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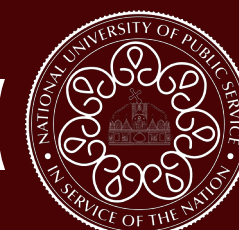
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Structuration Theory and Strategic Alignment in Information Security Management: Introduction of a Comprehensive Research Approach and Program[1]

László KOVÁCS,[2] András NEMESLAKI,[3] Ákos ORBÓK,[4] András SZABÓ[5]

Information communication technology (ICT) has changed our life and it has a determinant role in our everyday activities; over the last years it has created a constantly changing, developing and complex ecosystem. In this paper, we argue, that this newly formed environment, requires new approaches for exploring technology and society relationships, and we pose the general question how pervasive ICT ecosystem shape interactions and relationships between humans and technology on different levels. This question is pivotal for understanding challenges of information security; in our contribution, we present a four-phase comprehensive research program systematically analysing a) our new smart environment, b) various dimensions of information security awareness, c) the role of leadership and finally d) the importance of strategic alignment.

Keywords: *information, communication, technology, security, research*

Introduction

Moore's law which is the driving force of exponential progress in technology performance has enabled computers and computing to become an everyday social experience by embedding connected microchips into everyday artefacts, basically surrounding us by smart objects. This new paradigm of computing involves digitally mediated embodied experiences in everyday activities through everyday artefacts where the interface between material and human has disappeared. [1] As, however, ICT has become ubiquitous and affordable, pressure on innovation has also become more widely spread. In a fascinating monograph, former Google CEO Eric Schmidt and Jared Cohen, a foreign relations and counterterrorist expert, paint an exciting new world of the future in the digital age—how ICT reshapes people, businesses and nations all together. [2]

As argued, not only economical competitiveness and our national security is determined by information communication technologies (ICT), but we can safely say that almost all our social interactions and everyday practices have become intertwined with technology. In the case of these exponentially developing ICT tools and services the basic question arises; does

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this fast-paced development also mean that our vulnerability and dependency is increasing? Are we becoming more exposed to risks by using this new infrastructure? New innovative tools, systems and services appear in our everyday life with such a high-level of complexity that ordinary users can hardly, if at all, orient themselves in this new socio-technical ecosystem.

The symbiosis of technology and society is most dominant in urban settings, since half of the globe lives in this habitat. [3] Even more, according to UN statistics, in 2012, already 78% of population of the developed countries was living in cities, but due to demographic, environmental and economic reasons migration to urban areas is a major trend in the developing world as well. [4] Technology plays and should continue to play a major role in contributing to the quality of life, support sustainability and simply provide innovative solutions to manage the living conditions in these more and more overcrowded urban spaces.

So far regulation of cyberspace, strategies to tackle the vulnerabilities, and policies to address security have been treated on a national states' level—according to traditional strategy making paradigms. [5] After looking at several attempts in European countries, analysing their relevant documents and decrees, it is apparent that some countries take a general approach, considering this problem an overarching challenge of an information society, and some others, intend to tackle it as a specific concern of security addressing it from a critical infrastructure point of view. [6]

The general question in our research program is how the pervasive ICT ecosystem shapes user behaviour, what type of opportunities and threats arise in this environment, and how strategic thinking can mitigate risks and seize opportunities in this new era of human-technology relationship. In this essay, we outline the epistemological foundations of this issue and propose a research agenda to systematically address the above challenges; concretely, we provide a framework on how institutional level cyber strategies can be developed in the pervasive computing era, or—looking at the other side of this coin—investigating how emergent behavioural challenges can be translated to higher level strategies ensuring a safely working ICT based ecosystem.

Theoretical Foundations

We anchor our research approach of cyber security to the dialogues of science technology studies[6] (STS), [7] due to the interdisciplinary nature and topical fitting to the discourses about how technology shapes social institutions and how social institutions—such as governments—influence technology development and adoption.

