protection		
38-40*	Annulment from 01.01. 2019			
41	Public order – Law enforcement	Infrastructures of public services		
42	National defence	Infrastructures of national defence		

Table 1: Correspondence between sectors and sub-sectors under Directive (EU) 2016/1148 of the European Parliament and of the Council of 6 July 2016 on measures to ensure the equally high level security for networks, information systems, critical systems and installations defined by law (CLXVI tv, 4th ed., 2012)

There is a relevant difference between NATO's and the EU's concepts, NATO seeks to gain support to allied military operations against complex and large-scale military security challenges by building resilience, while the EU focuses on the critical infrastructures and its safeguarding at national level in order to ensure the provision of national and EU-wide sustainability based on those civilian capabilities. At the same time, the EU's approach and consequently our domestic legislation also focus on defense, including the protection against terrorism and the consequence management of a potential terrorist attack, rather than to focus on the continuous provision of the critical infrastructures' products and services in case of crisis. Despite all these differences, the current Hungarian regulations are able to provide the appropriate bases for coping with crises.

At the same time with the declaration of pandemic situation by the WHO, the Hungarian government decided on promulgating the law on state of emergency, which allowed imposing strict restrictions on assembly (more than 100 persons indoor and more than 500 persons outdoor events), border crossing and the closure of various institutions. Most probably due to early measures that Hungary has taken, there are relatively low numbers of infected cases and death toll in the country so far. However, we cannot say that everything is perfect and there is no room for further improvements in our health system, which is one

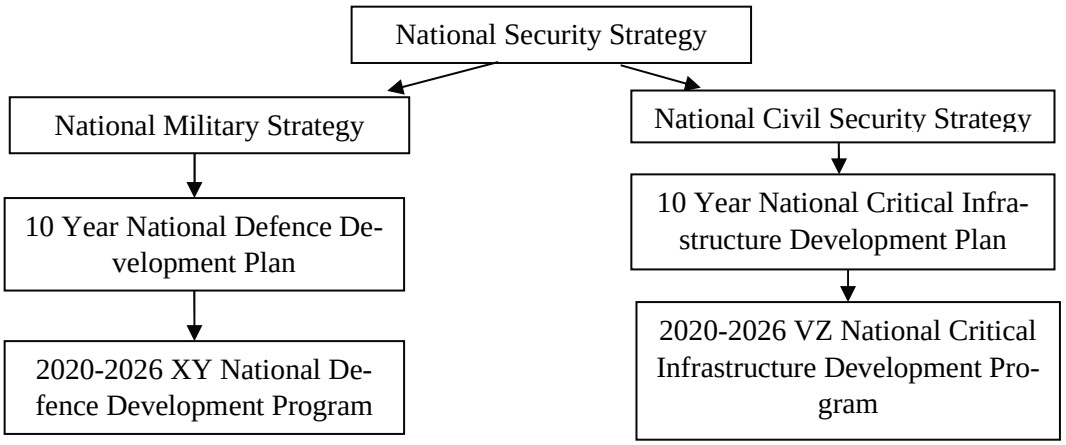
element of the critical infrastructures, was not prepared to deal with the epidemic. They had not enough protective and test equipment (masks, tests, protective clothing, etc.), respiratory equipment, ventilators, fans, hospital beds for intensive care. These shortfalls had to be mitigated by the government's urgent actions to procure tons of protective and sanitary equipment from China, the origin of the virus. Even in this way, the acquisition and the use of equipment was not risk-free, not just because of the potential further import of the virus, but also because of the sudden change of profile in many companies and the quick ramp-up of production often led to qualitative problems and faulty products. The urgent and ad-hoc procurement only reinforces the importance of the early preparations for crises. If we are not prepared to deal with crises situations (of any kind) using advanced plans in a systematic forward–looking way, we will be wasting time, delaying decision taking and hampering effective response that could result in higher number of losses of human life and material resources. In case of a sudden emergency, it may be a matter of luck to be able to procure the necessary quantity and quality of materials and equipment in a short period of time, taking into consideration the increased demand for the same articles and the usually limited production capacity. We have not mentioned yet the economic consequences of these procurements, there is no exact data for it, but it is certain that high demands and urgency are always rigging up prices, so it is pretty sure that current procurement of these assets are much more expensive than it would have been years ago. The unexpected liberation of numerous hospital beds has provoked great debate and dislike among the medical professionals and the population as well, this fact also shows that this operation was not coordinated with the hospitals and the professionals in advance, the hospitals were not pre-designated for this task. So far, there was no mention on the human factor related to the crises, doctors, nurses and other supporting staff of a hospital, who continuously provide extraordinary efforts to save life in this very hard situation. However, it is well-known that there are serious shortages of medical personnel at almost all levels. From the data published by the OECD, it can be calculated that between 2009 and 2017, roughly 12,000 doctors and three times more nurses were trained in Hungary, however, the increase in the Hungarian health system was only two thousand doctors and 1,500 nurses by 2017. (g7, 2019) Where are the others?

The situation with regard to the designation of critical facilities and services is somewhat similar. Based on the declared state of emergency, the Armed Forces was tasked to introduce military control over vital institutions and services, which mainly related to a certain range of service and production capacities in the field of transport, energy and pharmaceutical sectors. As we can see, these are all part of the critical infrastructures and are listed in the table above. The companies were designated in a relatively short period of time, but the names of the designated companies were only published when the military controllers arrived to the companies. It was considered preventive measures to inhibit the designated companies from hampering the process or excluding themselves from the procedure. All this shows that significant elements of the critical infrastructures were not pre-designated and prepared for its tasks, for those legal, management related and cooperative obligations they have to fulfill in a crisis. We think that a lessons identified exercise must be conducted after the end of this crisis summarizing all the essential experiences and incorporate them into the current regulations to make it up to date.

Based on several nations' experiences gained by this crisis we believe that ensuring the continued operation of the critical infrastructures is the root of security, both in everyday

life and in time of crisis as well. Therefore, the systematic, strategic-level planning for the development of critical infrastructures must be included into the national security strategies and planned together or parallel with the military part of it. Hungary has no long tradition in the strategic planning since the legal frameworks of it have only been set in 2012. The first two products were the National Security Strategy and the National Military Strategy issued in 2012. Therefore, it is no wonder that there is no tradition or practice in elaboration of a civil security strategy. The situation on the military side is significantly better due to our NATO membership. From 1999 Hungary participates in the NATO Defense Planning Process that requires a mid-term, strategic-level planning to develop our military forces and capabilities. This planning process currently sets the so-called capability targets for the development of our military forces and capabilities by 2036. These goals are integrated into our national defence (strategic) planning process, breaking them down into a ten-year time horizon, and allocating resources for its implementation. In this way, according to the Hungarian regulations, plans and ideas for the development of the armed forces are available for ten years in advance. After implementing these goals and objectives, the planned military forces and capabilities will be available to provide responses against the expected security challenges of the given period. This forward-looking strategic planning procedure is missing on the civilian side to plan and develop civilian capabilities (critical infrastructures) in a structured and systematic way.

The objectives and requirements of the National Security Strategy (NSS) issued in 2012 (Government Decree-I, 2012) were only broken down by the military side in the National Military Strategy (NMS) (Government Decree-II, 2012), and further detailed in the 10 Year National Force Development Plan and in the short term National Force Development Program. With regard to civilian capabilities, there is no an integrated strategic planning system, which would include all elements of the critical infrastructures representing the other side of the “security coin”. The military side cannot exist without civilian capabilities, and vice versa, they together form the "two sides of the security coin." In order to answer the complex challenges of our current world, only complex responses could be considered appropriate with the combination of capabilities from both, military and non-military dimensions. Therefore, we propose the following structure to develop an integrated and balanced national security planning system:



2. Figure: Proposed structure for the national strategic planning of security (Own edition)

The purpose of the NSS is, based on the analysis of the security environment and the expected security challenges, to determine the national goals and objectives including the way to achieve them together with a comprehensive system of the governmental instruments by which Hungary can enforce its national security interests in the international political arena.

Based on the goals and guidelines set out in the NSS, the NMS and the National Civil Security Strategy (NCSS) break down the expected future threats and challenges facing the country and the possibilities to address them in their strategic tasks and objectives at the level of sectors. Based on the security threats and challenges identified by the NSS, scenarios and course of actions will be developed to model the potential responses with the use of combined (military and non-military) capabilities defining the order of employment for both sides. Based on the results of modeling, main directions and priorities for the force development and the sector-specific development for the critical infrastructures will be determined, as well as the necessary tools and resources.

The 10-year development strategies/plans contain the qualitative, quantitative organizational and other requirements, as well as the rough schedule and resource allocation of the developments specifying the involved services on the military side in line with the guidance and the priorities defined in the NMS. The same procedure applies on the civilian side as well to prepare a 10 year development plan following the requirements above with the involvement of those sectors, which are indicated for prioritized development in the NCSS. In case of critical infrastructures, the allocation of developments and resources to certain sectors is of course a more complex task than in the military side, since critical infrastructures involve several sectors and include not only state-owned companies but also a large number of private and multinational companies. Therefore, wider variety of tools is needed to achieve the desired developments and investments. In addition to legal regulations, it is possible to achieve strategic goals by introducing financial, economic and other incentives, or through state security investments.

In both cases, the development programs are considered implementation program plans, which include all details of the acquisition and the development processes including the defined quantitative and qualitative requirements, resources, terms of payment, deadlines, training, education, operational and logistics procedures, and so on. We think that the well-tried NATO approach for development of military capabilities by using DOTMLPFI[3] system was successful for long time, therefore, it could also be applicable for the development of civilian capabilities.

The comprehensive interpretation of security and its introduction into the national strategic planning system is currently a rough concept, based on a flexible adaptation of the long-standing military security planning system to the elements of the non-military security dimension, taking into account the specifications originating from the differences of the dimensions. The structure and procedures outlined above are in line with the 38/2012. (III. 12.) Government Decree on the Governmental Strategic Control (Government Decree, 2012), which provides an opportunity to establish horizontal co-operation among the sectors in parallel with the implementation of strategic planning in each individual sectors. A detailed planning procedure should be developed with the involvement of all participants and

[3] DOTMLPFI - Doctrine, Organisation, Training, Material, Leadership, Personnel, Facilities and Interoperability

a proper regulation of the planning activities should be ensured. The comprehensive planning of national security should be carried out or coordinated by an organization/authority above all sectors, as the emergence of inter-sectors disputes and conflicts of interests are almost inevitable, since several sectors would interpret this activity as a reduction of their power or a possibility to access to additional resources. However, it should be noted that in general, crisis management is a governmental task, in which a significant and substantial part of the sector's power will be removed from the sectors to the central management (government), therefore it is evident that the central management should be empowered to conduct strategic planning and control all the preparations for crisis situation. At the same time, the individual sector-specific development strategies need to be complemented by the planning and controlling of the implementation of strategic security tasks and developments defined by the security strategic documents.

FINAL THOUGHTS

We believe that, due to the changed security circumstances, a significant change is needed in the approach of security, with putting equal emphasis on the military and non-military dimensions of it, as they constitute together the security as a whole.

In line with it, the mandates and tasks of international organizations involved in the European security need also to be reviewed, since the coronavirus epidemic is the second crisis (first was mass migration) in short time when nations had to face all problems alone without international assistance in anticipating, preventing or dealing with it in a coordinated way. The result of review, of course, also depends on the willingness of nations, if they insist on maintaining the status quo demonstrating their sovereignty, they will only achieve a "slice of security" with the military dimension. However, the military dimension itself will not be enough to overcome complex challenges, without developing non-military dimensions, nations will lose the complexity of their potential responses for complex challenges.

From a national perspective, we also propose to follow a broader approach of security and a comprehensive interpretation of security dimensions. As a part of this, it is recommended to introduce the non-military dimension in the strategic planning system of security and to extend the well-tried military planning system to the non-military sectors, taking into account the necessary flexibility and its specific features.

The longer-term development plans (10 years) based on coordinated priorities and systematic use of budgetary resources could ensure the development of the targeted military and non-military capabilities and assets, which will more likely address complex challenges in case of a potential crisis.

Detailed procedures for the strategic planning of security should be developed with the involvement of all participants and the appropriate regulation should be ensured in accordance with the 38/2012. (III. 12.) Government Decree on the Governmental Strategic Control.

BIBLIOGRAPHY

[1] CLXVI. törvény (2012): *a létfontosságú rendszerek és létesítmények azonosításáról, kijelöléséről és védelméről*, Budapest.
[2] EU (2008): 2008/114/EC *Council Directive on the Identification and Designation of European Critical Infrastructures and the assessment of the Need to Improve Their Protection*, Brussels.
[3] EU (2016): 2016/1148 *Directives of the EU Parliament and of the Council* Concerning *Measures for a High Common Level of Security of Network and Information Systems across the Union*, Brussels.
[4] EU (2005): *Green Paper on a European Programme for Critical Infrastructure Protection*, COM(2005) 576 final, Brüsszel.
[5] g7 (2019):https://g7.hu/adat/20191112/magyar-orvosok-ezrei-noverek-tizezrei-hagyjak-el-a-palyat-vagy-az-orszagot/ (accessed: 10. 04. 2020.)
[6] Határátkelő (2020): *Akár 25 millió munkahely is megszűnhet*,http://hatarat-kelo.com/akar-25-millio-munkahely-is-megszunhet/ (accessed: 11. 04. 2020.)
[7] Index-1 (2020): https://index.hu/belfold/2020/03/10/covid-19_koronavirus_jarvany_terkep_esetszam_halottak_fertozottek/ (accessed: 01. 04. 2020.)
[8] Index-2 (2020): https://index.hu/gazdasag/2020/03/31/nemetorszag_koronavirus_tamogatas/ (accessed: 05. 04. 2020.)
[9] Index-3 (2020) https://index.hu/kulfold/2020/03/25/who_koronavirus_cselekves_ideje_egy_honappal_ezelott/
[10] (accessed: 27. 03. 2020.)
[11] Index-4 (2020): https://index.hu/kulfold/eurologus/2020/04/12/ep_szovivo_koronavirus_jarvany-eu_valsag_jaume_duch/ (accessed: 15. 04. 2020.)
[12] Korm. hat.-I (2012): 1035/2012. (II. 21.) *Korm. határozat Magyarország Nemzeti Biztonsági stratégiájának elfogadásáról*, https://2010-2014.kormany.hu/download/f/49/70000/1035_2012_korm_hatarozat.pdf (accessed: 06. 04. 2020.)
[13] Korm. hat.-II (2012): 1656/2012. (XII. 20.) *Korm. határozat Magyarország Nemzeti Katonai stratégiájának elfogadásáról*, https://www.kormany.hu/download/a/40/00000/nemzeti_katonai_strategia.pdf (accessed: 06. 04. 2020.)
[14] Korm. rend. (2012): 38/2012. (III. 12.) Korm. Rendelet a kormányzati stratégiai irányításról, Budapest
[15] Lasconjarias, Guillaume (2017): *Deterrence through Resilience*, NATO Defence College, Eisenhower Paper Nr.7. May, Roma,
[16] NATO (2016): *Warsaw Summit Communiqué*, Warsaw. https://www.nato.int/cps/en/natohq/official_texts_133169.htm (accessed: 07. 04. 2020.)
[17] Politico (2020): https://www.politico.eu/article/coronavirus-europe-failed-the-test/(accessed: 20. 04. 2020.)
[18] Portfolio (2020): https://www.portfolio.hu/gazdasag/20200331/ennel-csak-rosszabb-lehet-a-helyzet-kiszamoltak-mekkora-kart-okoz-a-koronavirus-jarvany-a-magyar-autogyartasnak-423264 (accessed: 21. 04. 2020.)
[19] Dr. Csaba Vida (2009): *A biztonság és a biztonságpolitika katonai elemei*, Nemzetbiztonsági Szemle MMXIII/I évf. I szám, Nemzeti Közszolgálati Egyetem, Nemzetbiztonsági Intézet, Budapest 91-92 o.

FUNCTIONAL SAFETY OF ROAD VEHICLE INFOTAINMENT SYSTEMS

KÖZÚTI JÁRMŰ INFOTAINMENT RENDSZEREK FUNKCIONÁLIS BIZTONSÁGA

DÉVÉNYI Géza[1]

Abstract

This paper investigates the challenges arise due to the increasing performance and complexity of In-Vehicle-Infotainment (IVI) systems. Mass production road vehicles implement more and more highly automated driving functions. The IVI-systems are interconnected with these functions as well as are in close interaction with the driver. Therefore, the IVI-systems are considered as safety-critical. The proper interaction with the driver can play a significant role in the controllability of hazardous driving situations. The requirements on providing valid information, e.g. geolocation, to other critical functions make the IVI-systems safety-critical. IVI-system malfunctions of self-driving vehicles can have the potential to lead to the violation of critical transportation infrastructure. The compromise of critical IT-infrastructures, e.g. cloud-based navigation, can have the potential to lead to malfunction of the IVI-system of self-driving vehicles.

Keywords

automated road vehicle, critical infotainment system

Absztrakt

A cikk a közúti jármű infotanment rendszerek (IVI) növekvő teljesítményéből és komplexitásából eredő kihívásokat taglalja. A sorozatban gyártott közúti járművek egyre több magas szinten automatizált vezetési funkciót valósítanak meg. Az IVI rendszerek összeköttetésben vannak ezekkel a funciókkal valamint szoros interakcióban vannak a jármű vezetőjével is. Ezekből adódóan az IVI rendszereket egyre inkább biztonságkritikusnak tekintik. A vezetővel történő megfelelő interakció alapvető szerepet tölthet be veszélyes vezetési helyzetek kezelésében. Ez mellett a más kritikus funkciók számára történő valós információk (pl. geolokáció) szolgáltatása is kritikus feladat. Önvezető autók IVI rendszerének hibás működése kritikus szállító infrastruktúrák veszélyetetéséhez vezethet. Kritikus IT infrastruktúrák (pl. felhő alapú navigáció) veszélyeztetése is magában hordozhatja annak lehetőségét, hogy az önvezető járművekben hibás IVI rendszer működéshez vezessen.

Kulcsszavak

automatizált, közúti jármű, kritikus, infotainment, rendszer

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INTRODUCTION

The new road vehicles continuously implement more and more automated driving related features. The ultimate goal of the technology development in the automotive industry is to produce fully autonomous cars, that can drive everywhere in all conditions. Until reaching that advanced state, the technology will have to get over several maturity level. Due to the nature of the automotive business, the technical complexity of the autonomously driving cars and the related critical infrastructures, the continuous development is impossible without properly analyzing the whole context. This paper briefly describes the main IVI system components, highlights the automotive context and the relation to critical infrastructures.

BUILDING BLOCKS OF IVI-SYSTEMS

A general sketch of a premium passenger car can be seen in Figure 1. Not all these system blocks can be found in each passenger car. Some blocks are new developments, and some have already undergone major changes. [1] The main function of the IVI is still providing a Human Machine Interfaces (HMI) in the vehicle. The development of a HMI is a complex, interdisciplinary challenge. [2] As per in other vehicle domains, as well as in the IVI domain, the electronics and the software were the most innovative technological areas in the last decades.

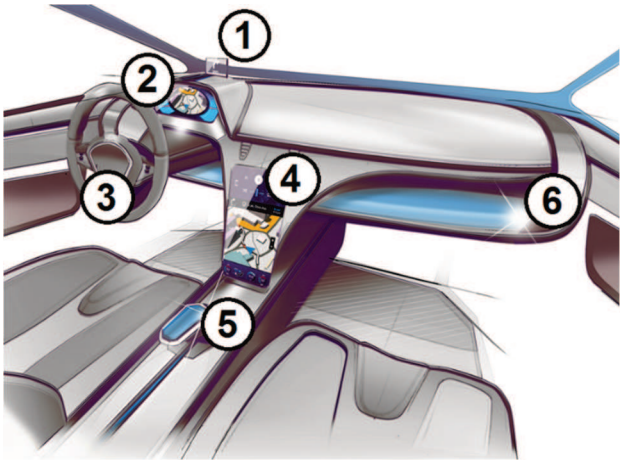

Figure 1 [3] Passenger car In-Vehicle-Infotainment system

The brief description of the building blocks listed below as per numbering in Figure 1**.**

The head up display (1) is a small transparent panel to project a limited amount of information on, mainly to inform, alert or warn the driver. This component is one of the latest developments in the automotive IVI systems. It is usually a compact, digital component. The instrument cluster (2) is one of the original building parts of the IVI systems. It also presents critical information to the driver, e.g. vehicle speed, information on the engine condition. The new premium category cars are already fitted with Liquid Chrystal Display (LCD). Due to reliability purposes, e.g. the safety critical warning functions have not always integrated in the LCD screen but are still using individual (Light Emitting Diode) LEDs.

The steering wheel controls (3) include several buttons and switches integrated in the steering wheel for the comfort of the driver. Vibrating effect can also built in the steering wheel to provide a diverse way of warning for the driver. This warning function can already be considered as safety critical. The head unit (4) can function as the actual brain of the IVI system. For all future cars, it will include a touch screen and a reasonably powerful hardware is able to meet performance requirements of the installed Operating System (OS). It usually includes a Global Positioning System (GPS) receiver for the navigation and a Subscriber Identification Module (SIM) card for the mobile connection. Its control can be fully touchscreen integrated depending on the design of the concerned brand and car type. This control integration tendency supports the cost reduction by removing the hardware buttons and switches. Since the head units by now can implement a hypervisor and can run several OS, the software architecture became hierarchical and complex. This aspect is becoming essential, as the safety critical part of the OS has to be free from interference with other non-safety critical parts of the OS or other OSs. The architecture of future IVI systems will be modular to comply with the technical complexity and the increasing number of the software suppliers. This sort of modularity will demand mature development processes as in the design phase as well as in the integration phase. The control panel (5) is placed in the center console and interconnected with the head unit. Even though the increasing number of features integrated in and controlled by the head unit, lots of Original Equipment Manufacturers (OEM) keep this block, as this is the easiest and safest to use controlling components while driving. It is usually pure electronics, fully integrated component and therefore has no demanding requirements for the system and the software level development processes. The microphones and speakers (6) are the general audio components of the IVI. Their importance and the concerning requirements on the reliability and the quality are increasing as voice recognition features develop. At this stage, the speakers generally have a significant role in the driver warning part of the safety concept.

DRIVING AUTOMATION

SAE J3016 – Levels of driving automation

Program managers and vehicle level designers have to make decisions on the level of the vehicle driving autonomy from the concept phase of the development. In order to provide a common terminology for the industry, the Society of Automotive Engineers (SAE) International issued the J3016 standard. [4] The standard defines six levels of driving automation as per Table 1. It shows the responsibility of the environment monitoring and the driving at each level. Level 0 refers to the lowest level of automation, meaning there is no driving automation at all. Level 5 refers to the highest level of automation, meaning full autonomy. At this level both the environment monitoring and the driving functions are carried out by the system under any circumstances. It means, that there is neither pedals nor steering wheel in the vehicle.

Level	Environment monitored by	Driver	Example
0	Human	Human	Lane departure warning
1	Human	Human	Lane centering OR adaptive cruise control
2	Human	Human	Lane centering AND Adaptive cruise control same time

Level	Environment monitored by	Driver	Example
3	System	Human OR System	Traffic jam chauffeur
4	System	System	Local driverless taxi
5	System	System	Same as Level 4 but in all conditions

Table 1: SAE J3016 Levels of driving automation

Advancement of the autonomous driving technology

Gartner hype cycle [5] is a visual representation of the advancement, adoption and application of different emerging technologies. It was developed and introduced by the research and Information Technology (IT) firm Gartner Inc. The hype cycle has been used by Gartner since 1995. Figure 2 shows the hype curve with its dedicated phases and the positions of Autonomous Driving Level 4 and 5 in 2019.