Advocates of STS argue that there is no such thing as a social problem that does not have technological components; nor can there be a technological problem that does not have social components, and so any attempt to make such a division is bound to fail. They suggest that the development of technological devices should be interpreted within an analysis of the struggles and growth of "systems", having components both human and technological, or "networks" consisting of entities, concepts, artefacts, humans and—very importantly—complex relationships between them. [8] This approach to the study of technology uses the "seamless web" or "actor-network" metaphors, [9] which stress the importance of paying attention to the different but interlocking elements of physical artifacts, institutions and their environments, blurring different levels of analysis. [10]

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6   Some sources use the phrase Science-Technology-Society under the same acronym, basically referring to the same broad church of scholarship. For instance, [11] has this approach.

In order to develop a framework in STS, within which operational research design can be implemented, we took two explanatory theories for defining our research constructs.

The first of these set of theories are the offspring of Anthony Giddens's structuration theory, specifically its application in information systems. [12] [13] In the centre of structuration concepts we find structure: which is defined as a set of rules and resources organized as properties of social systems. Systems, furthermore, are reproduced relations between actors or collectives, organized as regular social practices. Social structure is constantly created through the flow of everyday practices, shaped by a mutually constitutive duality of agency and institutions. As Orlikowski has shown, this constitutive duality can be extended to the human-technology relationship where none of the two are in preference to the other—there is simply an inseparable interplay between emergent technology driven user behaviour and institutionally constraining strategies and regulations. [14] Emergent behaviour is formulated through mechanisms which are ways things happen due to the interactions of actors. Constructs of emergency, for instance, can be described using Actor-Network Theory, [9] which inherently treats technology and human actors symmetrical. Stabile working structures emerge as a mechanism of human-machine interplay where flexible routines influence flexible technologies. Leonardi describes this alteration of technology and routine interactions as "imbrication of agencies" where for instance new technology is constrained by old routines or new routines generate new features of technology. [15] Material agency influences emergent behaviour by its feature set and it is both constraining and enabling at the same time. Symmetrically, human agency can also be constrained by several features of institutional, cultural, biological limitations or path-dependencies.

The second theoretical foundation of our research program originates from general strategic management, and its classic application in information management focusing on the so called "fit" and "alignment". [16] Alignment addresses both how ICT is aligned with the business and how the business should or could be aligned with ICT. When discussing business-ICT alignment, terms such as "harmony", "linkage", "fusion", "match" and "integration" are frequently used synonymously with the term alignment. Alignment is about the process to ensure that the organizational strategies adapt harmoniously both horizontally and vertically.

Alignment of IT strategy with the organization's business strategy is a fundamental principle advocated for over 25 years, [17] it also has been an evergreen dilemma on the top list of information management issues both for senior IT managers and business executives. [18] Educating line management about the possibilities and limitations of information technology is very hard, as is setting IT priorities for projects, developing resources and skills, and generally integrating systems with strategy. It is even tougher to keep business and IT aligned, as business strategies and technologies evolve. Economic shifts caused by events such as innovative entrepreneurial ideas, regulatory changes, new innovations or international security scandals bring in dramatic swings as how to respond.

There is a strong evidence in the information management literature that IT has the power to change industries and markets. [19] [20] This very broad stream of research also shows that adoption of IT driven innovation, moreover economic returns of IT investments only happen when it is coupled with organizational change, [21] process redesign, [16] systemic skill development of employees and high level management commitment at conception and execution in tandem with professional project management at implementation. [22] Alignment, on the other hand, gets much less attention in relation to the public IT domain, while

the importance of value delivery in e-governance has been heavily emphasized. [23] We argue, that strategic alignment models (SAM) serve as useful frameworks in public administration—for instance with regards to cybersecurity strategies as well—as they do in a business setting.

Alignment processes—coupled with the concepts of social construction of technology—are the glue holding together previous decisions or external dependencies of IT suppliers, contacts with other governments or elements of the ICT ecosystems which determine the risks of our new virtual world in cyberspace.

Research Model for Information Security Strategy Construction

On the previously outlined theoretical foundations we developed a research design and complex program to investigate how information security strategies are formulated and constructed. As we argued in the previous section, our interest focuses on two general theories as foundations—the social construction of human-technology structures and the alignment coupled with ICT and organizational fit processes. In the complex ecosystems of technology, institutions, regulations, legislations and organizations, these processes move top-down (strategy execution – institutional approach) and bottom-up (behavioural emergency – agency approach). When we designed our research model, depicted in Figure 1, we hypothesized that these are non-exclusive flows (right and left arrows) and they work in tandem, constructing a special dynamic of maturity shaping both the strategy process and the environment we live in.
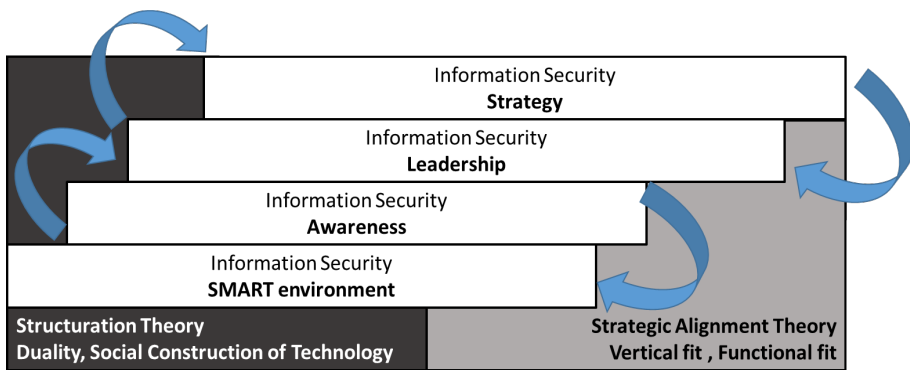
Figure 1. Research Model for Information Security Strategy Process.
(Edited by the authors.)

In Figure 1 we depicted four key constructs of this idea, which need to be tested and verified according to a robust research design and complex program. In this section, we describe the key elements of this design and the rational of including them into the research model. These are in the order shown in Figure 1 and are Information Security (IS) issues in our smart city environments, IS awareness living and working in this environment, how leadership reacts and influences behaviour and, finally based on all this, how IS strategy institutions are created and operate.

Analysing the Duality of Advanced Technology and Society Relationship in the Urban Environment

As we have argued, the most significant habitat of the future human-technology ecosystem will be urban areas in all parts of the world. There are two main conceptual beliefs pressing against each other in this setting which, in our opinion, require thorough investigation. The first is the effectiveness and efficiency orientation encouraging and seeking out ICT innovations, new business models and setting directions in city improvements such as transportation, energy utilization, public safety, and pervasive services such as health monitoring. The second, is a deep sociological and human orientation emphasizing the threat to privacy, individual control over one's decisions, the disappearance of local communities, and a lifestyle when virtual reality will dominate human connections.

With our contribution in this chapter we intend to explore this dichotomy and to explore its mechanisms with the following:

- identifying the risk factors which threaten the "smart city" concept both from an ICT infrastructural point of view and from a human and social point of view;
- categorizing approaches in smart cites according to challenges in infrastructure management, public safety, law enforcement, and privacy management;
- observing and experimenting with everyday human-computer interaction in urban setting, like traveling, communicating, and using services, and seeking out patterns of behaviour and new social norms;
- analysing the interactions of stakeholders and mapping how the social-business-technology ecosystem is structured within which smart cities operate;
- documenting new norms of equipment use, effectiveness of intelligent and pervasive services, and the new roles of regulatory institutions.

During our research program, we would like to test the main hypothesis of this chapter, that is by disassembling the complex social and technology structures into elementary pieces we can improve our understanding of the structuration process within the complex network of institutions, human actors, ICT components, social norms, innovative services, and higher level security and safety.

Behavioural Analysis in Cyberspace: Assessment of Information Security Awareness

In the pervasive computing environment, non-intentional use of technology is natural, and with the disappearance of digital divide in organizations and societies motivational and economical barriers are not significant any more. Therefore, in this phase we focus on intentional use, that is, awareness in order to explore critical challenges of user behaviour, especially from a security perspective. As anecdotal experience and lots of research shows, documented requirements and campaigns have little impact on changing attitudes [24] [25] and behaviour in this context, therefore a deep understanding of information security awareness is essential for understanding human-computer interaction in the future.