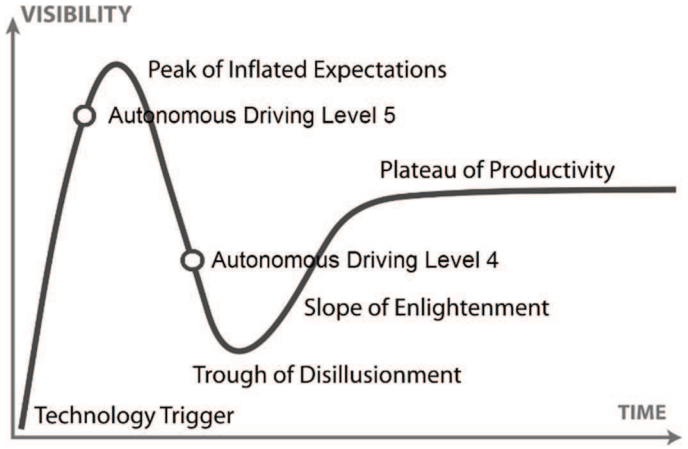

Figure 2: The hype cycle

The horizontal axis represents the time with no definite scale. The vertical axis represents the visibility of the individual technologies, also with no definite scale. The main purpose is to show the actual position of the individual technologies and their relative positions. The positions of the technologies can be compared to their positions in the previous years. The advancement of the technologies along curve can be varying. Some technologies simply disappear before reaching the Plateau of Productivity. Some technologies are not recognized in the early phases. Anyway, the autonomous driving technologies have been in the highlight of the researchers, the automotive developers as well as the marketing sector. Therefore, there has been plenty of information available on this field. Table 2. lists and briefly describes the phases of the hype cycle.

No.	Phase	Description
1	Technology Trigger	The initiation of a potential technology breakthrough. Early concepts can trigger significant publicity. Usable products no necessarily exists. Business model is unproven.

No.	Phase	Description
2	Peak of Inflated Expectations	Early publicity start delivering news on failures besides the success stories. Some companies take action; most don't
3	Trough of Disillusionment	Interest drops as implementations fail to be proven. Several technology developers quit. Investment continues only for the products meet the requirements of early adopters.
4	Slope of Enlightenment	Successful concepts outline sustainable business models. The technology becomes more understood. New generation products arise from survivor technology developers. More enterprises fund pilot projects. Conservative companies remain cautious.
5	Plateau of Productivity	Mainstream adoption starts increasing. Supplier assessing criteria become more established. Broad market applicability and relevance are clearly paying off. If the market size is big enough than the technology can further grow.

Table 2: The phases of the hype cycle

As per the 2019 hype cycle the autonomous driving level 4 technology is well over the Peak of Inflated Expectations period and is getting close to the bottom of the Trough of Disillusionment phase. Perceptions with regard the autonomous driving can change quickly. The speed of the autonomous driving technology development directly depends on other technologies such as sensors, Three-Dimensional (3D) sensing cameras, Artificial Intelligence. Fatal road accidents of self-driving cars can significantly slow down the social acceptance of the technology. According to Gartner's study, neither Level 4 nor Level 5 will not reach the Plateau of Productivity in ten years.

SMDR categorization system

For some problems, the standard categorization of levels of driving automation cannot cover each aspect in the consideration. For analyses of highly automated and connected road vehicles, IT security also has to be taken into account. In such case, a specific Storage-Maintenance-Driving-Routing (SMDR) [6] categorization can be applied as per Table 3. The SMDR categorization was developed at Óbuda University, Budapest, Hungary.

Categories	Category S	Category M	Category D	Category R
Abstract category	Property	Thing	Relation	Control
Aspect of vehicle	Storage in vehicle	Technical operation	Moving the vehicle	Traffic control
Problem	**Storage**	**Maintenance**	**Driving**	**Routing**
Level 1	Objects	Traditional maintenance	Traditional driving	Static routing
Level 2	Creatures, special objects	Controlled maintenance	Controlled driving	Dynamic routing
Level 3	Humans	Periodic maintenance	Automatic driving	Central routing
Level 4	Hazardous material	Automatic maintenance	Convoy driving	Community routing

Table 3: SMDR categorization of automated vehicles

THE AUTOMOTIVE CONTEXT

Production Volume

The number of the produced cars is by order of magnitudes higher than that of other safety critical systems, e.g. power plants or airplanes. Any critical problem resulting in a recall of a car type can cost a lot for the OEM. On the other hand, the big car factories require huge investments, which can return in decades only. Therefore, the industry is traditionally very cost sensitive, setting extremely tight budget for the development.

Supply Chain

The supply chain extends around the globe and is very complex. The responsibility sharing between the parties is based on actual contracts, but the players have to comply with the global quality standard IATF16949 [7] by International Automotive Task Force. Taking into account the increasing number of the software suppliers, the standard requires the software suppliers to build competency to carry out self-assessments on their own software development processes.

Technical complexity

The complexity of the in-vehicle communication network continuously increased as many new Electronic Control Units (ECU) were implemented and connected to the vehicle Controller Area Network (CAN). The volume of the software implemented in the ECUs boomed along with the number of required features and the performance of the electronics hardware. A new premium car has over 100 million Lines of Code (LoC). As a comparison, a Boeing 787 has 3 million or less LoC. [8]. Such level of complexity raises specific requirements on the architectural design (at the system, software and hardware level), on the component interface specification, on the related integration test specification as well as on the actual integration process.

Vehicle lifecycle

The OEMs traditionally have a very conservative approach on the verification and the validation of new technologies. For that reason, OEMs want to see a product with fully validated feature set by the Start of Production (SoP) This is a reasonable requirement to reduce the risk of a recall campaign. On the other hand, IVI systems have an increasingly stronger customer requirement to be able to add new system features after the SoP. The vehicle domains are more depending on the actual hardware, e.g. chassis, power line, usually can't be upgraded with new features. The developers therefore will have to specify hardware that is more powerful and a properly modular software architecture. Taking also into account the increasing technical complexity, the full system validation before SoP is getting a bigger challenge. This is also an important area, where OEMs and the IVI software suppliers will have to come to a compromise. Some features might be released with a lower but still reasonable level of validation and might be upgraded based on the field experiences. Tesla cars are already able to remotely update its software accordingly. [9]

Cultural differences

Due to the implementation of the direct User Interface (UI) the IVI is unique among the other vehicle domains. It is feature rich compared to the chassis or the power line domain. Since the UI is always, an essential part of the vehicle's level safety concepts, the developers have to take into account the target market cultural background. Developers

working for global markets have to develop competence to deal with this aspect, which is time demanding for the organization.

Personalization

Mobile users are used to their phone's personal settings and want to keep using the familiar UI while driving or travelling in a car. Therefore, the IVI UI has to be able to dynamically adjust to the driver's and the passengers' device settings. The trend of car-sharing [10] strengthen the requirements on personalization. This aspect creates information security requirements too for the system, e.g. authentication, authorization, and accounting (AAA). [11]

Information security

Future autonomous cars will continuously monitor the environment and send information to the cloud where High Definition (HD) maps [12] will be created and maintained. The HD maps will be an integrated part of the traffic and logistics infrastructure, which is considered as critical infrastructure. In the same time, road vehicles will download HD map data to feed their navigation functions. Compromising the map providers IT system can have the potential to lead to hazardous driving situations for individual vehicles, as well as to traffic system level incidents. The in-car communication network can also be compromised via the IVI system, which can lead also to hazardous driving or traffic situations. The root cause of the security gap can be either a focused hacking or a malfunction of the UI integrating IVI system. Thus, developers have to analyze the IVI system's malfunction root causes from information security point of view. Vice-versa, the IVI system malfunctions have to be considered as root cause of security gaps.

Newcomers in business

With the integration of System on Chip (SoC), quality displays and high-performance Graphics Processing Units (GPU) global, originally non-automotive OS providers, e.g. Google and Apple, and several small software component developers appeared in the market. These companies have no traditional automotive background. This cultural gap is a big challenge to fill for each party. The software suppliers will have to adopt to the automotive quality standards. For software suppliers the Automotive Software Process Improvement and Capability dEtermination (ASPICE) [13] became the leading standard on the development processes. On the other hand, the OEMs tend to adopt agile software development methods, e.g. Scaled Agile Framework (SAFe) [14] at the different organizational levels. This is also an area, where the partners along the whole supply chain will have to come to a compromise.

FUNCTIONAL SAFETY STANDARDS

ISO26262 Road vehicles – Functional safety

The society and the authorities want to see a continuously decreasing trend in the number of car accidents. The inappropriately low level of safety can result in a recall with financial, legal as well as reputational consequences. In order to reduce such risks rooted in the malfunction of safety critical systems the International Organization for Standardization issued the functional safety standards for road vehicle ISO26262 in 2011. The standard purposes listed below:

- provides an automotive safety lifecycle (management, development, production, operation, service, decommissioning) and supports tailoring the necessary activities during these lifecycle phases;
- provides an automotive-specific risk-based approach to determine integrity levels Automotive Safety Integrity Levels (ASIL) [15]

Table 4 summarizes the ASILs. ASIL Quality Management (QM) refers to the lowest level of safety criticality and ASIL-D refers to the highest level of safety criticality. In the second column vehicle level functions listed as per their usually applied ASIL;

ASIL	Example
QM	Movie and game systems
A	Connectivity, GPS, navigation system
B	Instrument cluster, steering wheel sensor
C	Stability control, valve control
D	Braking, electronic power steering

Table 4: Automotive Safety Integrity Levels

- uses ASILs to specify applicable requirements of ISO 26262 so as to avoid unreasonable residual risk;
- provides requirements for validation and confirmation measures to ensure a sufficient and acceptable level of safety being achieved;
- provide requirements for relations with suppliers.

ISO/PAS 21448 Road vehicles — Safety of the intended functionality

The absence of unreasonable risk due to hazards resulting from functional insufficiencies of the intended functionality or by reasonably foreseeable misuse by persons is referred to as the Safety Of The Intended Functionality (SOTIF). [16]

The standard provides guidance for the design, verification and validation activities necessary to achieve the safety of the intended function. It is important to note, that this standard does not cover the faults addressed by ISO26262 or hazards caused by the system. This standard is meant to be applied to intended functionality where situational awareness is critical for safety. Situational awareness is essential for emergency system functions (e.g. emergency brake) and Advanced Driver Assistance Systems (ADAS) at Levels 1 and Level 2. The standard can also be taken into account for higher levels, but further measures might need to be applied. Measures defined in the standard can be used for the development of innovative functions, where situational awareness is based on complex sensor data and processing algorithms. The standard considers intended use and foreseeable misuse combined with hazardous system behavior during hazardous event identification. Intentional misuse of the system is considered feature abuse. Such sort of abuse is not in the scope of the standard.

SAFETY INTEGRITY LEVEL

According to the automotive functional safety standards, the system safety topic has to be considered throughout the whole lifecycle of the vehicle. The interactions between the

vehicle and the environment has to be assessed and documented by certified safety specialists of OEMs during the concept phase in the Hazard Analysis and Risk Assessment (HARA) The outcome of the assessment will determine the ASIL for each considered hazardous event. The standard's guideline on severity classification considers damages caused to the vehicle, the passengers and pedestrians. In some situations, these damages can be significantly lighter than the resulting losses caused by a severe traffic jam, mainly in dense urban areas. The more automated driving features will be implemented in vehicles the driver more will be used to them. For example, sound effects and streamed video on the head unit assist drivers during reverse driving or emergency breaking. At this stage the controllability of the driving scenarios where such driving assisting systems or warning messages are unavailable are considered generally controllable. Due to the lack of driving experience with no driving assisting features the controllability specification guideline will need to be reviewed. The unavailability of warning messages at high speed, e.g. on motorway can have the potential to lead to hazardous situations classified with higher severity. Navigation solutions assist drivers in route planning, battery management of electric vehicles and charging station finding. Due to the loss of GPS signal or connection to a cloud-based navigation can lead to hazardous situations higher than ASIL QM. In case of fully autonomous cars (Level 5) the communication between the driver and the vehicle is essential. The driver must be able to instruct the vehicle under any condition. The combination of these changes will necessarily lead to the increase of ASIL of IVI functions.

CONCLUSION

The technical complexity and the performance of the In-Vehicle-Infotainment systems continuously increasing. Due to the safety and security requirements, developing reasonably reliable systems requires to follow standard processes throughout the whole vehicle lifecycle. The higher level of automation applied in a vehicle, the higher level of ASIL will be assigned to In-Vehicle-Infotainment systems. In order to meet reliability requirements SOTIF and information security also have to be applied from the concept phase of the vehicle lifecycle. Critical infrastructures including or interacting with autonomous road vehicles, e.g. road traffic, logistics, info communication systems, electric car charging stations, emergency services will have to be prepared for integrating autonomous road vehicles. The experts of the concerned infrastructures should be involved in the hazard analysis, the risk assessment and the safety concept's verification activities.

REFERENCES

[1] N. Krausz, A. Csepinszky, V. Potó, Á. Barsi, "Az autós térképtől az önvezetésig: a járműnavigáció története," Geodézia és kartográfia, ISSN 0016-7118 , 2019. (71. évf.), 1. sz., 14-18 p.

[2] G. Meixner, C. Häcker, B. Decker, "Retrospective and Future Automotive Infotainment Systems - 100 Years of User Interface Evolution" in Automotive User Interfaces, Springer International Publishing, 2017, ch 1, pp 3-53

[3]"*Passenger car In-Vehicle-Infotainment system*" NNG Lld, https://www.nng.com/nng-ux-atlas, 2020

[4] Levels of driving automation, SAE J3016, Society of Automotive Engineers International, USA, 2016.
[5] K. Panetta, „5-trends-appear-on-the-gartner-hype-cycle-for-emerging-technologies,“ https://www.gartner.com/smarterwithgartner/5-trends-appear-on-the-gartner-hype-cycle-for-emerging-technologies-2019, Gartner Inc, 2019.
[6] Albini, D. Tokody, Z. Rajnai, “The Categorization and Information Technology Security of Automated Vehicles Hybrid Navigation” Interdisciplinary Description of Complex Systems 16(3-A), 2018, 327-332.
[7] Development of products with embedded software, IATF16949:2016 8.4.2.3.1, Quality management system for organizations in the automotive industry, International Automotive Task Force, 2016.
[8] “How much code?” Cars, https://codeinstitute.net/blog/much-code-cars/, 2019.
[9] “Software Updates” Tesla Inc, https://www.tesla.com/support/software-updates, 2019.
[10] B. Schlag, L. Rößger, “Car sharing - Motive und Intentionen,” Reportpsychologie (45), 2, Germany, 2019, 10-19,
[11] Ueda, H, Kurachi, R, Takada, H, Mizutani, T, Inoue, M, Horihata, S, “Security authentication system for in-vehicle network,” SEI Technical Review, Number 81, 2015, 5-9
[12] Barsi, V. Poto, A. Somogyi, T. Lovas, V. Tihanyi, Zs. Szalay, “Supporting autonomous vehicles by creating HD maps,” Production Engineering Archives 16, Poland, 2017, 43-46.
[13] Automotive SPICE v3.1, Qualitäts Management Center im Verband der Automobilindustrie (VDA QMC) Working Group 13 / Automotive SIG, 2017.
[14] Scaled Agile Framework, Scaled Agile Inc, USA, https://www.scaledagileframework.com, 2019.
[15] “Concept phase”, ISO26262:2018 Part 3 Road vehicles — Functional safety, International Organization for Standardization, ISO/TC 22/SC 32, 2018.
[16] “Safety of the intended functionality,” ISO/PAS 21448 Road vehicles, International Organization for Standardization, ISO/TC 22/SC 32, 2019.

BIOMETRIC TECHNOLOGIES AND DEVELOPMENTAL AND INFORMATION SECURITY ISSUES RELATED TO THEIR GROWTH IN AFRICA

A BIOMETRIKUS TECHNOLÓGIÁK ÉS AZ ELTERJEDÉSÜKHÖZ KAPCSOLÓDÓ FEJLESZTÉSI ÉS INFORMÁCIÓBIZTONSÁGI KÉRDÉSEK AFRIKÁBAN

KOVÁCS Attila Máté[1]

Abstract

Closing the technology gap is a very difficult and fragile process for many regions of the world, in particular in Africa and sub-Saharan Africa, which will be explained below. There is growing evidence of successful technological development in the region. It especially affects information and communication technology, but also agriculture and other sectors. Both university research and co-funded technology development projects are important sources of technology development in the economy. This paper on certain questions relating to biometric technologies focuses on the analysis of key sectors and actors in these processes, and in addition to detailing the difficulties posed by development gaps suggests the possibility for faster technological development 'leaps'.

Keywords

Biometrics, development gap, Sub-Saharan Africa, technology development, 4G

Absztrakt

A technológiai rés megszüntetése nagyon nehéz és törékeny folyamat a világ számos régiójában, Afrikában és különösen Afrika Szaharától délre fekvő részén, amely e cikkben kerül kifejtésre. Egyre több a bizonyíték a térségben a sikeres technológiai fejlődésre, amely leginkább az információs és kommunikációs technológiák terén figyelhető meg, de érinti a mezőgazdaságot, és más szektorokat is. Mind az egyetemi kutatás, mind a társfinanszírozású technológiai fejlesztési projektek fontos fejlesztési források a gazdaságban. Ez a biometrikus technológiákhoz kapcsolódó egyes kérdéseket vizsgáló cikk az e folyamatok által érintett kulcsfontosságú ágazatok és szereplőik elemzésére összpontosít, és a fejlesztési hiányosságok által okozott nehézségek részletezése mellett felveti a gyorsabb, fejlődési „ugrások" lehetőségét.

Kulcsszavak

Biometria, fejlettségi rés, szub-szaharai Afrika, technológiai fejlődés, 4G

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INTRODUCTION

Technological development as well as technology transfer from abroad depend on a number of socio-economic factors and require a specific environment. These include factors such as existing infrastructure, human capital development and education, the legal framework, in particular intellectual property rights, informal institutions, research and development opportunities, and access to education.

This process can be of utmost importance again related to the process of knowledge transfer of technology and resulting application, innovation and development in the field of biometric technologies. Technologies based on biometric identification have been evolving and spreading at a very quick pace in a wide range of applications in recent years. And this process, combined with proper attention and data protection regulations, may create a positive impact.

The European Commission has drawn up a proposal containing minimum requirements in the field of security policy, including the requirements for a passport with biometric identifier. In Brussels, two years before the United States, a visa-free travel with biometric passport conditional had been made, and passports with two biometric identifiers were agreed on. The Commission mentioned the fingerprint as an option that was at the discretion of the Member States. At the same time, it proposed the creation of a central database containing the fingerprints of all European citizens, i.e. no less than 450 million EU citizens [1].

Consequently, many African governments are developing science and technology policies, establishing ministries of science and universities of engineering, devoting more resources to targeted science development programs, and stepping up international cooperation with organizations such as the World Bank, ADB, IDB, DFID, CIDA, UNCTAD, UNESCO that develops science and technology capacity building programs [2]. At the same time, a number of local-level projects are underway in Africa and consist of a bottom-up position on the technology development agenda. It is noteworthy that there are areas of research and technological development in some sectors of African economies, most of which are not related to the markets of the region [3]. Moreover, these markets have great potential and will become increasingly important in the global economy.

And while biometric technologies can be considered secure in general, and are more difficult to compromise as well, we must not ignore that these systems have also weaknesses. This paper cannot cover the technological aspects and full spectrum of the dangers of biometric identification technologies, but will mention some of the fundamental concerns especially in connection with African applications specifically.

BIOMETRICS AND BIOMETRIC TECHNOLOGY

Biometrics uses some characteristics and markers of the person that are unique and easy to digitize. These biometric features are for example the fingerprint, the voice, the vascular network of the cornea, or the shape of the face [4]. In addition to the immediate advantages of biometrics, it also has a number of disadvantages. Simpler solutions are easy to deceive, but more sophisticated products are very expensive. In many cases, there may

be hygiene or data protection issues (due to the possibility of covert surveillance). Nevertheless, biometric methods combined with biometrics are considered the most reliable solutions for user identification.

Although many methods can now be used for the biometric identification of users, methods based on fingerprint identification can be considered almost dominant. The adoption and widespread use of alternative methods is certainly yet to be seen. The primary explanation for this is (despite its relative inaccuracy) the fact that due to its low feasibility and user-friendliness, fingerprint-based identification is currently the most popular biometric technology. However, for the sake of a more complete picture, it is advisable to look in other directions as well.

There are many sources about biometrics as an identification procedure, but almost no systematic material has yet appeared on its control side.

- Biometrics [Greek] can be defined as biostatistical, quantitative analysis and statistical comparison and scientific processing of living organisms, their body parts and their life processes [5].
- Biometrics is the identification of a person with measurable physical and biological characteristics [6].
- Biometrics (ancient Greek: bios = "life", metron = "measure") is the identification of a person based on the measurement of one or more unique physical or behavioral characteristics. The use of biometric data through automated methods to establish identity based on measurable physiological (physical) and behavioral (behavioral) traits such as fingerprint or voice [7].
- Biometric identification is a type of personal identification, an identification procedure based on different, measurable biological traits, physiological or behavioral characteristics of a person (biometrics) [8].

Advantages of biometric identification:

- The method actually identifies the person himself/herself, and does not check for indirect characteristics such as a password or key that can be stolen or decrypted.
- Using the right tool or technology, it is possible to make sure that the sampling comes from a real living person; consequently it significantly reduces the possibility of deception.
- A silent alarm may be possible if, for example, another finger is used to read a fingerprint or another password is used for voice recognition.

Disadvantages of biometric identification:

- Most methods require special hardware that is still quite expensive.
- For people with disabilities, the method may not be applicable.
- From a hygienic point of view, solutions that require physical contact may cause problems.
- The examined characteristics can vary in time as a result of illness or injury.
- The results of the readings are never exactly the same, so the sensitive point of these systems is the degree of fault tolerance, as this can degrade the reliability of identification in terms of both false acceptance and false rejection.

- Repetitive deception is possible in several cases, such as voice-based authentication, whose attack mode may not be defensible in all cases and its prevention is quite expensive.
- The computer may not be able to verify the authenticity of the scanner hardware, so it may be the target of attacks.

Legal or privacy issues may be raised in case of the scan that is performed remotely without the person's consent (such as facial identification). These and wider problematic areas lead directly towards the questions of both theoretical and practical application.

THEORETICAL AND PRACTICAL DILEMMAS OF APPLICATION AND APPLICABILITY

From the point of view of this paper, three areas of application deserve special attention.

Travel control.

For a variety of reasons, there is an increasing requirement to let people travel via planes, ferries, and even trains to be individually registered, with interim checks at multiple locations. Today these requirements are mostly being driven by security concerns, visa regulations and other such reasons. And, because the amount of people traveling is already large and is predicted to increase at significant rates, all organizations involved in the management and control of mass transportation industries are very interested in the rationalization and automation of necessary procedures. This is especially the case in the activity of the International Civil Aviation Organization. The pressure caused by the growing number of passengers is surely one of the most significant reasons for the introduction of biometric passports, visas and other controls/documents. This organization recommends very clearly, that "*Contracting States should incorporate biometric data in their machine readable passports, visas and other official travel documents, using one or more optional data storage technologies to supplement the machine readable zone, as specified in Doc 9303*" [9].

Financial and other transactions requiring authorization.

It is already apparent in finance-utility applications, that money in physical form (bank notes and coins) is being replaced more and more by the virtual forms of financial transactions – digital transactions via data base entry. Today this happens in the form of credit or bank cards, pocket electronic money, etc. However, it is clear that, in most cases, the physical card is not important, because money is directly connected to a person. The spread of biometric authentication in the economic sector (i.e. banking and trade) will decrease the need of physical objects, such as cards – since virtual money can be directly connected to a person (or to the legal person). This will result in a significant change both in the behavior of people, but also in the abilities that governmental organizations will have in their surveillance of money movements (financial transactions).

Remote voting (authorization).

Perhaps the most important change in society will be brought about by the creation of an entirely new market for biometric devices that I denominate as *remote authorization*. The merge of existing and future networking developments with biometric solutions will allow people to have the opportunity to authorize a wide range of transactions (e.g. voting,

purchasing, accessing, decision-making authorizations etc.) via the network, from remote locations.

It is interesting and characteristic that biometrics also played a role in the identification of soldiers in African peacekeeping operations [10].

In many ways, the following two examples of refugee camps or elections are at least as relevant:

A) The Yidai refugee camp: 80,000-100,000 refugees, a UNHCR pilot project for the biometric registration of the entire population of the camp, if successful, will be introduced amongst most refugee camps around the world.

- benefits:
  - cost efficient,
  - equal redistribution,
  - combined with digital maps, a wealth of information on diseases and logistics
- risks and unintended negative consequences:
  - data management and protection practices compliance,
  - complete lack of a complex legal background,
  - long-term consequences for individuals, reinforces the 'refugee is not a full-fledged person' mentality,
  - 'cheap image campaign opportunity' for technology companies while also providing testing ground for uncontrolled testing of new, less reliable technologies

B) Voter Registration in Kenya [11], 2013.