To analyse the user behaviour and awareness we will use experimental design, focused group sessions and unique exercises and scenario building borrowed and adopted from military experiences. The following topics will be explored here:

- understanding how users handle anonymity and digital presence in different environments;
- understanding how organizations manage their cyber assets and regulatory interfaces for controlling individual use;
- modelling the complexity of defence organisms, mapping the complex relationships of human actions, policies, technology and different stakeholders;
- creating scenario based demonstrations to help recognize cyber security for users to make cyber incidents understandable and visual for them;
- creating cyber security Table Top Exercise (TTX) scenarios, and a platform to easily perform such policy level exercises (using collaboration, data visualization and scenario management tools);
- analysing security exercises like Cyber 9/12, Locked Shields, CDX, and several others, we create recommendations for organizations on how to enhance organizational learning with simulations.

Education and learning are key drivers for increasing awareness. In this respect, efficiency of ones individual learning process highly depends on ones capabilities, motivation and most importantly the learning methods. Acquiring previously unknown skills and latest knowledge is always easier if the learner is interested in the topic. Nowadays, cyber skills are not only "good to have", but have become a "must have" skill in nearly all fields and professions. So, it is very important to highlight these skills in a university curriculum, and also to create teaching materials which are easy to learn, while keeping students´ interested. [26] A novel approach to increase cyber security awareness is the gamification of the education. [27] While years earlier security awareness training was characterized as a dark classroom full of people watching an annual presentation about the importance of IT security, nowadays these are much better envisioned by using online materials, demonstration videos and being engaged in interactive exercises. In our research, we are looking for more sophisticated methods to support future needs of skill development, like attack simulations, educational games and role play. We are looking for such methods to increase the efficiency of the learning process, to ease the workload of instructors, and to make education an enjoyable experience.

Talent management is also important to prepare cyber security experts for their future jobs, to keep them in the profession and to track their professional development. [28]

Our main hypothesis in this chapter is that such complex human-technology relationships can only be successfully tested and explored if a proper environment is available where actions-reactions can be simulated and practical experience can be gained.

Analysing Changes in Strategic Thinking and Leadership in Cyberspace

Strategic thinking and leadership approaches are traditionally top-down and driven by a clear hierarchy of objectives. Mission statements and objectives are set at high level and, institutionally, they are broken down to goals, action items, programs and projects. This paradigm is characterized by a strong deterministic view, expected lower levels abide by the higher ones. Managerial mind-set therefore revolves around phrases such as, alignment, compliance, fit, and classic feedback mechanisms. [29]

In the course of this research chapter we intend to explore how the phenomena of technology driven emergency influences traditional top-down strategic thinking by investigating the following areas:

- Describing emergent behaviour in the era of pervasive computing. Emergent behaviour is formulated through mechanisms, which are ways how things happen due to the interactions of actors. [30] Alteration of technology and routine interactions for instance can be described as imbrication of agencies where new technology is constrained by old routines or new routines generate new features of technology.
- Studying emergency with the use of Actor-Network Theory [9] which inherently treats technology and human actors symmetrical. Stabile working structures emerge therefore as a mechanism of human-machine interplay where flexible routines influence flexible technologies.
- Running focused group sessions with information security executives to explore the counter pressing forces between institutional alignment to high-level objectives and emergent behaviour as a result of employee-technology structuration.
- Analysing cases of successful and unsuccessful leadership attempts to create organizational alignment, and apply action research principles for seeking out solutions through ongoing consultations with information security managers, policy makers and experts.

Once we have a better understanding of emergency and, importantly, its interpretation by managers, leaders and policy makers we intend to formulate how traditional technology deterministic strategic thinking can be improved by the inclusion of emergency.

Strategic Approaches for Information Security: Mechanisms of IT Alignment

As experience shows, strategic documents, which address policy issues, leadership actions and desired regulatory responses have serious deficiencies in taking into consideration the dynamism in technology innovations especially in ICT. [6] The wide gap between these plans and the rate of change in ICT development results in delayed government responses, disorientation amongst economic actors, and quite often misinterpretation of broader social implications of technology adoption. We intended to address the conceptual problem that existing strategies and plans are, therefore, insufficient for achieving sustainable results in high level public policies. This challenge, furthermore, results in inappropriate regulations, inadequate legislations leaving many of the technology´s pressing social implications unanswered. [31]

In this research chapter, we plan to execute the following experiments:
- analysis of the existing international strategies, white papers and policy documents analysing cyberspace;
- analysis and evaluation of the Hungarian (national) documents addressing the same issues;
- juxtaposition of technology—especially ICT—state of the art and rate of change with strategic initiatives in these documents, showing how this juxtaposition impacts public administration, economic policy and national security;
- explore how the dialogue between different actors, leadership, and institutions structure social practices, which later on get documented and codified;
- based on these findings and the research results of chapters 1–3 create a conceptual model on how technology induced change in leadership, security awareness and everyday social practices can be incorporated in strategic planning, programs and legislative initiatives.

Based on these results we would like to prove our hypothesis that successful strategic planning and documentation of information security policies require taking into consideration the change of ICT development, and the complex intertwining of technology-society dynamism.

As a summary, our general assumptions, or testable research questions for our program, can be outlined as follows:

- Information security assessment in contemporary pervasive ICT environment can only be assessed through situated actions, observing and analysing human-technology interaction, during real use.
- ICT penetration in urban habitats has a measurable impact on social behaviour creating effectiveness and efficiency in several areas, but creating tremendous challenge in areas of privacy and security.
- Incorporating the concept of emergency into strategic thinking improves organizational alignment and enables better technology adoption. When managers, leaders and policy makers understanding is widened with emergent thinking, they are more likely to find strategic solutions which create adherence to information security principles.
- The dynamics of ICT is a determining factor for creating policy level information security documents. Without analysing and incorporating the transformative power of ICT into the policy setting information security strategies are likely to fail.

Research Methodology and Expected Contributions

As far as methodology is concerned in the field of STS a wide range of conceptual tools and techniques are accepted for the investigation of the construction of socio-technical entities. [32] It is important to have in mind, however, that this approach rejects both technological and social determinism: it thus goes beyond traditional approaches that are concerned with assessing the "impacts" of technology, in order to examine what shape the technology has these "impacts" and the way in which these impacts are achieved. [10] Therefore we plan to apply a set of methodologies which are not only suitable to test our hypotheses but are also in alignment with duality and the relational ontology of human and material. The key methodologies we are going to use are experimental design, comparative policy analysis, and action research.

Experimental Design:
For the analysis of Research Chapter 1–3 experimental design is planned as key methodology. We set up both controlled simulations using the ICT research environment, and anthropological observations on how users behave in situated actions. [33] The variety of ICT equipment, the situations, and the scenarios, combined with the selection of participants will provide the empirical basis of testing hypotheses in these research chapters. Naturally, experiments will be combined with broader data gathering, as we might explore such constructs, which need different verification. [34] We will also apply focused group sessions and log analysis in order to enrich our data and information about human-machine interaction.

Comparative Policy Analysis:
Both our theoretical framework and the concrete needs of Research Chapter 4 require the institutional analysis of technology society relationship. In our case this will entail policy

analysis and text mining of strategy documents. Using this set of methodologies rich narratives of interviews, case study collections and systematic comparison of different information security and cyber defence strategies will be developed. [35] Transcripts of the expert workshops will also be included, and other secondary data sources will be juxtaposed to the empirical findings throughout the document analysis.

Action Research:

Action research aims to solve current practical problems while expanding scientific knowledge. Unlike other research methods, where the researcher seeks to study social phenomena but not to change them, action research is concerned with solving particular problems and simultaneously studying the process. It is strongly oriented toward collaboration and change involving both researchers and subjects. [36] We will use this methodology with information security managers to capitalize on learning both by the researchers and these managers within the context of their social system. By doing so, we create a clinical method, similar to a consultation process which puts researchers in a *helping role* with practitioners. Using the laboratory as a clinical setting we will diagnose situations both for the managers and for the researchers creating a collaborative learning environment. Using theories and models in the learning process we will induce collaborative change. In this therapeutical stage, we will study the effects and impacts of this change.

The human-technology experiments will be executed in a computer laboratory setting.