- An exponentially rising cost of the African elections (Congo $ 360 million, of which $ 58 million for biometric systems, Ghana 124/76, Kenya 293 / ~ 100),
- The Kenyan election cost $ 20 per vote (average European cost $ 1-3 / vote),
- Contracts, citing business interests are completely and non-transparently confidential.

On the basis of all this, we can draw a conclusion of this stage. The triple benefits of technology companies, which are separate from the public good, are as per below:

- Africa can be a source and field of innovational freedom, demand and opportunities,
- This could be a part of an image campaign and as such, its many costs can be accounted for, as aid or social contributions,
- Huge profits due to universal data entry practices (identity cards, refugee camps) and unclear legal situation, in most cases with very long-term and unilateral contracts.

A RESEARCH DIMENSION - DO DEVELOPMENT GAPS DYNAMIZE OR PARALYZE?

More efficient use of existing resources through the development of science and technology is crucial for economic development. As a worthy component of the concept of wider sustainability, it has become an important element of policy strategies at national and regional level in most countries [12].

However, in terms of science and technology, the gap between economically less developed regions around the world persists. Developed countries seek to finance innovation and new technologies to gain competitive advantage in global markets, while developing and emerging economies seek to catch up with the level of technological innovation achieved by the former group. African countries have shown interest in enhancing the region's technological potential since the 1980s, but the technology gap persists. It is often related to the lack of a specific policy that would define and guide their actions and the ineffectiveness of existing policies to guide policies. The proliferation of biometric technology examined in the following chapters could be a forerunner of African telecommunications. It is also a question of how this relationship can be operationalized and justified.

According to a survey by the Internet World Statistics, the proportion of Internet users in Africa was 28.6% in 2015, and has been growing dynamically year by year ever since [13]. It is important to note that the ratio is deceptive for sub-Saharan Africa. That is caused by the fact that people in countries like Egypt, Mauritius or Morocco often do not use internet at home leading to a significant difference between individual access and the overall level of access and usage.

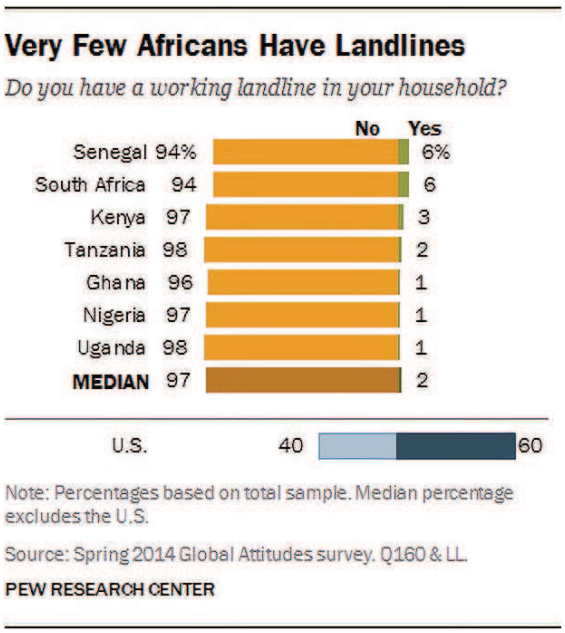

Figure 1 – Fixed line phone saturation in Africa

Mobile phone penetrations have grown at a much faster, remarkable rate. Taking the continent as a whole, the proportion of adults with a mobile phone increased from 1% to 54% between 2000 and 2013 (see Figure 2).

The digital revolution began in 1999 with the intrusion of telecommunications companies KenCell and Safaricom into the market. And in the years since, mobile communication devices have begun to play a very significant role in the African economy. In Kenya, for example, a banking service called M-Pesa made it possible to transfer money even to those who did not have a bank account. It was a huge change because before that, only 15%

of the population had had a bank account, but now everything from buying gasoline to paying wages or even tuitions can be arranged.

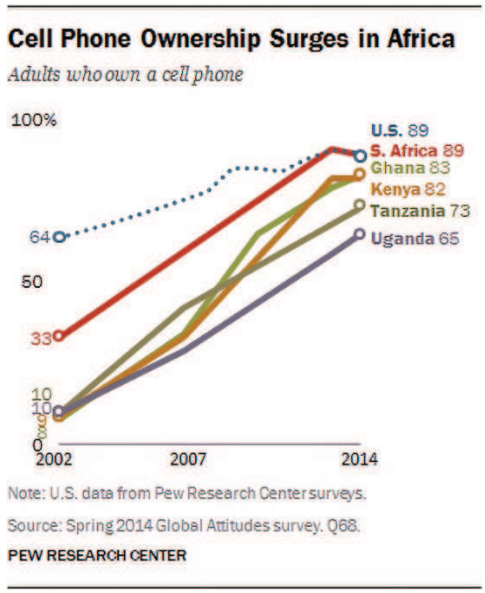

Figure 2 – Mobile phone ownership dynamics in Africa

Tens of millions of dollars move through M-Pesan every day, saving you time and money on travel, eliminating the dangers of transporting money, and boosting your cash flow. Similar systems have been developed in other countries.

And although the number of Internet users is growing rapidly, more than half of the world's population still does not have access to the Internet [14].

However, some phone operators are making increasing efforts to connect wider layers to the World Wide Web in the African market with smartphones tailored to local, rural needs.

The continent's two largest mobile operators, MTN Group in South Africa and Orange SA in France, have cut into the sale of simplified smartphones in recent years, which are being offered to the African population living in modest conditions for just $ 20. The devices have a smartphone "brain", while their appearance evokes the heroic age of handheld phones.

About 100 million units of phones with special software are planned to be sold this year, a 50 percent increase, making KaiOS one of the most dynamically growing mobile operating systems in the world.

Google also saw the potential in the company, with the techie investing $ 22 million in the software development company last year, which received another $ 50 million in support from investors in May this year. The rapid growth of the company exemplifies that even a mobile phone that can be purchased for a few thousand Forints can become an important innovation.

EXPERIENCES OF EARLIER TECHNOLOGICAL SHIFTS AND 4G REFLECTIONS AS 5G IS COMING

According to a statement issued by the ITU (International Telecommunications Union), there were already 3.3 billion mobile phone subscribers at the end of 2007, representing 49% of the world's population. Of course, it doesn't mean that every second person actually has a cell phone, as business customers in particular often have separate private and business numbers.

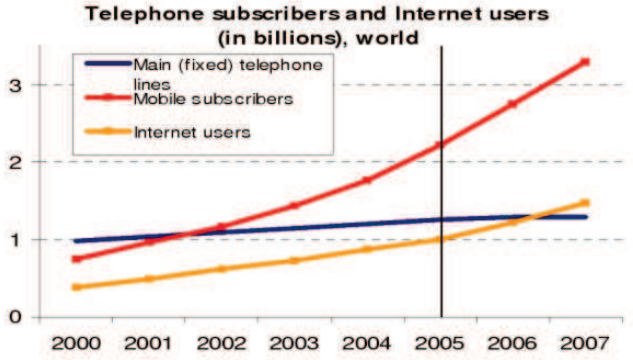

Figure 3 – Early regional dynamics of fixed-mobile shift, 2000-2007

The fastest growth is in Africa, where the number of subscribers increased by 39% between 2005 and 2007. Asia saw a 28% growth over the same period. India acquired 154, China 143 million new subscribers in the last two years. Landline subscriptions are constantly being pushed into the background, with only 10% of all subscriptions in Africa, for example, landline. The number of fixed line subscriptions worldwide was able to show a 1% increase. In many cases, new landline subscriptions are linked to growing internet subscriptions.

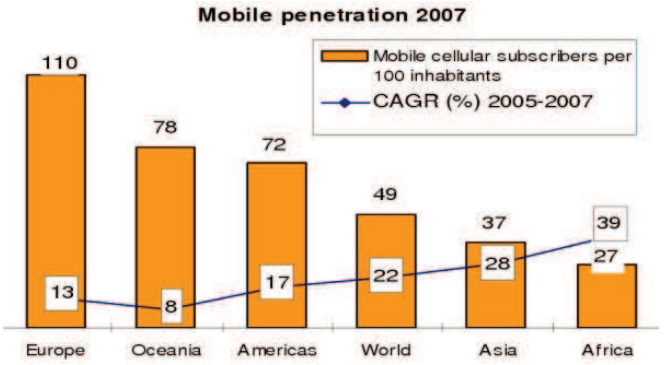

Figure 4 – Early regional dynamics of mobile penetration, 2005-2007

The introduction of 4G in Africa, on the other hand, has been characterized by insufficient start-up energy and investment for development. Due to the high cost of installation, implementation was initially slow. Without real coverage, consumers could not access a good 4G network, which allowed them to use the devices properly.

This has reduced consumer engagement / interest in high-speed technologies and, as a result, usage and acceptance have not even improved as coverage has increased (from 10% in 2014 to 46% in the third quarter of 2019).

With this in mind, it may be interesting to see how the fate of 5G technology is evolving in Africa. The other previous shifts were more successful by leaps and bounds, and even skipped further significant improvements to the fixed network itself, and it immediately switched to mobile in the field of telecommunications.

APPLICATIONS OF BIOMETRICS IN AFRICA

In Nigeria, initiatives related to national identification systems, exploration of payroll accounting, ensuring the integrity of student elections and secure retail payments in the country have been coupled with initiatives related to mobile services, elections and mobile banking. Airport identity systems have also played a prominent role in industry news, and a series of articles delving deep into the pressing issues of the biometric ecosystem continues to review facial recognition policy, focusing on possible U.S. regulations.

In a single Nigerian state, more than 17,000 employment-related frauds (such as bogus employment) and similar technology have been used for student elections and biometric-backed ID cards can be issued to the entire population. However, Tanzania's problems with SIM registration and Ghana's resistance to new voter registration illustrate the ongoing delays in digital ID projects in Africa. A separate story could be told of two banks in Nigeria and South Africa launching facial recognition services, the former for cardless retail payments and the latter for mobile app authentication.

One company integrated contactless fever detection with its facial recognition product, and another integrated fever detection and facial biometric terminals with payment technologies to deploy public transportation.

Singapore's national digital identification system is adding a facial recognition authentication service to kiosks at banks and government offices to remove service passwords. The government is also working to open the SingPass mobile app and provide facial recognition to elderly people in Singapore and overseas who may need the service but can't get to the kiosks.

AirAsia is transforming its brand with biometrics and big data by offering new experiences to its customers. The company operates separate iris-biometric experiments and a fast-track airport accounting experience system (FACES) developed by the partner to manage travelers.

Influence groups provided two guidelines for the use of biometrics and other AI systems this week. The five principles of the Pentagon and the Roman AI ethical call, which include a group operated by the Vatican, Microsoft, IBM, and others, have many things in common, starting with responsible and reliable requirements for systems.

In Morocco, the moratorium on the use of biometric facial recognition has been extended until the end of 2020, with a decision by the CNDP (National Commission for the Control of Personal Data Protection) leaving open the possible experiments and introduction of certain technologies in certain areas.

Experiments with facial recognition and other biometric data may be permitted on a case-by-case basis, and the CNDP is committed to exploring all solutions that could directly or indirectly contribute to reducing the health risks of the coronavirus pandemic emergency.

The CNDP notes in the announcement that it currently prioritizes addressing health risks and plans to include as a partner an assessment of the "proportionality of technologies to targets" that could contribute to tackling the crisis. It also makes recommendations on "the national architecture of identifiers and the establishment of a national third-party system for trustworthy biometric authentication mechanisms".

CNDP is committed to supporting the development of a data-centric economy with added benefits through data management. And (this is also one of the reasons for the ban) he expressed reservations about service providers, each with its own biometric database, which is often maintained outside the Commission's jurisdiction.

There is a need for a national decision on the use of a third-party database for authentication, whether in the public or private sector, and a reliable third-party system can be set up according to the technical specifications of the new version of the National Electricity Utility. More specifically, the CNDP notes that credentials and usage data should not be stored together and that special sector identifiers can be used to develop detailed data protection policies.

"The CNDP therefore proposes identifier architecture at the national level that takes into account constitutional, economic, social and technical requirements," the panel wrote in its discussion paper.

The CNDP also intended and intends to confirm the claims of manufacturers and service providers that their technology allows for consultation without biometric data storage, and will consult the DGSSI (Directorate General of System Security Information) on future national.

OPPORTUNITIES AND RISKS FOR THE FUTURE - SOME RELEVANT DIMENSIONS OF SECURITY AND AFRICAN MANIFESTATIONS OF DATA PROTECTION

The United Nations resolution of 14 December 1990, which sets out guidelines for the regulation of computerized personal data files, is not binding.

On a more global basis, therefore, legal reliance relies heavily on the broader provisions on personal data. However, such provisions are sometimes not able to fully interpret and manage biometric data.

In the EU, however, the General Data Protection Regulation (GDPR), the General Data Protection Regulation, is directly applicable in all 27 Member States of the European Union and the United Kingdom from May 2018. In this, biometric data is clearly defined and protected.

- Harmonized framework within the EU,
- The right to be forgotten,
- "Clear" and "affirmative" consent,
- Strict sanctions for non-compliance with these rules.

However, outside the European Union, the level of protection depends on the legislation in force. Assuming there is such legislation. An example of this is the United States, where three states (Illinois, Washington and Texas) protect biometric data and 47 do not.

A more activist example is the California Consumer Data Protection Act, which is a significant step forward for the country. It improves the data protection rights and consumer protection of California residents from January 1, 2020.

The CCPA could serve as an example elsewhere for shaping future legal frameworks.

African nations have also taken steps to align with the EU GDPR, with a specific focus on data protection in their unique environment.

The Mauritius Data Protection Act could almost serve as a roadmap in other parts of Africa by making the law accessible through examples and multilingual documents. Kenya's 2019 Data Protection Act was also important in securing local adjustments, which could provide significant control over the government usage of people's data.

Togo's legislation also goes beyond the GDPR in protecting people's data interconnection.

It can be said that African countries are adopting modern data protection laws that are related to the GDPR, but not copies of it. Moreover, the new African laws show their own way of thinking and approaches to today's most pressing and important data protection issues, tailored to the African situation.

As for innovation and development, many African governments have recognized their importance. Therefore, the government of Ghana not only ensures macroeconomic stability, but also aims to promote the construction of at least one factory in each district[2]. Ghana has also started to digitize public services. In future, every Ghanaian will receive a biometric ID in order to set up a database for services - for example in the health sector.

With adequate security and data protection measures biometrics can both be an enabler of political freedom, voting or healthcare and a source of innovation and economic growth.

BIBLIOGRAPHY

[1] E. Commission, "EU proposal on biometrics in visa and passports," 2003.
[2] . A. Watkins and M. Ehst, "Science, Technology, and Innovation Capacity Building for Sustainable Growth and Poverty Reduction," World Bank, Washington, 2008.
[3] K. Andrzejczak Świerczyńska, *Transfer of technologies in development models*, 2014.
[4] Merriam-Webster Dictionary Publishing, „Merriam-Webster Dictionary," 2020. [Online]. Available: www.Merriam-Webster.com/dicitionary. [Hozzáférés dátuma: 01 05 2020].
[5] Columbia University Press, The Columbia Encyclopedia, Sixth Edition, New York: Columbia University Press, 2008.
[6] LIBE, „Biometrics at the Frontiers: Assessing the Impact on Society For the European Parliament Committee on Citizens' Freedoms and Rights," Justice and Home Affairs (LIBE), EUR 21585 EN, 2005.

[2]"Industrialization is a priority for us," said the Ghanaian Vice President Mahamudu Bawumia at the opening of the 3rd German-African Business Summit in Accra.

[7] F. L. S. Justitia, „BIOPASS Study on Automated Biometrics Border Crossing Systems for Registered Passenger at Four European Airports," Warsaw, 2007.
[8] Á. Bunyitai, „A ma és a holnap beléptető rendszereinek automatikus személyazonosító eljárásai biztonságtechniai szempontból," *Hadmérnök*, p. 23, 1 2011.
[9] ICAO, „Doc 9303 on Automated identification".
[10] J. Besenyő, Magyar békefenntartók Afrikában, Budapest: Katonai Nemzetbiztonsági Szolgálat, 2013, p. 348.
[11] Business Daily Africa, 2013. [Online]. Available: https://www.businessdailyafrica.com/Corporate-News/How-BVR-technology-is-poised-to-revolutionise-voting-in-Kenya/-/539550/1627228/-/nq72fsz/-/index.html. [Hozzáférés dátuma: 10 05 2020].
[12] Yelpaala et al., „The Big Question: Upwardly Mobile: What role should technology play in Africa's development?," *World Policy Journal*, pp. 3-7, 2012.
[13] Internet World Statistics, „internetworldstats," 2015. [Online]. Available: http://www.internetworldstats.com/stats1.htm.
[14] World Bank, "Individuals using the Internet (% of population)," 2015. [Online]. Available: https://data.worldbank.org/indicator/it.net.user.zs?end=2017&most_recent_value_desc=false&start=1960&view=chart.

HUMANITARIAN ACTION TO EMPOWER THE MOST VULNERABLE SOCIAL GROUPS IN DISASTERS AND COMPLEX EMERGENCIES

HUMANITÁRIUS SEGÍTSÉGNYÚJTÁS A LEGSEBEZHETŐBB TÁRSADALMI CSOPORTOK MEGERŐSÍTÉSÉRE KATASZTRÓFÁK ÉS KOMPLEX VESZÉLYHELYZETEK SORÁN

SZILÁGYI Béla[1]

Abstract

This paper deals with the well documented problems of the most vulnerable and invisible social groups in disasters and complex emergencies, however, changes the focus of attention and action, furthermore analyses the possibilities of turning these threats into opportunities of empowerment. We identify the most vulnerable social groups – ethnic/religious minorities; children, pregnant and lactating women and children with disabilities – and investigate the impact of threats on them in selected disasters/complex emergencies. Empirical evidence has been collected about good practices on how to include the empowerment of these groups in humanitarian operations in these emergencies. These implemented operations show how humanitarian relief and development can be turned into a long-term opportunity of cooperation and empowerment of the most vulnerable communities.

Keywords

humanitarian action, vulnerable social groups, people with disability, development and empowerment, disasters and complex emergencies

Absztrakt

Ez a dolgozat a katasztrófáknál és komplex veszélyhelyzetekben a legsebezhetőbb és „láthatatlan” társadalmi csoportok jól dokumentált problémáival foglalkozik, azonban fel kívánja cserélni a figyelem és a cselekvés fókuszát, továbbá azt vizsgálja, hogy ezeket a fenyegetéseket hogyan lehet ezen csoportok fejlődésének a lehetőségévé változtatni. Azonosítjuk a legsebezhetőbb társadalmi csoportokat – etnikai/vallási kisebbségek; gyermekek, várandós és szoptató anyák; valamint gyermekek –, és vizsgáljuk a veszélyek okozta fenyegetettségüket néhány kiválasztott katasztrófánál/komplex veszélyhelyzetben. Empirikus bizonyítékokat gyűjtöttünk a jógyakorlatokra, hogyan lehet a humanitárius tevékenységek részévé tenni ezeknek a csoportoknak a megerősítését. Ezek a végrehajtott programok bizonyítják, hogyan válhat a humanitárius segélyezés és fejlesztés a legsebezhetőbb közösségek számára az együttműködés és megerősítés hosszútávú lehetőségévé.

Kulcsszavak

humanitárius tevékenység, sebezhető társadalmi csoportok, fogyatékkal élők, fejlesztés és megerősítés, katasztrófák és komplex veszélyhelyzetek

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IN MEDIAS RES

Stakeholders of humanitarian response, both organisations and individuals agree that the most vulnerable groups in complex emergencies are children (especially those under five years), pregnant and lactating women, the elderly, women in general, people with disabilities, the geographically or culturally isolated, „second class citizens" for racial reasons, ethnicity, religion or political position. Most of the times and in most of the countries they had been vulnerable before the disaster happened or the complex emergency started and the disaster or complex emergency just worsened their situation.

The Pan American Health Organization maintains in Recommendations for the Care of Mentally or Physically Challenged Persons, and the Elderly in Emergencies that "in emergencies, the limited mobility of pregnant women, children, mentally or physically challenged persons, and the elderly mean that these groups are more at risk from the phenomena"[19].

This paper discusses three specifically vulnerable groups in society who are exposed to significantly higher risk than the majority of the population in complex emergencies, and analyses good practices from the experiences of Hungarian Baptist Aid, a major Hungarian relief, development and educational organization, how humanitarian relief and development can be turned into a long-term opportunity of cooperation and empowerment of the most vulnerable and invisible communities:

- Ethnic/religious minorities in conflict
- Children, pregnant and lactating women
- Children with disabilities

ETHNIC/RELIGIOUS MINORITIES IN CONFLICT: MUSLIM TAMILS IN SRI LANKA AND DISPLACED CHRISTIANS IN THE MIDDLE EAST

Muslim Tamils in Sri Lanka

The most persecuted religion in the world is Christianity [16] today, and the attacks on Christian churches and congregations at several locations of Sri Lanka at Easter in 2019 killing more than 250 people and injuring more than 500, proved that Christians living on the island do face lethal threats. The National Christian Evangelical Alliance of Sri Lanka (NCEASL) documented 94 attacks on churches, the intimidation of and violence against pastors and their congregations in 2019, and the obstruction of worship services, compared with 88 in 2018 [17].In retaliation of the Easter suicide attacks by the Islamic group National Thowheed Jamath, several mobs led by Buddhist monks and Sinhalese nationalists attacked and vandalized mosques, Muslim-owned businesses, and homes in May. The US State Department International Religious Freedom Report states that Sri Lankan "government officials continued to engage in systematic discrimination against religious minorities" and "government officials and police often sided with religious majorities and did not prevent harassment of religious minorities and their places of worship"[17], which meant persecution and harassment against Christian, Muslim and Hindu religious minorities. Focusing on disasters and complex emergencies in Sri Lanka, one of the marks of ethnic/religious minorities in these times are the Muslim Tamils, studied at the time after the 2004 tsunami.

The Sri Lankan Civil War broke out in 1983 between the government armed forces and the Liberation Tigers of Tamil Eelam (LTTE) that tried to establish 'Tamil Eelam', a separatist state [12].Unlike the majority Sinhalese and the minority Tamils, whose identity is based on language, history and traditions, Muslims in Sri Lanka have a special status as they identify primarily with their religion, Islam. Muslims are divided by several factors including language, residence on the island, profession, etc. Moreover, some Tamil nationalists still question whether there is a distinct ethnic group for Muslims or they are ethnic Tamils practising a different religion from the majority. As a result of pressure from both the Sinhalese and the Tamil groups, the apolitical Muslim community changed its attitude and strengthened its identity. Although they do have certain rights, Muslims are under-represented in the state structure, and they were not significant actors in Sri Lankan politics at the time of the 2004 tsunami.

The Muslim community had been frequently caught in the middle of conflict. Many Muslims in Sri Lanka are Tamil speakers and populate the Eastern and Northern regions, a Tamil Eelam area. In addition to that, government policies alienated Muslim minorities, and at the same time, they were still targeted by armed separatists for their supposed role in conflict. No wonder that all sides treated Muslim groups with suspicion and did not make them parties to negotiations, while the problems of Muslim community were ignored and that caused severe consequences [12].

"With over 500,000 internally displaced persons, international agencies struggled to locate many of the 'refugees' [more precisely, internally displaced persons, IDPs] to deliver the appropriate humanitarian aid that is required"[13]. The underdevelopment of peripheral regions limited economic opportunities, thus IDPs were not self-reliant, were often sustained only by the World Food Program that fed 90% of the displaced [10]. The state and multilateral agencies were required to provide rehabilitation and reparations to destroyed villages and communities with particular attention in the Jaffna region[13].Muslims required insurances for maintaining their security in temporary settlements, coupled with security for their possessions [2]. Livelihood opportunities were not delivered free of political persuasion for displaced Muslims impeding them to become self-sufficient thus causing mental and physical vulnerability and insecurity. This created further social distance between the minority Muslim group and other majority groups.

Needless to point out again that the regions and settlements where the Muslims lived were the most neglected in the tsunami response, unfortunately not only by programs implemented by the Sri Lankan government but by the international humanitarian community as well. While the Hungarian Baptist Aid focused on the region stretching from Colombo to Hambantota with emergency medical assistance, emergency humanitarian assistance, house reconstruction and livelihood, then later with major long-term education, child protection and agricultural programs among the Sinhalese and Christian population, and worked on the island for several years; neither did we lose sight, nor focus to empower the "invisible" and vulnerable group in the East. I worked in Sri Lanka over an extended time in 2005, and visited the neglected areas of Ampara, Kalmunai and Batticaloa region in the East Coast again 16, 26 and 38 months after the tsunami, it was evident that neither the relief, nor the rehabilitation efforts in this region were nowhere close to that of Colombo, Galle and Hambantota.

The Hungarian Baptist Aid received an indication of this group and started to provide immediate emergency relief from 30th December 2004, just a couple of days after the devastation of the tsunami. We continued the relief and rehabilitation activities for 18 months in different forms of water, food, livelihood, job creation, vocational and education programs aiming mainly at the children of the Muslim population of the Ampara, Kalmunai and Batticaloa region both at the institutional and individual level.

Displaced Christians in the Middle East

Another example of ethnic/religious minorities in complex emergencies are many of the refugees and IDPs in the Middle East who were persecuted for their faith and religious backgrounds (Christians, Yazidis and others) and were uprooted by conflict. Displaced Syrians are the largest number of forcibly displaced people in the world with 6.7 million IDPs and 6.6 million refugees; these two groups account for over half of the country's population. Turkey, Lebanon, Jordan, Iraq and Egypt are the major recipient countries with approximately 5.5 million Syrian refugees [25].Lebanon is the country with the largest number of refugees per capita in the world: an estimated 1.5 million Syrian refugees, a large percentage of them are Christians, approximately 18,000 refugees and asylum-seekers are from Iraq, Sudan and other countries in addition to the 200,000 Palestinian refugees under UNRWA mandate [24]. The vast majority of these refugees are women and children; many are widowed and orphaned because their Christian husband/father had been killed. One in four people in Lebanon is a Syrian refugee and one in three people is a refugee in general. According to UNHCR, 73 percent of Syrian refugees are living below the poverty line and 55 percent below the extreme poverty line [24].As the economic crisis in Lebanon continues, refugees will become more impoverished.

Lebanon is different from its regional neighbours in that respect that it has a high level of religious diversity and safeguards promoting religious freedom. Christians comprised 40 percent of Lebanon's population in 2015, however, this number decreased to 33 percent in 2019 [6].Lebanon is considered a relatively safe haven for people of all faith and religious backgrounds from several countries; persecuted Christians, Yazidis and other refugees from around the Middle East may find a place that will protect their right to religious expression. However, in the past years, harassment and atrocities against religious minorities increased, and while Christians in Lebanon do not face the same kind of persecution as Christians in other parts of the Middle East, the emigration trend among the Christian Lebanese youth has accelerated to an alarming condition.

The Hungarian Baptist Aid has been working with local partners since 2006 providing not only relief to the displaced in Lebanon and Syria (food and hygiene assistance, winterization items, health services), but has placed great importance on empowering individuals and education. Vocational trainings (sewing, hairdressing, AC and electricity installation and repair, adult literacy, and computer classes) and agricultural assistance have supported the individual dignity, self-reliance and sustainability of these people. Refugee and IDP children are traumatized, left their homes, friends and everything they held on to, behind and are also out-of-school. Education is not only about transferring basic knowledge; attending school provides displaced children with a safe place to play and develop, gives them hope for the future, provides routine and a sense of normalcy, a place to make friends and build social skills, serves as a protection tool by decreasing common risks for refugee

children such as abuse, child labour, early marriage, exploitation, trafficking, and radicalization. Through our local partners, non-formal education and psychosocial support have been provided in nine learning centers in Lebanon and in three child friendly spaces in Syria. We also support two Christian schools in the Bekaa Valley and in Beirut, the latter suffering great damage as a result of the port explosion on 4 August 2020. The Hungarian Baptist Aid immediately sent a team to provide not only humanitarian and emergency medical assistance, but also support the renovation of the damaged school building in Beirut. Many non-Christian children are also enrolled in Christian schools for quality education and for the mindset of teaching students to be lifelong learners and good citizens – based on Biblical values. Christian schools in Lebanon are role models of respect, tolerance and dialogue that are essential for durable peace in a country torn by sectarian conflict.

CHILDREN, MOTHERS, PREGNANT AND LACTATING WOMEN

Alberto Minujin et al in Children Living in Poverty rightly insist on the well-established phenomena that "children are the most vulnerable group in conflict and emergency situations. Children are too often forced to flee their homes, witness atrocities or even perpetrate war crimes themselves. Children are not responsible for war, yet it robs them of their childhood."[15] Disasters and armed conflict do not only deprive them of their immediate needs, such as shelter, proper nutrition, healthcare, but also of their future opportunities by disrupting or impeding their education, while affecting their whole lives by suffering from emotional, physical and sexual abuse.

This latent vulnerability can pave the way for real dangers compromising the well-being of children. Additionally, the wellbeing of children has a long-term effect on the development of society. Reaching out to children is therefore of great importance: it is not only a requirement of humanity and social justice, but "represents an essential element of any development strategy which aims to reduce the prevalence and structural reproduction of poverty overall"[29].

In order to develop a strategy to target children in complex emergency situations, we need to conceptualize our approach for children in general. White continues to suggest that there are two main approaches to be found:

- considering children basically as individuals, as a social group with their own rights, needs and entitlements
- considering children as a part of a social group – most importantly, the family – and emphasising their embeddedness[29].

However, we need to tailor assistance specifically to children – one of the most vulnerable groups – while maintaining a holistic approach and not separating our assistance from the support to the social structures ensuring the safety and wellbeing of children. Sarah White goes on to argue that "a mother and her children constitute the basic unit, to which the children's fathers and other relatives are attached in a variety of arrangements"[29]. It is especially the type of these arrangements that accounts for a specific family model – which is of course mostly different from the one that shaped the minds of relief workers.

Similar observation applies to the other category of vulnerable persons in a complex emergency: pregnant women, women with small children (lactating women) and to some extent women in general. The special needs in health services and nutrition also need to be

addressed in emergencies, and it is important to find the way how these groups may be targeted and supported both as a part of the family, and also individually in a very well targeted manner.

Afghanistan

The Hungarian Baptist Aid has implemented several projects in complex emergencies with a special focus on children and maternal health. An example of this is our work in Afghanistan that alloys the attributes of a development project and of humanitarian assistance. The first humanitarian assistance was delivered in the autumn of 2001. In the coming years several health and education programs were delivered focusing especially on women. The Hungarian Baptist Aid began the training of qualified mid-wives in the province of Baghlanin in 2007 as severe shortage was reported in their numbers. Midwives were important and respected in the Afghan society, however, only 467 birth attendants[22] remained in the country of 26 million by 2002; the rest of them died or fled abroad, although the estimated number necessary to provide only the basic services in the country was 8,000-10,000. The number of 'graduated midwives' according to the Afghan Midwifery Education and Accreditation Board report rose to 3,001 by 2012 [11].Just 8 percent of women delivered their babies with the assistance of a midwife in 2002, 19 percent in 2006, and the Ministry of Public Health's 2010 survey already showed that 34 percent of deliveries were attended by skilled birth attendants[11].Afghanistan's maternal mortality ratio was the highest in the world: 1,800 deaths per 100,000 live births in 2000 and 1,400 deaths per 100,000 live births in 2008, in Chad and Sierra Leone 1,300 deaths per 100,000 live births in 2000, while Hungary's maternal mortality ratio is only 10 deaths per 100,000 live births[31].

The Afghan Ministry of Public Health together with the WHO and the Johns Hopkins Program for International Education in Gynaecology and Obstetrics developed the 18-month-long Community Midwives Education Program. The Hungarian Baptist Aid and its local partners used this program to contribute to the achievement of the following Millennium Development Goals:

- promoting gender equality and empowering women,
- reducing child mortality and
- improving maternal health.

The objective of this project was to reduce infant and maternal mortality and contribute to the wellbeing of mothers and their children through the training of healthcare staff. The following is a selection of the 27 modules taught: the role of the community midwife, nutrition, anatomy, family planning and reproductive health, immunizations, hygiene and prevention of infections, pre-natal care, STDs, care for rape victims, delivery, complications, care for the newborn, care for children with birth defects and disabilities, supervision, ethical challenges.

Children who die before they would be born, or are born with disabilities, or die within weeks of their birth, and their mothers who might also die or fall ill after giving birth, are the invisible vulnerable group of this complex emergency. An important element of the project was that it also contributed to the integration of women on the labour market since it provided women with a profession with growing demand for midwives in rural Afghanistan.

The multiplier effects of this project were especially important since the selected midwives returned to their rural communities after the training, thus the areas without obstetric care or without female health care personnel were provided with professionals. As the statistics cited above prove, a significant decrease in infant and maternal mortality was seen in the coming years as a result of the project.

Democratic People's Republic of Korea (North Korea)

The second program to serve as a case study is the one in the Democratic People's Republic of Korea (North Korea), which can be categorised as a prolonged and complex crisis. The Hungarian Baptist Aid worked in the DPRK from 1998 and selected children living in orphanages and in hospital care as its main target group, since even their very survival was dependent on external aid. When HBAid started to work in the DPRK in 1998 just after the great famine that had claimed the lives of approximately 1.5 million people, the under-five child mortality rate in the country was 72.9 deaths per 1000 live births in 1998, that decreased to 33 in 2005 and to 18.2 in 2018[27], while the same under-five child mortality rate in Hungary was 11.1 deaths per 1000 live births in 1998, 7.5 in 2005 and 4.3 in 2018[28].

"The imperialist propaganda tries to make the world believe that two million people died of hunger in our country in the last few years – this is certainly a lie. The subsequent natural disasters unfortunately claimed 220,000 lives according to our government's data", the general director of the Flood Damage Rehabilitation Committee informed me at a business dinner in the five-star Koryo Hotel in February 2002. Jean Ziegler, the UN Human Rights Special Rapporteur on the Right to Food said at a press conference held with the World Food Program in Geneva on 7th April 2004 that the North Korean humanitarian "tragedy has been going on for almost ten years, and according to secondary sources, five to seven percent of the total population died of hunger, malnourishment and related illnesses."[7]Considering the population of approximately 22 million, this means 1.1–1.54 million deaths [18]. A UNICEF colleague told us in a confidential conversation in 2002 that their findings showed that nine out of ten children were malnourished, six were starving and one died of hunger.

Considering the limits of humanitarian work imposed by the political structures of the country, humanitarian assistance had to focus on the support of institutions, but at the same time assurances had to be met that the target audiences were reached and the resources were not wasted or diverted by the regime. For these very reasons, HBAid rehabilitated the kitchens and donated washing machines to the orphanages in Sariwon city, 80 km south of the capital, Pyongyang. Other targeted assistance included food aid in the form of high-nutrition baby food and high-energy biscuits, furthermore, nappies, shoes, winter and summer clothes for children were provided, since these were indispensable for the wellbeing of infants and children (in this case due to their very survival), and also unlikely to be diverted from our target group. HBAid donated school supplies and toys to children both in child care institutions and those in hospitals, in addition to X-ray, ultrasound and laboratory equipment, surgical tools, IV fluids and special medications to the paediatric hospital and the provincial hospital of North Hwanhae Province.

Nias, Indonesia

As a third example, let us analyse a project that initially did not target the vulnerable populations discussed here, but a significant element still benefited them. The Hungarian Baptist Aid provided emergency and mid-term medical assistance to the inhabitants of the island of Nias, Indonesia in 2005-2006. 400,000 people live on this small island, most of them in several hard-to-access villages without any health care institutions or with as little as a minor health check-point and most islanders are unable to seek medical care on the island of Java. The surfing island, severely hit by the 2004 Christmas tsunami, was gravely damaged again three months later by the 2005 Easter earthquake in March, causing immense suffering and traumas for the population.

Since Nias had only one hospital in each of the two cities, Gunungsitoli and Teluk Dalam, and a dozen doctors on the island, HBAid set up mobile health care facilities with both Hungarian medical professionals, doctors and nurses who had been hired from other islands of Indonesia. These mobile health care facilities were made accessible for most of the rural population on a regular basis. 37 percent of the people who received health care at these mobile clinics were children. We treated more than 40 pregnant women, lactating women and women with small children: they received pre-natal care, small surgeries, special vitamins and general counsel.

During the implementation phase of the project the significant impact on these specific target groups was identified. However, as a lesson learnt from this project, a greater emphasis on these vulnerable groups in the planning phase could have strengthened the project, and an additional child-centered element could have contributed to the multiplication of the effects.

On a side note, we have to mention, that during our 18-month program we faced the sad reality of the rejection of the "Do No Harm" principle [1] by several agencies of the international humanitarian community. The two hospitals, destroyed by the subsequent tsunami and earthquake, were flooded with expired or unknown agent medicines. Such a practice is not only useless and burdens the already overwhelmed capacity of the local health care system, but also creates environmental pollution and financial burden as the Indonesian authorities had to dispose of them, and that is exactly what the "donors" did not want to pay for in their home country.

CHILDREN WITH DISABILITIES

"In emergencies, the limited mobility of pregnant women, children, mentally or physically challenged persons, and the elderly mean that these groups are more at risk from the phenomena", underlines the Pan American Health Organization [19].

If we suppose that children are vulnerable in complex emergencies, then children with disabilities are even more so. Children with physical disabilities, accompanied by mental disorder and, in many cases, with speech impairment, are the truly invisible victims. Not only are they neglected, hidden, ashamed of, but as we ourselves have experienced in several countries, they are regarded and treated as not part of human society.

The Hungarian Baptist Aid started to be involved in the rehabilitation, aid and the empowerment of children with disabilities by actively promoting their integration into society in 1997 both in Hungary and abroad. We have realised that there is growing demand

in the support for motor disabled children especially in those countries where there is no capacity for the advocacy of the disabled because of the lack of the necessitated infrastructure and professionals as a result of the inordinate circumstances in society and/or the political and economic environment.

Function Language and Movement Education Program

HBAid professionals have developed the Function Language and Movement Education [23]Program based on the Hungarian Pető-method known world-wide for patients suffering from neural disorders (such as cerebral palsy, Parkinson-syndrome, sclerosis multiplex, etc.), for those who had a cerebral accident or suffered from a head injury. The program provides an opportunity for complex education of motor disabled children, their families, conductors [special education teachers for children with disabilities using the Pető-method] and of the prospective conductor assistants as well. Following the adaptation of the method, it enables the parents and local conductors to direct special therapy. Altogether, it allows the integration of motor disabled children into society and community, as well as the development and restitution of their human relations.

The Function Language and Movement Education Program is truly holistic and not only in the physical and educational rehabilitation of the children. Parents of children with disabilities also face another hardship: since the child requires 24-hour supervision in the majority of the cases, either one of the parents need to stay at home and cannot hold a formal job, thus the family has a loss of income, or an older sibling needs to stay at home impeding her/his further education or work opportunities. Thus, while providing education and development for disabled children through the day in the center, the FLAME program also serves as poverty alleviation for parents, who can return to the job market. Additionally, it provides another job opportunity for teachers, besides the great benefit of raising awareness about status and empowering children with disabilities in society.

The first target-country of the FLAME programme was Albania, where HBAid have established a rehabilitation center. In 2000 the program was expanded to Kosovo, establishing a FLAME center in Pristina. HBAid sent regular conductor teams to work with the disabled children in the refugee camps of the Western Sahara between 2002 and 2006. The FLAME center in Topolya, Vojvodina, Serbia was opened in September 2003. HBAid has implemented FLAME projects in Jordan for Iraqi and Jordanian disabled children and their teachers in 2005, a new center was established in Ma'an, and the institutions of our partners were founded in Amman and Aqaba, then in Iraq as well. HBAid continued to work with FLAME in Cambodia (Phnom Penh), Vietnam (Hanoi) and Mongolia in 2006-2007. HBAid extended its FLAME project to Kandal Province in Cambodia and to Sri Lanka in 2008. Several new centers were established in Bac Giang Province in Vietnam in 2008-2009, Haiti in 2011-13, later in Tay Ninh and Da Nang Provinces in Vietnam in 2016. All these initiations resulted in operational FLAME centers, teachers have been trained and the abilities, physical, speech and mental capacities and independence of disabled children have been greatly developed.

The FLAME program was the most extensive in Cambodia, Vietnam and Haiti of these countries, however, for the purposes of this paper we will analyse those in complex emergencies: Kosovo, Western Sahara and Iraq/Jordan.

Kosovo

In the Kosovo conflict roughly a million ethnic Albanians fled or were forcefully driven from Kosovo, several thousand were killed (the numbers and the ethnic distribution of the casualties are uncertain and highly disputed). The Mother Teresa Society reported 534,530 IDPs by 1st October 1998, 63% of these were estimated to be children and 25% to be women [8] by the NGO Centre for the Protection of Women and Children, as men and teenager boys often stayed behind to protect the family property, whilst women and children sought safety in the woods and hills.

"Kosovo also has the highest infant mortality rate in Europe at 23.6 per 1000 live births. The 1996 Multiple Cluster Indicator Survey for FRY [Former Republic of Yugoslavia] put the infant mortality rate at 16.8 and the under-five mortality rate at 19.4 [per 1000 live births]. The rate must almost inevitably have risen during the conflict due to the breakdown in already insufficient maternity services and post-natal care in the areas of conflict."[8] Children were already a vulnerable, high-risk group during the Kosovo war, but even more so disabled children. As Carolyn Hamilton reported "disabled children have suffered considerably during the conflict. Handicap International (HI) reports that the lists of children attending their community centers were no longer valid. Families were either missing or displaced or too terrified to re-register. Many of the centers had been destroyed and looted, including the wheelchairs. Many of the disabled children have catheters which need changing and the absence of medical attention may result in these children contracting kidney infections and sores."[8]

The Hungarian Baptist Aid, among other feeding, non-food, shelter and reconstruction projects, as a practical response to the urgent needs of the most vulnerable group, started to implement the FLAME (Function Language and Movement Education) program in July 2000. Katalin Szenczy, the project manager spent the first month evaluating the disabled children in and around Pristina to be able to pick those who would later be the beneficiaries of the program. The selection process was solely based on physical state, thus Albanian and Serbian beneficiaries could likewise participate, and this already had an enormous reconciliation effect on its own. Our FLAME specialists have worked with the children, developing their skills, physical, intellectual and emotional capacities and strengthening their coping mechanisms. However, at the same time they also trained the staff and volunteers of our local partner to be able to continue the FLAME program even after the Hungarian team left Kosovo. The Kosovar project leader was confidently trusted to take over the responsibilities of the program from the summer of 2001.

Western Sahara

Refugee camps are meant to be for emergencies, but protracted refugee situations are becoming almost the norm. The average time refugees spend in camps has extended to 17 years. Western Saharawi refugees still live in camps in a harsh, remote corner of Western Algeria. These camps were established in November and December of 1975 in order to provide food, shelter and medical care for the estimated 65,000 refugees who had fled their homeland after the Moroccan occupation of the Western Sahara territory. Negotiations to resolve the 29-year-old dispute in Western Sahara remained stalemated in 2003, forcing the by then 165,000 Saharawi to languish in Smara, Laayoune, Asward, and Dakhla refugee camps near the Algerian desert town of Tindouf. Hungarian law enforcement and military

officers were involved in stabilizing the region, according to Besenyő's research, 25 Hungarian police officers and 106 military personnel served in MINURSO, the United Nations Mission for the Referendum in the Western Sahara peace missions between 1995 and 2018 in several tours [3] [4].The world seems to have forgotten the Saharawi people who have struggled to survive in extreme conditions and unbelievable poverty for 45 years, by now, since the occupation.

Life is extremely harsh in the camps that grew into towns by now: with temperatures up to 55 degrees Celsius in July and August, sandstorms are frequent, drought is constant, and the rare torrential rains are devastating. Even soil is imported for the very limited agricultural production. Lambs and camels are kept in the camps, but goats are the most preferred animals, as they provide milk and can be consumed completely. As a result of the ailing circumstances, the lack of resources, food and vitamins; food insecurity prevails among the refugees who have limited opportunities for self-reliance and depend on humanitarian assistance for their survival. "The 2018 Food Security Assessment confirmed the dependence of the Sahrawi camp population on food assistance; 30 percent of the population is food insecure, while 58 percent is vulnerable to food insecurity. Only 12 percent of the Sahrawi population is food secure… WFP currently represents the main regular and reliable source of food for the Sahrawi refugees in Algeria"[30] even in July 2020. Families without livestock are more prone to hunger and malnutrition. By 2003 acute malnutrition rate has been above 10 percent for years, chronic malnutrition, typified by stunting, was more than 30 percent [26]. "Global acute malnutrition among children of 6-59 months increased from 4.7 percent in 2016 to 7.6 percent. The anaemia prevalence among children 6-59 months is 50.1 percent, and 52.2 percent among women of reproductive age." [30]

Of all the people in Western Sahara, people with disabilities, and their families are in the most destitute situation, because they have to struggle for the simplest things in life. They have to cope with social marginalization and ridicule. The circumstances hit them worse, approximately 20% of children with disabilities suffer from acute malnutrition. There are significant needs in Western Sahara for the establishment of equal opportunity for socially disadvantaged groups, and in particular equal opportunity for people with disabilities. We are still a long way off ensuring general education and rehabilitation for a wide range of handicapped children in Western Sahara. The infrastructure and social institutions, as well as the team of trained professionals are either weak or missing. There were two schools for children of special needs for the four camps in 2002: one in the Smarra camp and the other one in Laayoune.

The Hungarian Baptist Aid worked in the refugee camps of Western Sahara from 2001 to 2006. HBAid provided vitamins, livestock, medicines, shoes, school supplies and toys to fight malnutrition and support the healthy growth and education of the refugee children. Starting in 2002, our conductors surveyed and examined the motor disabled children as prospective students for the FLAME program; they registered 198 motor disabled children. Most of them were not able to attend school and take care of themselves, thus they were dependent on family support and felt to be a burden for their families. A building was furnished with special FLAME furniture and equipment in the Laayoun camp for the conductive education where HBAid conductors and nurses provided practical training sessions for the "physiotherapists" of the camps with the goal of helping the children walk better,

move and use their limbs more easily at first, and then to be integrated into the school system, until they were finally more independent and felt more confident in life.

Iraq and Jordan

Considering the Iraq conflict, the Hungarian Baptist Aid wanted to focus on a small, but important segment of an invisible vulnerable group of children with disabilities. The FLAME program was intended to be carried out in Iraq as part of transition to development, but the donor, the Hungarian Ministry of Foreign Affairs requested HBAid to implement the program in Jordan due to safety reasons. HBAid invited Iraqi specialists and doctors from Baghdad and the Iraqi countryside to Jordan to participate in the training in cooperation with several local partners in 2005. Again, the goal was to empower children with disabilities by assisting them in their day-to-day lives, promoting their social integration and raising awareness in the wider public about the grave importance of the development and education of children with disabilities.

The main objective of the program was the conductive education of Iraqi specialists, their preparation to work independently with children with disabilities, to be able to teach and develop them. Additionally, Jordanian teachers and specialists also received training and equipment for the benefit of the Jordanian children. After the training HBAid provided the necessitated special equipment and furniture to the Iraqi specialists and the Iraqi center was duly equipped to work with children with disabilities. As stated before, with having the training conducted in Jordan with Jordanian partners, an additional result was obtained: a new center was established in Ma'an, and the centers of our partners were founded in Amman and Aqaba with Jordanian teachers.

CONCLUSION

As underlined before, most of the stakeholders of humanitarian response, both organisations and individuals agree that the most vulnerable groups in complex emergencies are children (especially those under five years), pregnant and lactating women, the elderly, women in general, people with disabilities, the geographically or culturally isolated, the „second class citizens" for racial reasons, ethnicity, religion or political position. Most of the times and in most of the countries they had been vulnerable before the complex emergency started and the complex emergency just worsened their situation.

"Decisions made for the appropriate and timely protection of the most vulnerable groups, during and after emergencies can make the difference between suffering further physical and emotional harm", suggests the Pan American Health Organization [19].

It is for us, humanitarian workers and agencies that these groups of invisible vulnerable victims shall be visible, appropriately and adequately assisted and helped in order to gain back their "normal" lives or even a higher standard as soon as possible.

We, humanitarian professionals do not merely save lives and alleviate human suffering. We aim higher: to uphold and uplift human dignity even in the most challenging emergencies.

REFERENCES

[1] Anderson, Mary B. *Do No Harm. How Aid Can Support Peace – or War*. Lynne Rienner Publishers. Boulder, Colorado and London. 1999.
[2] Asees, Mohamed Shareef. "Resettlement of Northern Muslim IDPs: A Case Study of Marichukkati Village in Mannar District of Sri Lanka." Colombo Telegraph, June 11, 2015. [online] https://www.colombotelegraph.com/index.php/resettlement-of-northern-muslim-idps-a-case-study/. (Accessed August 24, 2020).
[3] Besenyő János. *Magyarországés a nyugat-szaharai válság*. MonarchiaKiadó. 2020. p. 16-17.
[4] Besenyő János. *Participation of Hungary in African Operations between 1989-2019.* Óbudai Egyetem. Budapest, 2019. p. 74.
[5] Cahill, K. M ed. *Basics of International Humanitarian Missions.* Fordham University Press and The Center for International Health and Cooperation, New York, 2003.
[6] Central Intelligence Agency. "Middle East: Lebanon — The World Factbook." Cia.gov. Central Intelligence Agency, 2019. [online] https://www.cia.gov/library/publications/the-world-factbook/geos/le.html. (Accessed August 25, 2020).
[7] "Food tragedy unfolding in North Korea where millions have died – UN expert" AFP. 7th April 2004. Reliefweb. [online] http://www.reliefweb.int/w/rwb.nsf/6686f45896f15dbc852567ae00530132/8af8daffc9ecb6bbc1256e6f004e9085?OpenDocument (Accessed: April 9, 2004).
[8] Hamilton, Carolyn, and Nathalie Man. "Report of the Children and Armed Conflict Unit: The Impact of Armed Conflict on Children in Kosovo." The University of Essex. Colchester, Essex: The Children & Armed Conflict Unit, The Children's Legal Centre, The University of Essex, n.d. p. 9, 19-21. [online] https://www1.essex.ac.uk/armedcon/story_id/000031.pdf. (Accessed August 24, 2020).
[9] Hamilton, Carolyn, Helen Rimington, and Federica Donati. "Second Report of the Children and Armed Conflict Unit: The Impact of Armed Conflict on Children in Kosovo." The University of Essex. Colchester, Essex: The Children & Armed Conflict Unit, The Children's Legal Centre, The University of Essex, 1999. [online] https://www1.essex.ac.uk/armedcon/story_id/000033.pdf. (Accessed August 24, 2020).
[10] Hasbullah, Shahul H. "LINES Magazine." February 12, 2003. [online] http://web.archive.org/web/20030212020224/http://www.lines-magazine.org/Art_Nov02/Hasbulla.htm. (Accessed August 24, 2020).
[11] Iqbal, Mohammad, Aman Bashir, Noormal Co-, Khwaja Mir, Islam Saeed, and Mohammad Rasooly. "Maternal Health Care Trends in Afghanistan." Demographic and Health Surveys (DHS) Program. Calverton, Maryland: ICF International, July 2013. p. 2-3. [online] https://dhsprogram.com/pubs/pdf/WP97/WP97.pdf. (Accessed August 24, 2020).
[12] Islamic Human Rights Commission. "Internally Displaced Muslims in Sri Lanka: Calls for Greater Attention to Their Plight." Islamic Human Rights Commission, April 20, 2007. [online] https://www.ihrc.org.uk/publications/briefings/5428-internally-displaced-muslims-in-sri-lanka-calls-for-greater-attention-to-their-plight/. (Accessed August 24, 2020).
[13] Islamic Human Rights Commission. "Sri Lanka. Submission to the UN Universal Periodic Review. Second Session of the UPR Working Group, 5-16 May 2008." OHCHR UN

Office of the High Commissioner for Human Rights, May 1, 2008. [online] https://lib.ohchr.org/HRBodies/UPR/Documents/Session2/LK/IHRC_LKA_UPR_S2_2008_IslamicHumanRightsCommission_uprsubmission.pdf. (Accessed August 24, 2020).
[14] Milburn, Beth; Baart, Judith; Gál, Dávid; Kroese, Agnes; Haleem, Joohi and Daibas, We'am. "Inclusive approaches – humanitarian programming that leaves no one behind" in: Griffiths, J. ed. *Together We Stand.* pg. 13-16. World Humanitarian Summit. Tudor Rose. Gomer Press Ltd., 2016.
[15] Minujin, Alberto, Enrique Delamonica, Edward D Gonzalez, and Alejandra Davidziuk. "Children Living in Poverty. A Review of Child Poverty Definitions, Measurements, and Policies." UNICEF, 2005. p. 10. [online] https://www.unicef.org/policyanalysis/files/child_poverty_final_draft_4_05.pdf. (Accessed August 24, 2020).
[16] Mounstephen Rev. Bishop of Truro, Philip. "Christian Persecution Review. Interim Report." Christian Persecution Review, 2019. Easter [online] https://christianpersecutionreview.org.uk/interim-report/. Bishop of Truro's Independent Review for the Foreign Secretary of FCO Support for Persecuted Christians. (Accessed August 24, 2020).
[17] Office of International Religious Freedom. "Sri Lanka International Religious Freedom Report for 2019." State.Gov. United States Department of State, 2019. [online] https://www.state.gov/wp-content/uploads/2020/05/SRI-LANKA-2019-INTERNATIONAL-RELIGIOUS-FREEDOM-REPORT.pdf. (Accessed August 27, 2020).
[18] "One million dead in North Korea food crisis, US state department says." Agence France-Presse. World News. 28 February 2001. [online] http://www.unhcr.ch/cgi-bin/texis/vtx/home/+3wwBmeDN269wwwweqwwwwwwwhFqnN0bItFqnDni5AFqnN0bIcFqcDdGBraAdGnwMzmZwwwwwwwDzmxwwwwwww/opendoc.htm (Accessed: April 9, 2004).
[19] Pan American Health Organization. "Care of Mentally or Physically Challenged Persons and the Elderly." Pan American Health Organization / World Health Organization, n.d. [online] https://www.paho.org/disasters/index.php?option=com_content&view=category&view=article&id=742&Itemid=659&lang=en. (Accessed August 24, 2020).
[20] Pan American Health Organization. "Domestic Violence and Violence in Temporary Shelters." Pan American Health Organization / World Health Organization. [online] https://www.paho.org/disasters/index.php?option=com_content&view=category&view=article&id=743&Itemid=659&lang=en. (Accessed August 24, 2020).
[21] Pan American Health Organization. "Recommendations for the Care of Children in Emergencies." Pan American Health Organization / World Health Organization. Accessed August 24, 2020. [online] https://www.paho.org/English/DD/PED/te_snnin.htm. (Accessed August 24, 2020).
[22] Smith, Jeffrey M., Sheena Currie, Pashtoon Azfar, and Ahmed Javed Rahmanzai. "Establishment of an Accreditation System for Midwifery Education in Afghanistan: Maintaining Quality during National Expansion." Public Health 122, no. 6 (June 2008): 558–67. [online] https://doi.org/10.1016/j.puhe.2008.03.009. (Accessed August 24, 2020).
[23] Szilágyi Béla, Szenczy Katalin and Szilágyi Lilla. *Function Language and Movement Education. Conductive Education, Health Development and Rehabilitation of Disabled Children.* Training material. Unpublished.

[24] UNHCR. "Lebanon Fact Sheet 2020 January." unhcr.org. UNHCR, 2020. [online] https://reporting.unhcr.org/sites/default/files/UNHCR%20Lebanon%20Fact%20Sheet%20-%20January%202020.pdf. (Accessed August 25, 2020).
[25] UNHCR. "Syrian Refugee Crisis: Aid, Statistics and News." Unrefugees.org. UNHCR, n.d. [online]https://www.unrefugees.org/emergencies/syria/. (Accessed August 25, 2020).
[26] UNHCR. "Western Sahara: UNHCR and WFP Call for Funds to Combat Malnutrition." unhcr.org. UNHCR, December 19, 2003. [online] https://www.unhcr.org/news/briefing/2003/12/3fe2dc384/western-sahara-unhcr-wfp-call-funds-combat-malnutrition.html?query=western%20sahara. (Accessed August 31, 2020).
[27] UNICEF. Democratic People's Republic of Korea. Indicator: Under-five mortality rate. Unit of measure: Deaths per 1000 live births. UNICEF Data Warehouse. [online] https://data.unicef.org/resources/data_explorer/unicef_f/?ag=UNICEF&df=GLOBAL_DATAFLOW&ver=1.0&dq=PRK.CME_MRY0T4.&startPeriod=1970&endPeriod=2020. (Accessed August 24, 2020).
[28] UNICEF. Hungary. Key demographic indicators. Trends in under-five mortality rate. UNICEF. [online] https://data.unicef.org/country/hun/. (Accessed August 24, 2020).
[29] White, Sarah. "Children's Rights, Inequality and Poverty." Department for International Development. DFID and University of Bath, February 28, 2002. p. 4-5. [online] https://webarchive.nationalarchives.gov.uk/20090121180248/http://www.dfid.gov.uk/pubs/files/childrens-rights.pdf. (Accessed August 24, 2020).
[30] World Food Program. "Algeria Country Brief July 2020." Reliefweb (OCHA). WFP, July 2020. [online] https://reliefweb.int/sites/reliefweb.int/files/resources/2020%2007%20Algeria%20Country%20Brief%20July.pdf. (Accessed August 31, 2020).
[31] World Health Organization, World Bank, United Nations Population Fund & United Nations Children's Fund (UNICEF). Trends in maternal mortality: 1990 to 2008. Geneva: World Health Organization. 2010. p. 28-32. [online] https://apps.who.int/iris/handle/10665/44423. (Accessed August 24, 2020).

CYBERATTACKS AND THEIR IMPACT ON ONLINE BRANDS' IMAGE

A KIBERTÁMADÁSOK ÉS HATÁSUK AZ ONLINE MÁRKÁK IMÁZSÁRA

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Abstract

The development of cyber-economy is creating new threats for brands and their public relations, especially for companies from sectors of online services and IT. Outcomes of cyberattacks are the new types of PR challenges for companies that can negatively impact a brand's image, reliance on products and services provided, and lead to general distrust towards whole branches of cyber-economy. Brands providing services related to online services or IT are especially vulnerable to the marketing consequences of cyberthreats. Online services are using personal data and financial assets of the users which may be intercepted, leaked out, stolen, misused, modified, replaced, and be used against the user's will or interest. In this regard, brands must prepare defense strategies from cyberattacks together with plans for dealing with the negative outcomes of cyberattacks and their consequences for the brand. This paper will focus on the threats for brand image related to cybersecurity, potential impacts of cyberattacks on user's perception of brand trust towards it, and how the companies may secure their customers and react to cyberattacks on them.

Keywords

Cyberbranding, cybertrust, PR, online security, online brands, brand trust, ICT-security, data protection

Absztrakt

A kibergazdaság fejlődése új fenyegetéseket jelent a márkák és azok közönségkapcsolatai számára, különösen az online szolgáltatásokra és az informatikai szektor vállalkozásaira nézve. A kibertámadások új PR-kihívásokat jelentenek a vállalatok számára, melyek negatívan befolyásolhatják a márka imázsát, és csökkenthetik a kínált termékekbe és szolgáltatásokba vetett bizalmat. Az online és informatikai szolgáltatásokkal kapcsolatos márkák különösen kiszolgáltatottak a kiberfenyegetések marketingre gyakorolt hatásaival szemben. Az online szolgáltatások a felhasználók személyes adatait és pénzügyi eszközeit használják, melyeket kibertámadások során lehallgathatnak, kiszivárogtathatnak, ellophatnak, és a felhasználó akarata vagy érdeke ellenére használhatnak fel. E tekintetben a márkáknak védelmi stratégiákat kell kidolgozniuk a kibertámadások ellen, valamint terveket készíteni a kibertámadások márkára gyakorolt negatív következményeinek kezelésére. Jelen tanulmány a márkák imázsának kiberbiztonsággal kapcsolatos fenyegetéseire összpontosít, és a kibertámadások lehetséges hatásait vizsgálja a márka iránti bizalomra. Továbbá arra keresi a választ, hogy a vállalatok hogyan biztosíthatják ügyfeleiket, és hogyan reagálhatnak az őket ért kibertámadásokra.

Kulcsszavak

Kibermárka, kiberbizalom, PR, online biztonság, online márkák, márkabizalom, IKT-biztonság, adatvédelem

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INTRODUCTION

Few key brand features are essential for brand success. Trust (Kim & Benbasat, 2003) among security and privacy (Reedy, Schullo, & Zimmerman, 2000). Trust is associated with the features of the brand like logo, message, values, products, and services provided under the brand's name. One of the attributes of brand success in IT and online services is a cyber-branding strategy (Breakenridge, 2001).

It is a keystone for companies from the IT and online services sector to build secure and trusted services for their users, to develop procedures to actively defend and protect their systems, but as well to prepare mechanisms allowing them to cope with brand crises where safety, privacy, and assets of customers are endangered. For that IT and online services brands have not only to prepare effective reaction schemes towards critical cybersecurity hazards but as well they must create a way to keep the customer trust towards their brands even after significant damage caused by vulnerability of service ICT-Security. Because of the specificity of the dynamically changing and impersonal character of IT and online services sectors it may be much more challenging to keep the customer's trust than for traditional brands based on physical products or services provided or sold by a physical person.

DEFINITION OF BRAND

A brand is a set of features that are identifying and distinguishing a good or service from others. Brands can have features as name, design, symbol, or other brand-attributes fulfilling this requirement (Kotler & Armstrong, 1994). Taking into account the aspect of benefits for consumers, a brand is a set of functional and symbolic elements allowing to build a loyal group of consumers, and enable the brand owner to achieve a leading position in the market by fulfilling the marketing strategies of the company (Ghodeswar, 2008).

A brand can consist of verbal (name) and non-verbal (symbol, logo) elements. A brand may include the associations to names of cities, countries, and regions, names of animals, symbolizing nature (Edwards & Day, 2005). Names can come from history, pop culture from literary and musical works. The brand can consist of combinations of letters, digits, or symbols. The brand or part of the brand protected by law becomes a trademark and that may be used only by the brand owner and cannot be copied or imitated.

An attempt to systematize consumer behavior concerning online brands was made by G. Shao. According to his view, these behaviors include consumption, co-participation, and creation of content concerning brands (Shao, 2009). This approach was developed and detailed in D.G. Muntinga et al. research, which resulted in the definition of a framework for online consumer activity concerning brands. Depending on the degree of consumer involvement, they distinguish three types of such activity: consumption, contribution, and creation (Mutinga, Moorman, & Smit, 2011).

IT and online brands have the lowest level of consumer involvement in brand activities is consumption. It is the most common type of behavior that is related to the fact that it requires only the passive reception of the content related to a specific brand, placed on the Internet by other Internet users or brand owners. Examples of this type of action include watching videos, reviewing ratings, comments, and opinions on brands and reading discussions on brands on social networking sites (Schivinski & Brzozowska-Woś, 2015).

A higher level of involvement in consumer's online brand-related activities is characterized by the contributory type. Consumers contribute to the creation of brand-related content by participating in brand discussions on fan sites, writing comments on brands, or adding content e.g. photos, graphic messages, and videos on blogs and fan pages.

The highest level of consumer activity on the Internet concerning brands is the creative type of consumer's online brand-related activities. Examples of this type of behavior include running blogs devoted to particular brands, publishing product reviews, and creating and placing on the Internet e.g. films, photos, graphic messages, sound files related to a brand. This means that consumers representing the creative type are the creators of branded content that will later be consumed or contributed to by others.

IMPACT OF TRUST ON BRANDS

Trust has an impact on an online consumer's devotion to the brand. D. A. Aaker is defining brand quality as the consumer's perception of the overall quality of a product or service, or their superiority compared to alternative products and services. This hard to grasp feeling towards the brand, based on brand-related product or service characteristics such as reliability and performance (Aaker & Joachimsthaler, 2000), is impacting the perception of trust towards the brand. A brand may be associated with trust towards its features, but as well through the experience that is promising, or by the quality of the service or product that the company delivered to the customer before, building a positive association with the brand (Kotler, 2006).

The concept of trust is interpreted in terms of:

- Disposition - i.e. a mental subjective attitude towards the brand (evaluation, anticipation, expectation)
- Decision – extrapolated reliance on the product or service, a user is allowing itself to be dependent on the brand
- Behavior – a physical emanation of trust towards the brand.

Trust is an important resource of the organization and may be considered as the starting point for many management concepts. Trust management is a set of activities to create systems and methods, which allow dependent entities to make assessments and undertake decisions on the reliability of risky activities, as well as to enable these entities to develop and use brand credibility as their own. (Grudzewski, Hejduk, Sankowska, & Wańtuchowicz, 2009)

Trust in the brand can be categorised as consumer risk. The lower the expected and perceived risks the greater the confidence the consumer can give the brand. The most common risks that the consumers are taking:

- Performance - to what extent the brand is consistent with the description of the functions it performs.
- Financial - whether the brand will provide the right value for money spent (price).
- Time - does the consumer need to spend more time assessing the unknown of brands, and if the brand is unsuitable, how much time is left wasted.
- Social - whether the brand will be accepted by family, friends and whether
- the purchase will change their opinion about the buyer.

- Psychological - whether the consumer feels well as a brand owner (De Chernatony & McDonald, 2003).

INSIGHT ON BRANDS IN IT AND ONLINE SERVICES SECTOR

Trust plays an important role in the customer decision-making process in accordance with the will to undertake an economic activity, register, leave personal and financial data, and being tracked or monitored by data administrators. It is proven that business operations may be done more effectively if there is a customer trust towards the brand (Zucker, 1986). In the dynamic and competitive online services markets where the distance or time of realization of services has no impact or lower impact than in other spheres of economy, trust towards the brand may be the only assurance that the customer can have towards the enterprise. Because of lack of personal contact with the customer service and obligation of tracking support requests, is creating an atmosphere where the trust is associated only with the brand or product, and not as in traditional customer service with a physical company representative or salesman. Many online companies are having non-direct customer service which is not encouraging them to use it for help or complain as a traditional one for many users.

Lack of trust towards the brand is the key reason why people do not make purchases online (Lee & Turban, 2001). Security is among others considered as one of the important determinants and core elements of the online trust (Dayal, Landesberg, & Zeisser, 1999). Therefore, the brand manager must consider trust in the brand as a key asset of the marketing strategy. In this context, strong and trustful online brands can take the role of a consumer guide for those who are not keeping pace with rapid technological change, marketing confusion, and information noise on the market. In the multitude of information and opinions on the various offers available, offers marked with a strong brand increase confidence in the customer decision to purchase (Urbanek, 2008).

DEFINITION AND CATEGORIZATION OF CYBERTHREATS

There are several security threats impacting a brand's name and they may be divided into three levels:

- Allowing external users to access the system in an unauthorized way.
- Allowing users to have more rights and access to the platform than it was planned within the system.
- Events or actions that are affecting users' service quality on the platform, causing stoppages delays or leading to a system interruption.

Breach of every security risk level is a threat to the platform stability (Alhabeeb, Almuhaideb, Le, & Srinivasan, 2010) and can negatively impact the users' trust concerning the brand. Several aspects of users security or platform stability may be a subject of risk that can impact the brand's reputation:

- Personal data and user history (Zhang, 2014).
- Financial assets security.
- Anonymity of information (Medaglia & Serbanati, 2010).
- Service quality.
- Misleading of users, miscommunication, or lack of communication (Weber, 2010).

Security risk and security threats may have short term consequences (related to user satisfaction) and long term consequences (related to PR of the brand) connected with the stability of the platform and company and the brands' reputation. It is crucial for the companies to prevent the security risks because once the website would be classified as a potential danger by search engines, antiviruses or other applications responsible for the online security for the users, it is hard to rebuild the trust of users and categorization by search engines' algorithms.

There may be some preventive measures to avoid the emergence of the security threats (Gerić & Hutinski, 2007) such as software-based security measures (Barabanov, Markov, & Tsirlov, 2018), hardware-based security measures (Al-Omary, Othman, AlSabbagh, & Al-Rizzo, 2018) and user-based security measures (Toršić, 2018).

FACTORS OF CYBER-THREATS ON IT AND ONLINE SERVICES BRANDS PERCEPTION

External factors of the online service perception such as different markets, cultures or legislation are impacting the trust towards the service (Doney & Cannon, 1997). The other factors related directly to the IT and online services are:

- Consumer characteristics.
- Past user experience with the service or other online services.
- Perception of risk of using a service or a specific type of service
- Trustworthiness towards the service.
- The reputation of the brand.
- Website quality.
- Perceived usefulness of the service for the user.
- Perceived ease of use of service.
- Familiarity with the interface.
- Trusted seal given by the external authority.
- Experts opinion.
- Peers' opinion.
- Non-government or non-business association.

Factors impacting users' perception of safety are significant elements of acquiring trust towards an online brand. (Shah Alam & Mohd Yasin, 2010) The stronger is the perceived quality of service and brand safety, the higher is the level of trust towards the brand.

IT AND ONLINE BRANDS DAMAGE CONTROL STRATEGIES

Companies may deal with the negative reputation of their brands through several direct and indirect methods. The key aspect of those actions is to not let the bad reputation spread, and to reduce the sprawl of the information out of the bubble of customers who were already impacted by losing the security risk. The other aspect is to prevent the bad reputation to reach the new customers and Internet users who have not yet decided if they want to use the service or which service provider to use.

The damage control strategies used by brand managers may be:

- Fixing the reason for the distrust – to stop the proliferation of the security risk and to not expose other users of the Internet to the risk. The other way is to avoid escalation of negative word of mouth directed to the brand, especially with the use of social media and other activities associated with the service.
- Removal of negative reviews about the brand – to minimize the impact of negative reviews and opinions on the brand impacting current and new users of the service. This activity may be overcommitted by a brand manager and look as fake from the perspective of the user, because of that, the situation when service has no opinions or no reviews at all has to be avoided.
- Removal of negative message about the brand portraying it as dishonest – one of the worst images for the brand is to denude company profit orientation to the customers or present itself as non-interested in solving issues related to customer losses. In many situations, the way of conduct of the representatives of the brand or customer service agents may be considered by users as not empathetic, not proactive enough, or read as an approach without commitment to solving the customer problems. In some cases, it may be perceived as greedy and profit-oriented, especially when the fault of malfunction or cyber-risk is not on the user side or it is not perceived as such.
- Add positive opinions and reviews – users are expecting confirmation and assurance of the brand's professionalism and safety. One of the ways that users are looking for confirmation of such aspects is looking for active and independent opinions of users validating customer expectations related to a brand. Some companies are faking user opinions which may be revealed by users. In this situation, the outcome of such a move may bring contradictory effects to ones desired.
- Satisfying users who were impacted by the negative event – users who lost their assets or were stressed by the gap in company security systems are generally expecting a satisfaction of their loss. Dissatisfied customers may tend to spread negative information into the general public and by word of mouth. Giving the dissatisfied user extra gratification may reduce the frustration directed towards the brand and prove the company's professional and customer-oriented approach towards customer service. In some cases, customers may appreciate the satisfaction given and consider the risk-related situation as an accident that happened only once and it will not occur again, and the users may stay loyal to the brand.
- The distraction of haters of the brand – if the brand will gain its group of haters whose goal will be to disregard the brand in the public of Internet (doesn't matter if they are appearing as an effect of company mismanagement and policies or haters steered by the competition), the most efficient way to deal with hate towards the brand is to distract the haters. Distraction may be done by making haters' efforts insignificant and it may be achieved through focusing their complaints to not essential elements of the issue or to reveal the hating intentions or association with competitions of haters. Revealing intended hate initiated by competition may turn into a positive reaction of sympathy towards the brand.

- Providing an excellent level of customer service – customer service is a must when speaking about a successful brand image. In a situation of crisis, the behaviour of customer service agents or brand representatives is crucial for the brand's reputation. In the situation when service is working properly, for many users a brand is a seemingly invisible feature of product or service. The emotion tied with the realization of the brand is occurring during hurdles and in this particular situation, customer service is an indicator of the professionalism of the service.
- Preclusion of usage of the incident by competitors – in the competitive market competitors may seek easy gain by diminishing the market position of the company by utilizing the issues related to security. Crisis security situations may lead to the outflow of customers so it is important to manage to keep them associated with the brand and provide them a vision of better service quality despite the troubles caused to them before. There are reasons why users prefer to stay with brands and services that they are already used to like: familiar interface, already configured account, access to the history of service usage, networking build-up though the service, discounts collected by the time of usage of the service, gamification of service design and sympathy for the brand. A brand manager has to use it to minimize the users' outflow or general disappointment with the usage of this type of online service.
- Rebranding – in the situation when the damage given to the brand is too heavy for it to recover from. There may be a need to rebrand the brand's elements or to drop it down totally. One of the ways how companies may use rebranding is changing its association with particular elements and messages used by brands to communicate certain features to the customers. Rebranding may be directed into strengthening the weak points of current brand strategy or to distract users with a new stronger message that will have a goal to associate the brand with.
- Positive employer branding – in the case of some businesses, its employees or associates are numerous they may be a significant marketing asset. On the other hand, every employee may be a potential threat of an unauthorized leak of information or a cause of an inside job. A positive company branding may make company workers proud to work for the brand and by that, they become defenders of the brand's name and work for the brand as it is directly associated with them.
- Corporate Social Responsibility – strategy of corporate social responsibility may work as a long term strategy and it may be considered more as a strategy to build-up the brand than to use it in the crisis. But there are some situations where CSR may help to reach certain customer groups or to be used for users particularly devoted to certain values or concerns that the CSR strategy may answer.

CONCLUSION

Online and IT brands operating in a competitive environment, filled with potential security risks have to acquire user's trust to effectively gain and keep their customers. A high level of the ICT-security of the online platform is a key value that companies have to deliver, therefore the perception of trust is one of the most important features that have to be associated with a trustful brand. In the situation of crisis brands are the most vulnerable asset of the company related to the potential loss of users and decrease of reputation leading

to marginalization on the market. To inhibit this process brand managers have to prepare strategies that are allowing the service to deal with the crisis before the cyber-threats appear and to have prepared procedures and ways of conduct on the situation after the cyber-threat would emerge.

There are several ways to make the brand proof of security incidents and to cope with the negative image caused by it. Trust towards the brand is valuable not only during the time of crisis but it has to be build-up and grow together with user familiarization with it and during the time of interaction with it. The stronger the level of trust is created the more crisis-proof it becomes.

It is possible to distinguish the direct and indirect ways to cope with the security incidents relating to the trust of the brand, all of them require active reaction from the brand manager and whole service to minimize the damage caused by the security incident. A brand is the simplified emanation of user's perception of the service and it has to reach their expectations towards it. On the other hand, a brand cannot be detached from the service and its functionalities, therefore all the channels of building the customers experience related to the brand (service quality, service architecture, customer service, brand image) have to be integrated into one coherent vision and have to be included in the brand strategy. In this regard, from the perspective of the company not only the brand manager takes care of the brand's image, but all of the project associates will be familiarized with the brand strategy, its features, and the message that is willing to deliver to the customer. During the security incident brand managers have to closely cooperate with the customer service, financial and technical department in order to avoid unnecessary PR occurrences and lead the brand through the crisis with the least damage possible.

REFERENCES

[1] A. Al-Omary, A. Othman, H. M. AlSabbagh and H. Al-Rizzo, "Survey of Hardware-based Security support for IoT/CPS Systems," in Sustainability and Resilience Conference: Mitigating Risks and Emergency Planning, Amway, 2018.

[2] A. H. Keyhanipour, B. Moshri, M. Kazemian, M. Piroozmand and C. Lucas, "Aggregation of web search engines based on users' preferences in WebFusion," Knowledge-Based Systems vol. 20, pp. 321-328, 2007.

[3] A. Madhavi and K. Harisha Chari, "Architecture Based Study Of Search Engines And Meta Search Engines For Information Retrieval," International Journal of Engineering Research & Technology (IJERT) vol. 2 issue 5, pp. 1832-1835, 2013.

[4] A. V. Barabanov, A. S. Markov and V. L. Tsirlov, "Information Security Controls against Cross-Site Request Forgery Attacks on Software Applications of Automated Systems," in International Conference Information Technologies in Business and Industry 2018, Tomsk, 2018.

[5] B. M. Ghodeswar, „Building brand identity in competitive markets: a conceptual model," Journal of Product & Brand Management Volume 17 Issue 1, 2008.

[6] B. Schivinski and W. Brzozowska-Woś, "Badanie aktywności online polskich konsumentów dotyczącej marek," e-mentor nr 2(59, p. 77–85, 2015.

[7] C. G. Bell and A. Newell, Computer Structures: Readings and Examples, New York: McGraw–Hill Book Company, 1971.

[8] C. M. Medaglia and A. Serbanati, "An Overview of Privacy and Security Issues in the Internet of Things," the Internet of Things, pp. 389-395, 2010.
[9] D. A. Aaker and E. Joachimsthaler, Brand leadership. Building assets in an information economy, 2000: The Free Press, New York.
[10] D. Breakenridge, „Brand Building in The Digital Economy," w Cyberbranding, Upper Saddle River, Prentice Hall, 2001.
[11] D. G. Mutinga, M. Moorman and E. G. Smit, "Introducing COBRAs: Exploring motivations for brand-related social media use," International Journal of Advertising Vol. 30, No. 1, pp. 13-46, 2011.
[12] D. Kim and I. Benbasat, "Trust-related arguments in Internet stores: a framework for evaluation," Journal of Electronic Commerce Research, vol. 4, no. 2,, pp. 49-64, 2003.
[13] E. W. Felten, D. Balfanz, D. Dean and D. S. Wallach, "Web Spoofing: An Internet Con Game," Technical Report 540–96, pp. 1-9, 1997.
[14] G. Shao, „Understanding the appeal of user-generated media: A uses and gratification perspective," Internet Research Vol. 19, No. 1, pp. 7-25, 2009.
[15] G. Urbanek, „Strategie zarządzania aktywami niematerialnymi przedsiebiorstwa," Przegląd organizacji, pp. 13-16, 6 2008.
[16] H. Edwards and D. Day, Creating Passion Brands, London: Kogan Page, 2005.
[17] J. Reedy, S. Schullo and K. Zimmerman, Electronic Marketing: Integrating Electronic Resources into the Marketing Process, Mason: The Dryden Press, 2000.
[18] L. De Chernatony and M. McDonald, Creating Powerful Brands in Consumer, Service and Industrial Markets, Oxford: Elsevier/Butterworth-Heinemann, 2003.
[19] L. Erdödi, N. Ulltveit-Moe, H. Nergaard, T. Gjøsæter, E. Kolstad and P. Berg, "Secure Information Sharing in an Industrial Internet of Things," arXiv:1601.04301v1, pp. 1-12, 2016.
[20] L. G. Zucker, "Production of trust: Institutional sources of economic structure," Organizational Behavior, vol. 8, pp. 1840-1920, 1986.
[21] M. Alhabeeb, A. Almuhaideb, P. Le and B. Srinivasan, "Information Security Threats Classification Pyramid," in 24th IEEE International Conference on Advanced Information Networking and Applications Workshops, 2010.
[22] M. de Bruijne, M. van Eeten, C. Hernández Gañán and W. Pieters, Towards a new cyberthreat actor typology. A hybrid method for the NCSC cyber security assessment, Delft: TU Delft, 2017.
[23] M. Januszewska, I. Michalska-Dudek and R. Przeorek-Smyka, "Online Travel Agent and Travel Metasearch Engine as a Examples ofInformation and Communication Technologies Implementation in the Distribution of Travel Agencies Offers," in Proceedings of the 10th International Conference Liberec Economic Forum , Liberec, 2011.
[24] M. K. O. Lee and E. Turban, "A Trust Model for Consumer Internet Shopping," International Journal of Electronic Commerce, vol. 6, no. 1, 9 2001.
[25] N. Y. Conteh i P. J. Schmick, „Cybersecurity:risks, vulnerabilities and countermeasures to prevent socialengineering attacks," International Journal of Advanced Computer Research, Vol 6(23) , pp. 31-38, 2016.
[26] P. Beynon-Davies, Database Systems (3rd ed.), New York: Palgrave Macmillan, 2003.
[27] P. Kotler and G. Armstrong, Principles of Marketing, Englewood Cliffs: Prentice Hall, 1994.

[28] P. Kotler, „the New marketing and sales-strategies and tactics," w XIX Seminar of the Series Autorities, 2006.
[29] P. M. Doney and J. P. Cannon, "An examination of the nature of trust in buyer-seller relationships," Journal of Marketing, vol. 61, no. 2, pp. 35-51, 1997.
[30] P. Mateti, „Unix. The world's first computer virus," w The Unix Haters Handbook, Dayton, Wright State University, 2001.
[31] P. Toršić, "On the Programming Models, Smart Middleware and Self-Healing Capabilities for the Next-Generation Internet-of-Things," in Computing Conference 2018 10-12 July 2018, London, 2018.
[32] Q. Li and Y. Sun, "An Agent Based Intelligent Meta Search Engine," in Proceedings of the 2012 international conference on Web Information Systems and Mining, Berlin, 2012.
[33] R. H. Weber, "Internet of Things – New Security and Privacy Challenges," Computer Law & Security Review vol. 26, issue 1, pp. 23-30, 2010.
[34] S. Dayal, H. Landesberg and M. Zeisser, "How to Build Trust Online," Marketing Management, Fall, pp. 64-69, 1999.
[35] S. Gerić and Ž. Hutinski, "Information system security threats classifications," Journal of Information and Organizational Sciences vol. 31, pp. 51-61, 2007.
[36] S. Shah Alam and N. Mohd Yasin, "What factors influence online brand trust: evidence from online tickets buyers in Malaysia," Journal of theoretical and applied electronic commerce research J. theor. appl. electron. commer. res. vol.5 no.3, pp. 78-89, 2010.
[37] S. Sicari, D. Rizzardi, D. Miorandi, C. Cappicillo and A. Coen-Porisini, "A secure and quality-aware prototypical architecture for the IoT," Information Systems vol. 58, pp. 43-55, 2016.
[38] W. H. Grudzewski, I. K. Hejduk, A. Sankowska and M. Wańtuchowicz, Zarządzanie zaufaniem w przedsiębiorstwie, Kraków: Oficyna Wolters Kluwer Business, 2009.
[39] Z. K. Zhang, "IoT Security: Ongoing Challenges and Research Opportunities," in IEEE 7th International Conference on Service-Oriented Computing and Applications (SOCA 2014), 2014.

TRANSDISCIPLINARY APPROACH TO FIND CONNECTIONS BETWEEN ALTRUISM AND SAFETY

AZ ALTRUIZMUS ÉS A BIZTONSÁG KAPCSOLATA: TRANSZDISZCIPLINÁRIS FOGALMI KERET

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Abstract

Analyzing the human side of various procedures are not that far from safety and security sciences. However, there is not yet such a broad literature connected with the field of social sciences. This study seeks to understand the real processes through the lens of transdisciplinarity and find connections between altruism and safety. The conceptual framework of transdisciplinarity are disordered, so the study examines the question based on loosely defined concepts that assume coherence, whether can altruism fit into the world of safety sciences? By escaping the cages of disciplines, some connections can be found which help us to understand the real processes.

Keywords

reciprocal altruism, philosophy of safety, trust, human security

Absztrakt

A biztonságtudománytól nem áll messze a különböző folyamatok humán oldalának vizsgálata. Azonban a társadalomtudományok területéhez kapcsolódóan még nem áll olyan széles szakirodalom a rendelkezésre. A tanulmány a transzdiszciplinaritás lencséjén át igyekszik megérteni a valós folyamatokat és összekapcsolni az altruizmust a biztonsággal. A transzdiszciplinaritás fogalmi kerete rendezetlen. Így a tanulmány összhangot feltételező, lazán definiált fogalmak alapján keresi a választ arra a kérdésre, hogy vajon hogyan illeszkedhet az altruizmus a biztonságtudományok világába? A diszciplínák ketrecéből kimenekülve olyan kapcsolatok találhatók, amelyek segítenek megérteni a valós folyamatokat.

Kulcsszavak

reciprok altruizmus, biztonságfilozófia, bizalom, humán biztonság

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INTRODUCTION

The international academic literature analyzes altruism from several perspectives. The definition of altruism is a subject to further discussion, as it is diverse between disciplines. There is no difference in case of defining safety. While altruism is more typical for researches in social sciences, safety is mainly concerned with engineering and safety sciences. As it is difficult to bring together these diverse fields, we invoke the research strategy of transdisciplinarity. According to Basarab Nicolescu [1] transdisciplinarity examines territories beyond different disciplines. "*All observers are the slaves of their disciplines, which force them to see through the lens of their concepts and methods. The big question is, whether it is necessary for us to stay within the cage of our existing disciplines. If we want to name reality, then we should escape our cage, but must avoid slipping into the glorified mainstream cage, or any other. It is logical for the majority to recommend everyone being in the same cage, and then there will be no arguments*" [2, p. 866].

Therefore, we seek the answer to how the broadly understood concept of safety can be related to the field of social sciences in a transdisciplinary approach. The present study is a theoretical research that brings together various relevant literature to frame altruism and safety. We first look over the classic presence of altruism in certain cases, after we examine the concept of safety in such a way that we can finally present the intertwining of two essentially different areas.

ALTRUISM AS A WAY OF TRUST

Altruism is a prosocial behavior, "*which can be interpreted as a helping lifestyle, a loyal activity that serves the interests of both parties, influenced by prosocial tendencies, and helps the other party*" [3, p. 199]. According to Hewstone & Stroebe [4] there are three levels of assistance; helping behavior, prosocial behavior and altruism. Help is usually work-related and can be done not only by individuals, but also by an organization. Prosocial behavior is individual and the way of support is voluntary, while in the case of altruism, the helper is guided by empathy and long-term goals. [4].

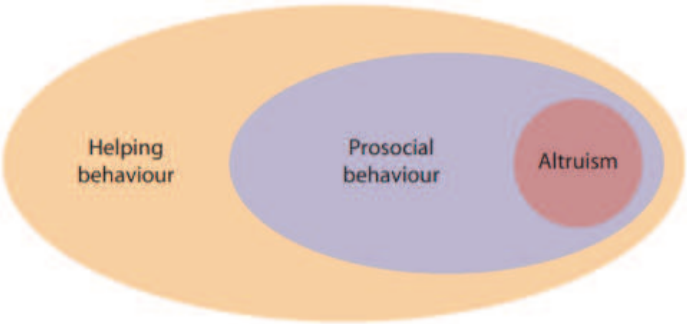

Figure 1. Relationship between the concepts of helping, prosocial behavior and altruism [5, p. 179]

The 19th century French philosopher Auguste Comte formed the creation of altruism as a concept. In his view, altruism is an instinct that is opposed to egoism and is related to selflessness. However, the definition of altruism varies from discipline to discipline. According to psychologists, altruism is a kind of hidden selfishness, while biologists associate

it with behavioral genetics. Sociologists see this type of behavior is a motivating factor for improving the well-being of others. There are also different transdisciplinary approaches. Bonnie Benard [6] in her work about resilience described altruism as the *"highest form of social competence"* [6, p. 16]. According to Ann S. Epstein [7] altruism develops in childhood as soon as we experience empathy. *"Empathy is the ability to understand another person's feelings by experiencing the same emotion oneself. Empathic behavior is demonstrated through caring, compassion, and altruism"* [7, p. 35]. Here and now, we are building upon economic view; however, it is closely related with sociological view. In the economic approach, according to Balázs Hámori [8] altruism can be defined as the withdrawal of others' prosperity into the individual's welfare function [8]. In another study [9], Hámori points out that, according to the development of economics over the last two to three decades, it examines the motivations of »beyond self-interest« and cases of propitiousness and viciousness. Onto the characters of the economy particularly the underdeveloped one, the envy and wicked joy changes individual utility functions and creates a connection between individual utilities. In the same way, altruistic and compassionate economic actors, whose survival has been questioned for a long time, not only exist, but with their manner »magnetize« the behavior of selfish actors who contact them. As a result of this cooperation, they act »as if« they are selfless [9].

Altruism has different criteria. Kahana & Midlarsky [10] in their research highlighted that one of them is the adequate motivation (care, morality, social sensitivity, etc.), the other criteria is the rate of cost (the participant loses more than he/she invests), then the rate of volunteerism (voluntary assistance), and finally the extent of the possibility of alternative actions (there are real alternatives to action). According to the authors, it is rare for all criteria to meet at the same time, so a scale has been set up with a low rate of altruism at one end and a high rate at the other end [10]. In addition, altruism has different forms of appearance that are related to framing taken from different approaches in different disciplines (like kinship altruism, selfish altruism, etc.). One of the most common of all is reciprocal altruism, a type of "gift exchange" where the individual expects a return in the future in exchange for selflessness. According to Hámori one of the most important components of reciprocal altruism is trust. Reciprocal altruism can be described as a kind of exchange relationship, more precisely as a clearing system for charities, but it is also a community of risk. Reciprocal altruism can also interpreted as risk sharing. In order to guaranteed the benefits of mutual favors, in most cases we need to belong to a well-defined network. The bigger and tighter the net, the safer [8]. These types of networks can emerge not only among market players, but also between organizations and consumers, friends, acquaintances or even university groups. Trust can also reduce the costs for actors, as cooperation in the other party awakens respect and propitiousness, and those who are respected can acquire financial benefits [11] [12]. Trust also led to the so-called "opportunistic behavior". In such cases, advanced trust results lasting relationship, and the parties do not assume that either of them could abuse the situation. Breaking up a long-term relationship of trust is far more unfavorable than fraud for instantaneous profit, because if either party notices, trust-based cooperation leads to failure. It is beneficial of both participants to ignore situations that bring momentary benefits but undermine cooperation in long run. Trust is a premise for reciprocal altruism at networks. As Hámori quoted Putnam [13], trust can be defined as a legitimate expectation that others will do the right thing [8].

The concept of trust is not solid in the literature. There are a number of approaches, as in the case of altruism, depending on the discipline. Currently, the risk-based approach is closest to the goal of our study. In a level of risk management, its purpose is to provide the highest possible level of security, based on the identification and ranking of risk. Risk is an uncertain event or activity, what occurrence may affect the expected result in a negative way [14]. Delimiting trust points out to the relationships between trust and risk. However, nor in this case we provide a congruent definition, rather different scientific framings. According to Mayer, Davis, and Schoorman [15] trust is *''the willingness of a party to be vulnerable to the actions of another party based on the expectation that the other will perform a particular action important to the trustor, irrespective of the ability to monitor or control that other party''* [15, p. 712]. The authors allude to trust as an action whose outcome is uncertain because the trustee cannot control the interaction. They make a distinction between trust and trustworthiness. In the case of trust, it can be assumed that we have outlined and also we are aware of the possible outcomes of the events, still we take a voluntary risk, even though we become vulnerable by the other participant. While trustworthiness is the certainty of the other participant's responsible behavior what based on experiences. The essential difference is that while trust is an expectation, trustworthiness is a concrete certainty connected with experience [15].

In another approach, Das & Tang [16] in their joint work revealed *"at the subjective trust level, trust is not a subclass of risk but rather a mirror image of risk. […] In fact, both subjective trust and perceived risk represent the assessment of outcome probabilities of the same event. The crucial difference is that, whereas subjective trust portrays the assessment in a positive light — that is, the probability that the outcome will be what is desired — perceived risk describes the situation in disquieting hues — the probability that the outcome will be what is feared. In actuality, they are the mirror image of each other, evaluating the same situation from two distinctly different perspectives of hope and concern*" [16, p. 110]. In this case, trust and risk are not highlighted as obvious contrast pairs, but these two completely different constructs were identified as theoretical opposites. While we hope for a positive outcome in event of trust, the outcome for risk can be negative. Risk-based approaches suggest that trust is relevant where risk typify the relationship between the participants. In a domestic study by Gelei & Dobos [17] demonstrated that in cooperative relationships, the level of trust influences risk appetite. The stronger the trust between partners, the greater the willingness to take risks in risky situations [17].

Returning to altruism, therefore, trust is necessary to create reciprocity as a condition. Individuals for whom trust is anticipated reveal a high level of altruistic behavior, and the level of altruism increases in parallel with the level of anticipated trust [18]. Although trust is risky, while these are working as mirror images. When trust is low between participants, risk is observed as high and backwards. In this approach, the benefit of high trust should indemnify for the risk taking [16]. In the following, we examine the conceptual framework of safety and then map the relationship between altruism and safety.

PHILOSOPHY OF SAFETY

Safety is also a concept that is difficult to define precisely due to its diversity. Safety is challenging to interpret and since the middle of the twentieth century it has become more complex as it can also be a measure of a changing and complicated situation. Safety can be

interpreted in a complex way, taking into account the combined effect of several factors. Its field of application is also diverse; we can talk about political, social, societal, ecological safety, etc. It can also vary in scope, as safety can be interpreted globally or regionally, but also to countries, small or large communities and individuals [19].

A detailed analysis of the concept of safety would go far back to antiquity, but it would also be very long to list definitions that are relevant nowadays. The practice of creating, maintaining, and guaranteeing safety is the responsibility of safety sciences. According to Lieutenant Colonel Imre József Hadnagy [19], safety is a complex system of knowledge summarizing the theoretical elements and practical experiences determining the success of the activities of national, federal, regional and international organizations aimed at eliminating and minimizing the challenges, threats and risks affecting national safety in the broadest sense [19, p. 5].

The traditional military and state-centered approach to safety has been the subject of more serious criticism in the early 1970s, especially in the wake of events such as the oil crises in 1973 and 1978. By this time, the concept of safety was broadened, at the economic and environmental level, and the broadening of the concept kept going ever since [20]. According to Berek et al. [21], safety always covers a condition that is sometimes threatened by different factors, and safety can be interpreted in conjunction with this risk factor. In their complex, general framing, safety is the state of persons or organizations determined by the interaction of intentional unlawful behavior that endangers their existence or proper functioning and the protection resources applied to them [21, p. 5].

Safety is affected by a number of indirect (legal environment, management, institutional system, economic factors, etc.) and direct (illegal behavior or quantity and quality of protection resources) factors. In addition, its' complexity lies in the fact that the subject of safety - be it an object or even an individual - can be described by different characteristics, which are often jeopardized by completely independent threats. Due to the complexity of safety, creating and maintaining is a difficult task and can only be achieved using appropriate security tools [21], [22]. A more precise interpretation is obtained by assigning it to certain fields such as personal-, property-, environmental-, economic security, and so on. However, it can also be examined in a human approach, which means a poise, what keep risky situations away from the protected person [19]. However, one of the most relevant field of safety is human security, which focuses not on the state but on the individual. The basic concept of human security is the protection of the individual, which is realized through the protection of the interests and values of the individual in different ways [23]. United Nations Development Programme (UNDP) in their report from 1994 defined and specified *human security* first. However, literature differs security and safety from each other, [24] in this case, framing of human security provide excellent base. UNDP has gone beyond the conceptual framework of national and military security and opened a new dimension to human security. The concept of it has been focused more on people rather than nations, as they said: „*For most people, a feeling of insecurity arises more from worries about daily life than from the dread of a cataclysmic world event. Will they and their families have enough to eat? Will they lose their jobs? Will their streets and neighborhoods be safe from crime? Will they be tortured by a repressive state? Will they become a victim of violence because of their gender? Will their religion or ethnic origin target them for persecution?"* [25, p. 22]. The report perceive on human security as integrative concept what appreciate

the "*universalism of life*". As the main characteristics of it, UNDP framed four concepts. First, human security is universal, as there are many threats what are common to every people. Second, it is interdependent, as dangers of human security are no longer isolated events. Furthermore, is easier to ensure through early prevention than later intervention. Last, but not least human security is people-centered, referring on way of living, independence or opportunities. It also means "*protection from sudden and hurtful disruptions in the patterns of daily life, whether in homes, in jobs or in communities*" [25, p. 23].
Human security also has several categories, like economic, food, health, personal, community security etc., but each categories are focusing on people. United Nations in their Human Security Handbook [26] defined, as "*people-centered, comprehensive, context-specific and prevention-oriented responses that strengthen the protection and empowerment of all people and all communities*" [26, p. 6]. Human security system ensure the right of people to live in dignity, free from despair and poverty. It is a comprehensive approach what face challenges of people, including three components: freedom from fear, freedom from want and freedom to live in dignity. Shielding people from threats is a central task, and handle insecurities in a preventive, systematic and comprehensive way [27]. Challenges, dealt by human security are complicated, especially at international communities. Some of the basic challenges, what this field deals with are presented in Table 1. [26]. Although in a transdisciplinary approach, types of insecurities have much deeper meanings and much more factors that should be dealt with, also these are mutually reinforcing. Processes like globalization, multiculturalism or development of technology etc. provide new challenges that human security has to cope with [27].

TYPE OF INSECURITY	ROOT CAUSES
Economic insecurity	Persistent poverty, unemployment, lack of access to credit and other economic opportunities
Food insecurity	Hunger, famine, sudden rise in food prices
Health insecurity	Epidemics, malnutrition, poor sanitation, lack of access to basic health care
Environmental insecurity	Environmental degradation, resource depletion, natural disasters
Personal insecurity	Physical violence in all its forms, human trafficking, child labour
Community insecurity	Inter-ethnic, religious and other identity-based tensions, crime, terrorism
Political insecurity	Political repression, human rights violations, lack of rule of law and justice

Table 1. Types of human insecurities and possible root causes (own editing based on [26, p. 7])

A European Union approach to human security in 2003 Barcelona Report highlight the need of respect of human rights. It is crucial to enable communities to create the condition of stability and peace, which means intensive communication with civil society. *"Security is often viewed as the absence of physical violence and regarded as part of the political-military realm, while development tends to be considered part of the economic and social realm, and human rights are largely considered part of the civil/legal realm. Yet these distinctions are misleading. Development is more than material wellbeing, just as human rights must include economic and civil rights. Likewise, ensuring Human Security under circumstances of extreme vulnerability means a concern for both physical and material wellbeing. It is about helping people to feel safe in their homes and on the streets as well as ensuring they have what they need to live on"* [28, p. 8]. Although it is worth noting that framing human security has not reached any consensus yet. This is a concept that can be interpreted in many ways, in countless variations, and its explanation exists in many forms [29]. Sydney University professor Paul James [30] studied human security in a new dimension and reframed the approach by analyzing its strength and weaknesses. As a result, the author defined human security *"as one of the foundational conditions of being human, including both (1) the sustainable protection and provision of the material conditions for meeting the embodied needs of people, and (2) the protection of the variable existential conditions for maintaining a dignified life"* [30, p. 87].

Relying on the definition, the author emphasizes the importance of risk analysis as it is necessary to respond for events or processes that have an extensive and intensive impact in existential vulnerabilities of people. Two categories were listed of human security: the positive and negative human security. While positive human security means maintaining a "vibrant" human life in various areas of social life, negative human security means fighting against violations of fundamental human rights [30]. With analyzing the different approaches and forms of safety, further we try to find connection between altruism and safety.

CORRESPONDENCE BETWEEN ALTRUISM AND SAFETY

Altruism is a helping behavior that is based on pure selflessness, kinship, or even reciprocity. One of the basic components of altruism is trust and its anticipation, which is risky, especially if there is no prior experience with the relationship [16]. Both altruism and safety are complex concepts, which contains many factors. In addition, the concept of safety has expanded in recent decades. It is intended to protect the undamaged operation of a state, system, or object, but this framing cannot describe the whole process. Safety is subjective; it can be specified by attaching it to certain aspects, situations or areas. The constant new challenges (social, economic, environmental, etc.) further broadened the theory of safety [19]. The human security – as detailed in the previous chapters - is a people-centered concept aimed at protecting the individual and ensuring the basic conditions for a dignified environment and quality of life. The concept is no longer based solely on whether the state can avert a military threat or create physical security for public. The concept is based on the responsibility of the individual, a freedom of control what can adapt to new challenges e.g. as a consumer, can I decide to buy genetically modified produces? As a citizen, can I decide which political party to trust? [31].

Sociologist Frank Furedi [32] in his work Culture of Fear detailed the conceptualization of risk and the causes of losing trust. According to the author, *"risk is shaped by*

how society regards its ability to manage change and deal with the future" [32, p. 18]. The society finds a connection between the concept of risk and the concept of danger, what is worth to ignore. Fear is now not just a response to a threat, but a viewpoint in general that plays a decisive role in influencing human behavior. According to the author, the main goal of society is safety and security, as fear of everything has become a basic element of culture, which also puts its mark on initiative, risk-taking and trust. "*Today, the problem of trust is not restricted to one or a number of distinct relationships. It is not merely a question of workers not trusting their employers. The situation has reached the point where colleagues regard each other as potential enemies and where neighbors are perceived as threatening. Thus, in contrast to the past, the problem of trust exists within a setting where at all levels of society there is a manifest lack of confidence about the working of society*" [32, p. 144]. According to Carel Anne Heimer [33] the two basic elements of relationships of trust are insecurity and vulnerability. Insecurity manifests itself in the other's intentions and outcomes. Vulnerability is the risk that comes from the entrustors side in the event of a negative outcome. Modern society is characterized by distrust strategy, which means rather reducing vulnerability than reducing insecurity [33]. Analyzing vulnerability or risk are both important components of safety activities [34]. Due to the diversity of risk analysis methods and the limitations of this article, we do not detail the methods of risk analyzes, however, based on the presented researches, it can be said that it plays a big role in examining both trust and safety.

As mentioned several times, altruism is a helping behavior. In modern society, supporting altruism leads to a more stable environment and it also reduces aggressive behavior. Altruistic behavior contributes to human well-being and to physical or mental health [35]. Altruism is closely related to various volunteer and supportive activities such as charity or community-based programs. According to the humanitarian security concept - human security can be achieved by strengthening international law, coordinating international action, severely restricting weapons and tools of destruction, and preventing and severely punishing genocide and war crimes. The United Nations Office for the Coordination of Humanitarian Affairs (OCHA), established in 1998, oversees UN humanitarian and disaster response activities. Among its many activities, OCHA provides information on emergencies around the world and organizes international actions to mobilize donations and provide emergency assistance to those in need. OCHA's members and partners include governments, civil and humanitarian organizations, UN agencies, foundations and the Red Cross. The Central Emergency Response Fund (CERF) is a humanitarian fund established by the General Assembly in 2006 to help those affected by natural disasters and national conflicts. Governments, private sector, foundations and individuals upload it annually. In 2013 Hungary became a member of UN Disaster Assessment and Coordination [36].

UN's Office for the Coordination of Humanitarian Affairs created "*COVID-19 Global Humanitarian Response Plan*" and "*COVID-19 Solidarity Response Fund*", as a joint effort to fight global health crisis and appealed to governments to support these plans. Their main strategic priorities are first of all, „preparing and being ready" by decreasing the risks and protecting vulnerable groups. It is necessary to decrease deterioration of human rights and assets, as much as livelihoods and social cohesion. The plan also draw attention to prevent discrimination or violence against communities and enhance understanding and

awareness of the COVID-19 pandemic. Humanitarian work, not only from individuals but also from governments are more necessary nowadays, than ever before [37].

CONCLUSION

Concepts like altruism and safety could be obvious for ordinary people; however, deeper analyzing and framing provided a wider result. Both concepts were hard to puzzle out due to their complexity; however, we provided an overview – without being exhaustive – about their appearance in several forms and fields. It would be much longer, more complicated and probably impossible to reveal every form of altruism and safety. Although our purpose with this study was not to detail in so many words these concepts, but to find connection between them.

Trust, is a significant component of altruism, but it also holds risks, and these components are working as mirror images. By demonstrating several studies we revealed, how these are acting in various scenes [15] [16] [17] [32] [33]. Risk management is a term, what plays important role in safety as well. However, it is worth to mention, we did not dealt with specifying the different methods of risk-analysis, so as a first step for our following study, we will examine risk management in an angle of human security. Altruism could be infiltrated in the word of safety, since humanitarian work is an important part of human security. In this study, we also get a nearer view of humanitarian work from the aspect of United Nations. As our second step for our following study, we would like to take a closer look on volunteerism and humanitarian programs, not only from the corporate side, but also from the side of civilians. The UN and OCHA plays leading role in bringing together selfless actors and to create a culture of protection, but the strain of each individual could the inducement behind work.

REFERENCES

[1] B. Nicolescu, "Methodology of Transdisciplinarity: Levels of Reality, Logic of the Included Middle and Complexity," *Transdisciplinary Journal of Engineering & Science,* vol. 1, no. 1, pp. 19-38, 2010.

[2] J. Velencei, “Modelling the Reality of Decision Making with the Doctus Knowledge-based System,” in *Enterprise and Competitive Environment*, Mendel University of Brno, Czech Republic, 2017.

[3] S. Hegedűs, "A proszociális viselkedés fejlődése és fejlesztése a kisgyermekkorban," *Magyar Pedagógia,* vol. 116, no. 2, pp. 197-218, 2016.

[4] M. Hewstone and W. Stroebe, Szociálpszichológia európai szemszögből, Budapest: Akadémiai Kiadó, 2007.

[5] H. W. Bierhoff, Prosocial Behaviour, Psychology Press, 2002.

[6] B. Benard, Resilience: What We Have Learned, San Francisco, CA: WestEd, 2004.

[7] A. S. Epstein, Me, You, Us : Social-Emotional Learning in Preschool, Ypsilanti: High/Scope Educational Research Foundation, 2009.

[8] B. Hámori, Érzelemgazdaságtan, Budapest: Kossuth Kiadó, 2003.

[9] B. Hámori, "Indulatgazdaságtan - a preferenciák kiterjesztése és a kölcsönösen összefüggő hasznosságok," *Közgazdasági Szemle,* vol. 6, pp. 510-528, 1994.

[10] E. Kahana and E. Midlarsky, "Theories and concepts of altruism and helping," *Library of Social Research*, pp. 11-40, 1994.
[11] S. Pinker, Hogyan működik az elme, Budapest: Osiris Kiadó, 2002.
[12] J. Golovics, "Korlátozott racionalitás és altruizmus: behaviorizmus a közgazdaságtudományban," *Hitelintézeti Szemle*, vol. 14, no. 2, pp. 158-172, 2015.
[13] R. D. Putnam, Making democracy work. Civic traditions in modern Italy., Princeton: Princeton University Press, 1993.
[14] J. I. Molnár, "A kockáatelemzés a vagyonvédelem és a vagyonbiztonság az építészeti bűnmegelőzés aspektusából," *Hadmérnök*, vol. 14, no. 1, pp. 17-31, 2019.
[15] R. C. Mayer, J. H. Davis and F. D. Scoorman, "An integrative model of organizational trust," *Academy of Management Review*, vol. 20, pp. 709-734, 1995.
[16] T. Das and B. Teng, "The risk-based view of trust: a conceptual framework," *Journal of Business and Psychology*, vol. 19, no. 1, pp. 85-119, 2004.
[17] A. Gelei and I. Dobos , "Bizalom és kockázat a kapcsolatokban – egy kísérlet eredményei," BCE Versenyképesség Kutató Központ, Budapest, 2012.
[18] E. Fehr and U. Fishbacher, "The nature of human altruism," *Nature*, vol. 425, pp. 785-791, 2003.
[19] I. J. Hadnagy, "A biztonság korszerűértelmezése - avagy a biztonság ma már sokkal bizonytalanabb, mint korábban bármikor," 2008. [Online]. Available: http://www.vedelem.hu/letoltes/anyagok/135-a-biztonsag-korszeru-ertelmezese-avagy-a-biztonsag-ma.pdf. [Accessed 24 04 2020].
[20] F. Gazdag and P. Tálas, "A biztonság fogalmának határairól," *Nemzet és Biztonság*, pp. 3-9, 2008.
[21] L. Berek, T. Berek and L. Berek, Személy- és vagyonbiztonság, Budapest: Óbudai Egyetem, 2016.
[22] S. Munk, "A biztonság kérdéseinek dekompozíciója," *Hadmérnök*, vol. 5, no. 2, pp. 404-417, 2010.
[23] H. Hegedűs, "A biztonság fogalmának tágabb és szűkebb értelmezése, a humánbiztonság, avyag egy konferencia tanulságai," *Hadtudományi Szemle*, vol. 2, no. 1, pp. 65-76, 2009.
[24] S. Nas, "The Definitions of Safety and Security," *Journal of ETA Maritime Science*, pp. 53-54, 2015.
[25] United Nations Development Programme, Human Development Report 1994, New York: Oxford University Press, 1994.
[26] United Nations, Human Security Handbook, New York: United Nations Human Security Unit, 2016.
[27] L. Schirch, Handbook on Human Security, Hague, Netherlands: Alliance for Peacebuilding, 2015.
[28] U. Albrecht, C. Chinkin, G. C. Celador, S. Flechtner, M. Glasius, M. Kaldor, K. Kiljunen, J. Klabbers, J. Kuper, S. Licht, F. Lotti, K. Reinhardt, G. Schmeder, P. Seifter, N. Serra and G. Weisskirchen, A European way of security: the Madrid Report of the Human Security Study Group, Madrid, Spain: Human Security Study Group, 2007.
[29] A. Teke, "Az emberi biztonság és a „klasszikus biztonságfelfogás" viszonyrendszere," *Pécsi határőr tudományos közlemények*, pp. 25-32, 2018.

[30] J. Paul, "Human Security as a Left-Over of Military Security, or as Integral to the Human Condition," *Human Security and Japan's Triple Disaster*, pp. 72-88, 2014.
[31] F. Kondorosi, A migráció kockázatai, Budapest: Alexandra Kiadó, 2016.
[32] F. Furedi, Culture of Fear: Risk Taking and the Morality of Low Expectation, New York: Continuum International Publishing Group Ltd., 2002.
[33] C. A. Heimer, "Solving the Problem of Trust," in *Trust in Society*, New York, Russell Sage Foundation, 2001, pp. 40-88.
[34] L. Megyeri and T. Farkas, "Kockázatkezelés, tudomány vagy kuruzslás?," *Hadmérnök,* pp. 198-209, 2017.
[35] C. Yang, Y. Wang, Y. Wang, X. Zhang, Y. Liu and H. Chen, "The Effect of Sense of Community Responsibility on Residents' Altruistic Behavior: Evidence from the Dictator Game," *International Journal of Environmental Research and Public Health*, 2020.
[36] United Nations Office for the Coordination of Humanitarian Affairs, United Nations Office for the Coordination of Humanitarian Affairs Annual Report 2018, New York: OCHA, 2019.
[37] United Nations Office for the Coordination of Humanitarian Affairs, Global Humanitarian Response Plan COVID-19, Geneva: OCHA, 2020.
[38] C. Acedo-Carmona, E. Munar and A. Gomila, "Trust-based altruism facing new contexts: The Vyegwa-Gika pygmies from Burundi," *PLOS One*, pp. 1-13, 2018.

REDUCTION OF ENERGY AND WATER DEPENDENCE FOR SAFER CAMP MANAGEMENT: AUTONOMOUS WASTEWATER TREATMENT SYSTEMS

ENERGIA - ÉS VÍZFÜGGÉS CSÖKKENTÉSE A BIZTONSÁGOSABB TÁBOR-ÜZEMELTETÉS ÉRDEKÉBEN: AUTONÓM SZENNYVÍZKEZELŐ RENDSZEREK

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Abstract

A multitude of tragic historical examples proves that organic wastes, in particular faecal-infected wastewaters, are among the highest secondary threat in crisis situations. Untreated wastewater is a medium of most various pathogens and parasites; endangering both human and environmental health. Constructing complex wastewater treatment plants is impossible in emergency situations. The installation and operation of such systems is expensive, they require energy and chemicals from sources outside the camp, and the elimination of the produced waste sludge depends on external service providers, too. Treatment plants occupy a large surface, they are hard to camouflage and protect, and therefore they would constitute vulnerable points in the camps. Fast-installation, autonomous wastewater treatment systems are identified in this review, that depends less on external providers, can be hidden, and produce re-usable end products. Due to these advantages, they can serve both permanent refugee and peace-keeping military camps. Later on, they can be used by the local community.

Keywords

health protection, supply security, environmental safety, waste decontamination, cyclic management

Absztrakt

Tragikus történelmi példák sokasága igazolja, hogy válsághelyzetben a szerves hulladékok, azon belül is a fekália-tartalmú szennyvíz jelenti a helyszínen tartózkodókra leselkedő egyik legsúlyosabb másodlagos fenyegetést. A kezeletlen szennyvíz a legváltozatosabb kórokozó csírák és élősködők tenyészközege; az embert és a környezetet is közvetlenül veszélyezteti. Válsághelyzetben nincs lehetőség komplex szennyvíztisztító rendszereket létesíteni. Ezek kiépítése és üzemeltetése költséges, táboron kívüli forrásból villamos energiára és vegyszerekre szorulnak, és a keletkező szennyvíziszap eltávolítása is külső szolgáltatótól függ. E tisztítóművek nagy felületűek, nehezen álcázhatók és nehezen is védhetők, így a táborok sebezhető pontjai. Áttekintésünkben olyan gyors telepítésű, autonóm szennyvízkezelő rendszereket azonosítunk, melyek kevéssé függnek külső beszállítótól, elrejthetők, és újrahasznosítható végterméket bocsátanak ki. Így menekülttáborok és katonai létesítmények kiszolgálására egyaránt alkalmasak, utólag pedig a helyi közösség mindennapi életébe is integrálhatók.

Kulcsszavak

egészségvédelem, ellátásbiztonság, környezetbiztonság, hulladék-ártalmatlanítás, körforgásos gazdálkodás

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INTRODUCTION

Compared to the conditions of usual civil life, population density in both refugee and military camps is extremely dense. Therefore solid and liquid wastes are produced in high areal concentration, posing public health and environmental threats at the same time. This is why, sanitation issues have been treated with due care throughout written history, as witnessed from the biblical Old Testament until today's SPHERE standards and international regulations.

Whether caused by natural / industrial disaster or by armed conflict, crisis situations do not facilitate effective - if any - wastewater treatment. Pre-existing treatment facilities are damaged or overloaded, while time and other resources are lacking to construct new infrastructure. In *temporary camps*, sanitation often consists of simple latrines, meaning no wastewater treatment at all. Chemical water disinfection is applied in other cases, which converts immediate public health hazard to long-term environmental pollution. Complete wastewater treatment plants are sometimes built in *permanent camps*, according to the regulation of the operating country, such as in the former Swedish - Finnish PRT camp in Mazar-i Sharif (Afghanistan). But these facilities inflict the camp with a large surface, and they cannot be camouflaged, presenting a hardly defendable vital infrastructure, vulnerable to sabotage, armed attack, or floods, landslides. Moreover, such facilities are expensive to install and to operate, and they largely depend on the external supply of energy and chemicals, as well as sludge removal from the camp, while the disposed wastewater sludge is a hazardous waste, too. Identifying autonomous wastewater treatment technologies that are

- readily installable, easily transportable,
- less dependent on external supply
- easy to hide and
- produce re-usable end products

would improve all health, environmental and - when applicable - defence security of the camps.

Due to recent results in the research of electro-active microbes, development in fluid physics, and the publication of some advances of the former Soviet space exploration and artificial biosphere programme, it is now possible to set up devices that satisfy the above criteria. In the best case scenario, they may produce energy instead of consuming it, and may supply utility water for secondary use (cleaning, toilet flush, greening etc). Such autonomous systems could equally serve temporary and permanent, refugee and military camps. In case of being left in place after the emergency, they could be integrated into the everyday life of the local community.

Opportunities of improved wastewater treatment are reviewed in this paper. Solid-phase organic wastes involve no less risk to health and environment, but the remediation methods are entirely different. Therefore, they will be subject of another paper, only joining points will be highlighted here.

Reverse osmosis, electro-dialysis and other cutting-edge membrane technologies fulfil all of the four above criteria; they even suit to produce potable water. Despite this, they are not considered in this review because of their costly installation and operation.

THEORETICAL PRESENTATION OF THE TOPIC

Characterisation of wastewater

"Military bases resemble small cities and face similar sustainability challenges" - as concluded in the US Army report on transition to zero carbon emission [1]. This is why permanent military bases are either connected to neighbouring urban sewage systems, or they have their own wastewater treatment plants [1], [2]. Likewise, large permanent refugee camps are sometimes provided with treatment facilities[3], [4], or they are connected to the neighbouring sewer system, like the Kosovo IDP camp "Blazevo" near Novi Pazar, Serbia, as presented on Photo 1.

Photo 1: Blazevo IDP camp, Sandzak province, Serbia, 2008(source: the author's photo)

The fate of wastewaters in temporary camps is entirely different. Forward operation bases, outposts, transit camps operate in unstable areas, where connection to civilian infrastructure is not an option, and there is neither time nor resources to construct treatment facilities. Still, a concentrated discharge of wastewater risks rapidly overwhelming the self-purification capacity of natural ecosystems. Table 1 compares the chemical properties of wastewater available from a typical refugee camp with the one of a typical village wastewaters in Europe, against the discharge standards of a European Union member state.

Parameter	**Refugee camp wastewater [3]**	**Rural wastewater in Hungary [5]**	**Environmental discharge thresholdsin Hungary[6]**
COD mg/L	1909	305	either <150
BOD5 mg/L		137	or <50
TSS mg/L	594	193	<200
TN	1440	56	<55
NH4-N	1315	27	
TP		4	<10

Table 1: Composition of camp and municipal wastewater

Since the sources of wastewater in the studied camp - if collected at all - are basically the same as in other human communities, e.g. washing, cleaning, toilet flush, personal hygiene, cooking remains, its composition is close to municipal wastewater, with local variances. As expected, wastewater in the studied refugee camp (Azraq, Jordan) is far more concentrated, due to the limited availability of water in that region. Apparently, toxic metals present no sensible danger in camp wastewater, since industrial sources are largely absent from camps. The main pollutants are

- organic carbon, as indicated by high biochemical oxygen demand (BOD) and chemical oxygen demand (COD), just as the low concentration of dissolved oxygen
- suspended solids (TSS)
- nitrogenous compounds (TN, total nitrogen), including reduced (NH4-N) species
- phosphorus content was not measured in this survey, but an excess P concentration can obviously be supposed, too.

Although unmonitored in camp conditions, the presence of hydrocarbons, persistent organic pollutants (POP) and microplastics may be reasonably expected. POP is a vast array of bioactive substances, e.g. residues or the derivatives of surfactants, antibiotics, hormones and other medicines. These molecules are particularly hazardous because they affect the physiological functions of living organisms even in trace quantities. Decaying slowly or not at all, they accumulate in the environment, and may reach humans in potable water or by transiting through the food chain.

The SPHERE minimum standards are rather flexible on waste treatment[7], in order to cope with most possible situations between the extremes of emergency onset and permanent settlement. The SPHERE principles are the following:

- containment of human faeces
- minimum number of toilets (latrines, in practice): 1 per 20 inhabitants
- 3:1 female to male toilets
- maximum distance from dwellings: 50 m
- avoid the faecal contamination of water reserves
- proximity to hand washing facilities
- safe collection and disposal

Despite all flexibility, even such standards are difficult to respect under rudimentary conditions in areas where water is a scarce resource, like in the Dashtishur IDP camp in Balkh province, or the Etehad returnee camp in Baghlan province, Afghanistan. (See Photo 2 and 3). Wastewater management is often erroneously neglected even in densely populated, long-term camps, such as those in the Algerian desert for Saharawi refugees [8]where latrines have been used for over 40 years, and secondary recycled water is desperately needed to irrigate gardens [9].

Photo 2: Dashti shur IDP camp, Balkh, Afghanistan,2009

Photo 3: Etehad refugee camp, Baghlan, Afghanistan, 2008

(Source: the author's photos)

SPHERE has recently recommended the use of human excreta to produce biogas or compost in refugee camps. Water and energy saving opportunities are intensively researched both in permanent military bases for economizing resources [1], and in temporary or forward camps in order to ease logistic duties [10].

Usual wastewater treatment methods

Municipal wastewater treatment technologies

The common objective of all wastewater treatment technologies is to separate dissolved and suspended pollutants from water. The core of all widespread technologies is microbiological treatment, even if the exact way of removing each of the principal pollutants depend on the actual implementation. The biological cleaning process usually consists of three main steps. Biodegradable organic matter is partly decomposed by microbial metabolism to carbon dioxide and water to gain energy, while the remaining part is transformed and built in microbial cells. Excess nitrogen is first oxidized, then the resulting N_xO is reduced to inert N_2 gas that is discharged in the atmosphere. Excess phosphorus is usually bound into insoluble salts, then precipitated with the sludge that consists of dead microbial biomass and suspended solid pollutants, as well. The three-step biological process is preceded by the physical filtration of large particles, and may be succeeded by chemical disinfection. The essence of any wastewater treatment technology is to mimic the self-purification capacity of natural ecosystems, while enhancing some of its particular aspects. The simplest - and the least intensive - implementations are anaerobic lagoon (imitation of lakes), and constructed wetlands (imitating marshes or meadows). Both occupy large areas and host slow biodegradation processes; therefore, they are not practical for camp applications. Wastewater treatment plants use several methods to improve the natural bioprocesses:

- spacial or temporal separation of anaerobic, anoxic and aerobic phases
- artificial aeration and stirring
- flocculants and polyelectrolytes addition for better precipitation
- separation of water treatment from sludge treatment cycles
- immobilizing the microbes to form a biofilm on granules or membranes.

Sludge recirculation is generally applied. While the separated liquid fraction runs through the treatment system within a dozen of hours, sludge fraction is recycled many times to remain for weeks, leaving sufficient time for slow bioprocesses. Wastewater treatment systems result in fair water quality, but they require capital investment, the external input of energy and chemicals, as well as external services to remove and treat waste sludge from the camp. At the same time, a system of complex bioreactors still occupies a large area and needs skilled operators. Moreover, all the chemical energy bound in the organic matter gets lost. Treatment plants are efficient in removing organic carbon, nitrogen and phosphorus compounds from water. But they cannot eliminate viruses, as discovered in recent COVID research [11]and persistent organic pollutants which have been of growing concern in recent years[12].

Biomethanisation

Anaerobic microorganisms are able to partially oxidize organic matter in the absence of oxygen, by removing hydrogen instead. This is the underlying principle of biogas digestion that is extensively used for wastewater treatment. Organic molecules are first converted to fatty acids, that are further converted to acetate and, finally, to CH_4. H_2, H_2S and CO_2 are by-products of the reaction chain. Biogas digestors always transform only a part of the available organic matter, but they produce combustible biogas that can be used for cooking, heating, lighting or electricity generation. Biogas plants operate with a far longer hydraulic retention time than wastewater treatment plants (over two months) and they need heating for optimal operation.

Nearly 18.000 high performance biogas plants were operational only in the European Union in 2017 [13] . But these high-tech installations are complicated, costly to build and to run, need expertise and maintenance to operate. Due to their size, they are particularly vulnerable to natural disasters, sabotage or armed attack. Both India and the People's Republic of China have been developing small-scale, low-tech, extremely simplified biogas digestors of household scale, which are easy to build and to operate. But without heating and continuous stirring, these installations are relatively inefficient, the yield is unreliable, and without adequate post-processing, the biogas can only be used for heating and cooking.

As opposed to municipal wastewater treatment plants, biogas digestors cover their own energy needs and rarely require external chemical input. Due to heating and long retention time, viruses and persistent organic pollutants are better eliminated, as well. But they still rely on external services for eliminating the effluent. Because they produce inflammable gases, these systems are even more vulnerable than treatment plants. Taking all limitations into account, none of the currently used biogas technologies are appropriate in temporary camp conditions, although instances in permanent refugee camps [14] and military bases [15]exist, and SPHERE encourages their use, as well [7].

Composting

Composting microbially transforms a part of the substrate into biochemically stable macromolecules, while the remaining organic matter is oxidized to CO2 and water, supplying energy for this transformation. The simplest form of the process, ripening animal manure, has been used by humanity since millennia. The industrial-scale composting of other raw materials has been spreading since the 1970s.

The process consists of three main phases: the decay of easily biodegradable substances heats the substrate above 50 °C within the first 4 - 5 days. At this temperature, slowly degradable macromolecules break down to more easily degradable substances, thus this phase is self-sustainable until sufficient oxygen is present in the pore volume of the substrate. As oxygen is gradually consumed, the temperature decreases to the mesophilic zone, 35 - 45 °C in the second phase. Aerobic reactions slow down and – in parallel with it – anaerobic reactions dominate in the sub-spaces where oxygen is missing. Without aeration, this phase may last 2 - 3 months. Stable humus precursor molecules build up during the last, „ripening" phase when, while the decay of unstable substances ceases. The whole process can be accelerated with artificial aeration, either by regularly mixing the substrate or by forcing air through it. The optimal substrate has 40 - 60% moisture content and a C/N ratio between 25:1 and 50:1. Composting is appropriate to treat wastewater sludge with carbon-rich additives, such as straw or solid organic wastes. Simple variants of this technology, as shown on Photo 4, may then be considered for use in camp conditions, especially if it is linked to solid organic waste treatment.

Photo 4: Composting in Dehrazi, Afghanistan, 2007
(Source: the author's picture)

Alternative wastewater treatment opportunities

Biofiltration

A biofilter is a packed-bed bioreactor, containing a granular or fibrous matrix material, and a microbial consortium forming a biofilm on the inner surface of this matrix. Suspended and colloid-phase pollutants are physically filtered by the matrix. A part of the dissolved organic and inorganic pollutants is adsorbed to the matrix, too. The biodegradation of the dissolved, adsorbed or filtered organic matter and other bioprocesses, such as denitrification, nitrification and phosphate reduction take place on the biofilm. The packing matrix material itself may be inorganic or organic; it should be locally available, cheap, porous with high specific surface, e.g. volcanic gravel, plastic beads, reed, coconut fibre etc. Biofilters can be heated, and operated under either aerobic or anaerobic conditions. They host far more complex biochemical processes than wastewater treatment systems or biogas digestors, therefore they may be much smaller. They are simple to operate, but because they are sensitive to fouling, high concentration of suspended inert solids should be avoided in the incoming wastewater.

Bio-electrochemical systems - MFC/MEC

Another alternative application of oxidizing organic matter by extracting hydrogen is to remove an electron and a proton separately, to transfer them through different pathways and to unite them at a remote location. Bio-electrochemical systems use exoelectrogenic microbes that, in the absence of other terminal electron acceptor, are able to implement this process. They are able to transfer electrons through their trans-membrane enzyme system to a positively charged anode, while ejecting the corresponding protons to the growth medium. If a semi-permeable (usually cation exchange) membrane separates the anaerobic anode space of the reactor from the aerobic cathode space, the protons transit to the cathode by diffusion. The electrons arrive at the same place through an external circuit, where protons and electrons combine with atmospheric oxygen to form water. This is the biochemical principle of microbial fuel cells (MFC). If oxygen is entirely excluded, protons and electrons combine on the cathode to form elementary H_2 gas, in this case an external supply of electric potential is needed to provide the driving force. This latter application is microbial electrolysis cell (MEC)[16]. Bio-electrochemical systems transform organic matter less effectively than aerobic systems, and at the present state of art, they are unable to produce a considerable amount of electric power. Meanwhile, due to utilizing a different array of substrates, they can improve the efficiency of more traditional biodegradation technologies, such as biofiltration (MFC) or biogas digestion (MEC), when combined.

Electrofermentation-assisted biomethanisation

As enzymatic redox reaction chains depend on the electrolyte potential of the medium, alternative metabolic pathways can be selected by applying a suitably chosen electric potential into the bioreactor. For example, microbial consortium in a biogas digestor can be electrically stimulated to produce more H_2 at the detriment of CH_4, or more CH_4 at the expense of CO_2, etc. Assisting biogas production with electrofermentation promises improved biogas quality, reduced fermentor size, and more sensitive process control. According to recent research[17], the potential yield gain may reach up to 84%, and productivity might double.

A recent innovation to increase overall process efficiency is the application of jet-loop system instead of simple stirring. Jet-loops make a simultaneous use of the Venturi tube principle and of turbulent flow properties. This configuration avoids harmful vortex formation by separating the central downstream flux of a swirling liquid from the peripheral upstream in concentric cylinders. Jet-loop has its own drawbacks, but utilizing the mentioned physical laws, it consumes sensibly less energy than stirring blades to keep the same amount of liquid mixing. Jet-loop reactor configuration allows for up to 70 % mass transfer increase and even higher yield gains. [18] Despite the fact jet-loop is increasingly applied in a number of sectors, it has not made its way to the biogas industry yet.

Thermophilic bioprocesses are a lot faster than mesophilic, according to Avogadro's law. Using 60 ^{o}C instead of 37 ^{o}C as operational temperature allows shorter hydraulic retention times, meaning that a thermophilic biogas digestor can be smaller than a mesophilic one, eventually less than half the size, for the same amount of substrate.

Besides wastewater, solid wastes are the other major issue of disease control and epidemics prevention in a camp. Solid wastes in refugee camps comprise of about 70 % organic matter, with approximately 50 % moisture content. On the one hand, solid organic

fraction is an ideal host to pathogen microorganisms, parasitic worms and rodents propagating a multitude of diseases. It is therefore of prominent importance to rapidly remove and correctly decontaminate it. On the other hand, it contains useful chemical energy which, due to the high moister content, cannot be released simply by burning. Integration of the above improvements in biomethanisation science allows higher medium densities fed in a biogas digestor. This opens the possibility to treat wastewater combined with solid organic wastes.

Photosynthetic CO_2 supplementation with algae

Although one of the chief pollutants in wastewater is undercomposed organic matter, there is a stoichiometric lack of carbon with regard to nitrogen and phosphorus content. One possible way to circumvent this bottleneck is to photosynthetically bind sufficient atmospheric CO_2 for building excess nutrients in vegetal biomass, that is, a useful end product. "BIOS-III.", the log-term artificial biosphere experiment attached to the Soviet space exploration programme, proved in the 1960s that Chlorella sp., algae species were able to recover nutrients while decomposing organic pollutants from wastewater, with supplementing carbon from atmospheric carbon dioxide. [19]Since then, several species, including filamentous and microalgae, have been tested in various experimental configurations worldwide. The advantages of using algal instead of vegetal photosynthesis are:

- higher overall conversion efficiency
- microalgae can be readily recycled to, for instance, a biogas digestor
- optimal growth conditions can be more comfortably regulated in a closed photobioreactor than in a constructed wetland
- a photobioreactor can be fold up in several parallel layers, thus it is more compact than a wetland
- Biocoenosis in an algal reactor is simpler than a phytocoenosis, its behaviour is more predictable, that is, numerically more modellable.

Like biomethanisation, biofiltration and constructed wetlands, a photobioreactor can be electrochemically stimulated. Using algae is possible in, for example, a microbial fuel cell to produce elementary oxygen gas directly on the cathode,[20] reducing carbon dioxide that was produced on the anode. Due to its potential advantages, a wastewater cleaning technology based on bio-electrochemically assisted algal photosynthesis may eventually suit to camp conditions.

Bio-electrochemically assisted biofiltration

Biofilters can be hybridized with bio-electrochemical systems. A microbial fuel cell, for instance, may be created within a biofilter, separated to an anaerobic and an aerobic sub-space. The anode is inserted in the anaerobic bottom sub-space, while the cathode is placed on the top of the upper aerobic sub-space, exposed to the atmosphere. The two electrodes are connected through an external resistance. An identical biofilter without the electric circuit would similarly decompose the organic matter, but would leave far higher remaining nitrogen concentration. Bio-electrochemical assistance stimulates denitrification-nitrification processes and dephosphorisation. The oxidation of slowly degradable organic carbon may improve to some degree, as well.

Electro-active rhizosphere systems

The EU CORDIS "iMETland" research project is aimed at improving the efficiency of constructed wetlands in wastewater cleaning[21]. In all the various technological implementations of constructed wetlands, wastewater is fed in a porous or fibrous matrix, where aquatic plants are growing. The rhizosphere, composed of plant roots and the associated microbial community, decomposes organic pollutants and utilizes nitrogen and phosphorus as nutrients. The natural process is slow; this is why constructed wetlands require large areas for effective operation. In this experiment electrically conductive polymer fibres were integrated in the matrix, which allowed electro-active microbes to form a biofilm. In this way, the different enzyme-catalysed redox steps of the decomposition process could take place at the distant micro-spaces of the matrix [22]. Such spacial partition of the biochemical processes replaced stirring, which would otherwise have been impossible. This multiplied the reaction speed, reaching eventually up to ten times faster biodegradation in certain cases. Other hybrid setups, based on this principle, have been successfully tested, too [23].

CONCLUSIONS AND DISCUSSION

Established, emerging and experimental wastewater treatment methods are compared in this chapter, with regard to their potential feasibility and usefulness under camp conditions. Technological, financial and defence criteria are taken into consideration in a SWOT (strengths vs. weaknesses and opportunities vs. threats) matrix. Feasible configurations will then be suggested for pilot tests, based on the SWOT analysis.

Evaluation of camp wastewater treatment choices - SWOT matrix

Technology	Strengths	*Weaknesses*	Opportunities	*Threats*
Municipal WWTPs	Ripe technology, fair water quality, high throughput	*External supplies needed, residual pollutants, slow start-up, expensive*	Produces reusable water	*Cumbersome size, vulnerable, difficult to hide, skilled work needed, only few mobile applications*
Bio-methanisation	Ripe technology, autonomous operation, nearly disinfected effluent	*Post-treatment needed, long HRT, services needed, slow start-up, expensive*	Useful end-products, energy gain, connection to solid waste management	*Cumbersome size, difficult to hide, inflammable gases, skilled work needed, immobile*
Composting	Ripe technology, fast substrate disinfection, high throughput, inexpensive	*Only treats solid substrate, external energy input needed, slow start-up*	Useful end-product, connection to solid waste management, simple operation	*Sequential batch operation, immobile*
Biofilter	Emerging technology, high throughput, small size, short start-up, inexpensive	*Fouling, need for matrix post-treatment*	Reusable water, can be intensified with energy input, simple operation, mobile	

Technology	Strengths	*Weaknesses*	Opportunities	*Threats*
Bio-electrochemical systems (BES)	Substrate disinfection, short HRT	*post-treatment needed, energy needed, long start-up, expensive*	Improves the performance of other technologies, mobile	*No standalone technology available, skilled work needed*
Electro-fermentation	Emerging technology, autonomous operation, nearly disinfected effluent, accelerated start-up	*Effluent needs post-treatment, long HRT, expensive*	Useful end-products, energy gain, connection to solid waste management, scalable size	*Inflammable gases produced, skilled work needed, only a few mobile applications*
Algal bioreactor	Emerging technology, autonomous operation, short start-up	*Effluent needs post-treatment, expensive*	Useful end-products, link to solid waste management, mobile	*Skilled work needed*
Biofilter + BES	High throughput, small size, short start-up, cheap	*Experimental system*	Reusable water, simple operation, mobile	*No established technology available*
Constructed wetland + BES	Emerging technology, autonomous operation, inexpensive	*Risk of fouling, reduced scalability, reduced control, long start-up*	Produces reuseable water, simple operation	*Seasonal operation, immobile*

Table 2: SWOT matrix of available wastewater technologies

According to the SWOT analysis, one out of three traditional treatment methods, and three of the six alternative methods fulfil the feasibility criteria of camp application: composting, biofiltration, electro-active biogas digestion, electro-active biofiltration.

Suggested setup for pilot testing

A short, three-stage sequence of the simplest wastewater treatment methods is proposed on Figure 1, for pilot testing.

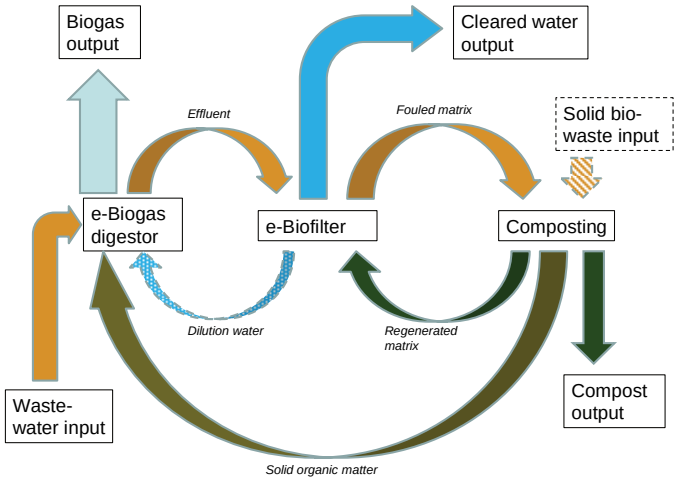

Figure 1: Flow-chart of a three-stage water management system for camp use

Stage 1: As shown in Table 1, biodegradable organic carbon concentration in camp wastewaters is high enough to feed into a regular municipal sewage sludge digestor. Wastewater is first fed in a biogas digestor for anaerobic pre-treatment. If the

- main purpose of the digestor is fast hygienisation and an anaerobic pre-treatment of raw materials, and
- is bio-electrochemically assisted, heated to thermophilic temperature zone,
- and the reactor design uses mechanical innovations such as jet-loop configuration,

a considerably reduced size with high flow-rate is allowed. With such size, the biogas digestor can be mobile, and easy to camouflage for additional protection. Toxic H_2S can be simply removed from the produced biogas within the reactor space itself, by a copper mesh inoculated with desulfurizing bacteria. Once the gas is dried in a condenser, it can fuel the engine of an aggregator to produce electricity. Under moderate climate, an average thermophilic biogas digestor consumes approximately 60 % of the waste heat produced in the aggregator, for maintaining its own temperature. The remaining heat can be used for other purposes.

Stage 2: The biogas effluent is treated in a biofilter, where bio-electrochemical assistance and mesophilic temperature secure a high throughput for aerobic biodegradation of the pre-treated organic matter, as well as for denitrification, suspended and colloid particle filtration, and phosphorus removal. The biofiltered water can be reused for nearly all purposes except for drinking, cooking and personal hygiene.

Stage 3: The matrix material needs regular regeneration because of fouling by suspended solids. The easiest way of regeneration is composting. About 85 % the filtered organic matter is ultimately decomposed to CO_2 and H_2O, while the remainder is transformed into stable macromolecule complexes. The composted material is partly reused as the biofilter matrix, partly recycled in the biogas digestor as co-substrate. The remainder can be used to fertilize eventual garden plots. Solid organic waste treatment may be linked to the

system at this point through co-composting, by mixing them to the fouled biofilter matrix. In this case, a grinder, chopper or other fragmenting tool is needed to ensure maximum 25-30 mm particle size in the composting phase.

In addition, bio-electrochemically assisted constructed wetland is a powerful water polishing tool. If topological and security conditions around the camp allow, its use is strongly advisable as water post-treatment, to produce quasi-potable water. Mobile high-tech membrane technologies would implement the same duty at several times higher cost.

SUMMARY

A multitude of various pathogens and parasites proliferates in untreated wastewaters, which contain a large scale of emerging pollutants in addition to threatening both human and environmental health. Camp wastewaters do not differ much from municipal wastewaters that can be cleared with well-established, widespread technologies. But building and operating complex wastewater treatment plants are expensive, and even worse, they rely on energy and chemicals from sources outside the camp, and the elimination of the produced waste sludge depends on external service providers, too. Treatment plants occupy a large surface, they are hard to camouflage and protect, constituting vulnerable points in the camps.

A number of emerging and experimental treatment options are identified in this review. Based on an evaluation against feasibility criteria in camp conditions, fast-installation, autonomous wastewater treatment systems are identified, that depend less on external supplies, do not need highly skilled operators, can be hidden, and if possible, produce re-usable end products. A simple, three-stage hybrid system is suggested for further study and pilot-scale tests both in refugee and military settings. The proposed system is expected to reduce health and environment risks without reliance on local civil facilities, while producing useful energy, re-usable water and stabilized compost for garden soil improvement.

RESOURCES USED:

Literature

[1] A. C. Procter *et al*., "Net Zero Fort Carson: Integrating Energy, Water, and Waste Strategies to Lower the Environmental Impact of a Military Base: Environmental Impact of Military Bases", *J. Ind. Ecol.*, vol. 20, no. 5, pp. 1134–1147, 2016.

[2] J. J.-L. Armstrong *et al*., "Characterization and Environmental Risk Assessment Associated with a Sewage Lagoon Managed by the Canadian Armed Forces", *Proc. 72st An. Conf. Canadian Geotech. Soc.*, St John's, NFLD, Canada, 2019, [online]. Available: https://www.researchgate.net/publication/338423978_Environmental_Risk_Assessment_associated_with_a_Sewage_Lagoon_Managed_by_the_Canadian_Armed_Forces/references#fullTextFileContent

[3] H. K. Kosonen, "Pathways toward rapid wastewater treatment response during the global refugee crisis", Ph.D. dissertation, University of Washington, Seattle, WA, US, 2018.

[4] H. Kosonen *et al*., "A Comparative Study on Rapid Wastewater Treatment Response to Refugee Crises", *Glob. Chall.*, vol. 3, no. 1, 2019, Art. no. 1800039

[5] I. Pásztor, "Examination of the effect of wastewater composition in dynamic wastewater treatment simulation", Ph.D. dissertation, University of Pannonia, Veszprém, Hungary, [in Hungarian] 2010.
[8] J. Besenyő, „Saharawi refugees in Algeria”, *AARMS*, Vol. 9, no. 1, pp. 67–78, 2010.
[10] M. Touš *et al*., "Energy and water savings in military base camps”, *Energy Syst.*, 2019, doi: 10.1007/s12667-019-00354-y.
[11] K. Curtis *et al*., "Wastewater SARS-CoV-2 Concentration and Loading Variability from Grab and 24-Hour Composite Samples”, *Epidemiology*, preprint, 2020, doi: 10.1101/2020.07.10.20150607.
[12] C. Ávila *et al.*, "Emerging organic contaminants in vertical subsurface flow constructed wetlands: Influence of media size, loading frequency and use of active aeration”, *Sci. Total Environ.*, Vol. 494–495, pp. 211–217, 2014.
[14] M. Al-Addous *et al*., "Evaluation of Biogas Production from the Co-Digestion of Municipal Food Waste and Wastewater Sludge at Refugee Camps Using an Automated Methane Potential Test System”, *Energies*, Vol. 12, no. 1, 2018, doi: 10.3390/en12010032.
[15] C. M. Asato *et al*., "Batch anaerobic digestion of synthetic military base food waste and cardboard mixtures”, *Bioresour. Technol.*, Vol. 216, pp. 894–903, 2016.
[16] K. Bélafi-Bakó, "Microbial Fuel Cells" Vol. PE 16/2017. Pannon Egyetem, Veszprém, Hungary, [in Hungarian] 2017.
[17] A. Schievano *et al.*, "Electro-Fermentation – Merging Electrochemistry with Fermentation in Industrial Applications”, *Trends Biotechnol.*, Vol. 34, no. 11, pp. 866–878, 2016.
[19] F. B. Salisbury *et al*., "Bios-3: Siberian Experiments in Bioregenerative Life Support”, *BioScience*, Vol. 47, no. 9, pp. 575–585, 1997.
[20] C. Yan *et al*., "Photosynthetic CO2 uptake by microalgae for biogas upgrading and simultaneously biogas slurry decontamination by using of microalgae photobioreactor under various light wavelengths, light intensities, and photoperiods”, *Appl. Energy*, Vol. 178, pp. 9–18, 2016.
[21] C. A. Ramírez-Vargas *et al*., "Community level physiological profiling of microbial electrochemical-based constructed wetlands”, *Sci. Total Environ.*, Vol. 721, 2020, Art. no. 137761.
[22] C. Ramírez-Vargas *et al*., "Microbial Electrochemical Technologies for Wastewater Treatment: Principles and Evolution from Microbial Fuel Cells to Bioelectrochemical-Based Constructed Wetlands”, *Water*, Vol. 10, no. 9, 2018, doi: 10.3390/w10091128.
[23] P. Srivastava *et al*., "Constructed Wetland Coupled Microbial Fuel Cell Technology”, in *Microb. Electrochem. Techn.*, pp. 1021–1036, 2019.

Resources

[9] S. Hidalgo, „Evaluation of DG ECHO’s action in the Saharawi refugee camps, 2006-2008”, daraint.org, Tindouf, Algeria, 2009. [Online]. Available: https://ec.europa.eu/echo/files/evaluation/2009/Algeria_Final%20report_ESRC.pdf.
[13] EBA Report 2018, [Online], Available: https://www.europeanbiogas.eu/wp-content/uploads/2019/05/EBA-Annual-Report-2018.pdf
[18] S. Weber, „Jet aerated loop reactors as alternative to stirred tank reactors”, p. 1 Online-Ressource (45 Seiten), 2019, doi: 10.25673/14027.

Legislation

[6] „28/2004. (XII. 25.) KVVM", *EURLEX*, 2005. https://eur-lex.europa.eu/legal-content/ES/ALL/?uri=NIM:36024.

Standards

[7] Sphere Project, *The SPHERE handbook: humanitarian charter and minimum standards in humanitarian response*, Fourth edition. Geneva, Switzerland: Sphere Association, 2018.

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