As far as contributions are concerned we expect the following key achievement as our program unfolds:

a) An English language monograph containing the results of the four Research Chapters published at a recognized and prestigious publisher.

b) Theoretical foundations of the problem statement, its relevance and the significance of anchoring our empirical work to Science Technology Studies will be published as peer reviewed scientific working paper, open for access to a wide audience at an early stage of our research.

c) Empirical results and hypothesis testing of Research Chapters 1. to 4. will be published in peer reviewed, prestigious and/or ranked international or Hungarian journals (four journal papers).

d) At the end of the first year a focused workshop will be organized by inviting Hungarian and international experts in order to ensure the relevance of the research design and the empirical experimentations during the following two years. The workshop is also expected to provide visibility and anchoring of the program both domestically and internationally.

e) Detailed research experiments, results and their analysis will be presented during the first two years of the program; all in all, 4 peer reviewed scientific conference presentations (two in each year) will be delivered and published in proceedings.

f) By the end of the program two new Ph.D. research topics will be developed, accompanied by necessary course components.

g) At the end of the third year, we organize a conference for both high level decision makers and academic professionals as a summit of the research program and as a forum to present the key findings.

Conclusions

In our paper, we presented a comprehensive research program—its theoretical foundations, research design, methodology and expected contributions in the field of information security.

We argued, that justification of this program is underlined by empirical results, and the dynamics of IT development suggest in the public domain the complex relationship between technology and society has to be taken into consideration. Information systems are not composed of technology alone, they are systems which emerge from the mutually transformational interactions between the information technology and the organization. The duality of this relationship is essential for understanding how innovation is enabled by ICT, because information systems are as much the result of ICT enabling an organization, as much as an organization enables an information system. Furthermore, both the economic value and the broader social value of such systems depend on how successfully this duality works, and how ICTs and organizations create new institutionalized socio-technical systems.

Therefore, the socio-technical systems approach is crucial for investigating the interrelatedness of technological and social systems. By drawing attention to the intertwining and interpenetration among technological and human processes, the socio-technical systems approach serves, and rightfully so, as a major policy making framework for ICT strategies and achieving better alignment.

We presented two foundational theories: Giddens structuration theory and Henderson Venkatraman's IT strategic alignment modelling. Based on these foundations we constructed a four-phase IS strategy formulation process—with top-down and bottom-up directions.

These four constructs concluded in four main research questions or complex testable hypotheses focusing on structuration in smart technology environments, security awareness of individuals in complex ecosystems, influences of human-technology duality on leadership and management; and finally, the high-level strategy formulation and alignment of institutions satisfying the bottom-up emergencies and top-down execution requirements.

We believe that the early stage publication of our initiative is relevant both for academia and practice, since our main objective with this paper—and with the whole research program—is to generate discussions between as many participants of the new cyber ecosystem as possible.

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Military Parachute History of Hungary

József BODA[1]

The author shall summarize the history of Hungarian military parachuting and share it with those interested in the topic. The article begins with the Imperial and Royal Aviation Troops of the Austro-Hungarian Empire parachute activities followed by the history of the participation in World War II and during the Warsaw Pact era until recent years.

In Hungary, so far, only a few books have been published covering the history and activities of parachute and special forces units.

Keywords: *long-range reconnaissance, military parachuting, parachute, para-troopers special forces*

Introduction

During the first years of the 1914–1918 war, the parachute was largely unknown among the Hungarian and Austrian military aviation troops. The use of parachutes started in 1917 within the units of captive (observation) balloons; at the end of the war it was increasingly used by combat pilots and crew members.

Until the end of the war, all in all, 177 jumps occurred, nearly all of them out of a captive balloon, only 8 jumps were counted out of airplanes.

54 jumps out of captive balloons were because of aviation attacks, 115 were made for training reasons. From planes 6 jumps were counted; all caused by aviation attacks, 2 due to plane crashes. 162 jumps out of the balloons happened without any complications, in 5 landings some persons were slightly, and 2 of them were fatally, injured. 2 jumps out of airplanes happened without any complication, in one of them a person was slightly injured and four fatally.

The Beginning

Lieutenant Theodor Spalek, equipped with a "Brunner" parachute made most of the drops all with smooth landings. He parachuted down from an altitude of between 300 and 700 meters twelve times. Lieutenant Leopold Gorke parachuted down from an altitude of between 90 and 400 meters six times, all jumps with smooth landings. [1: 276]

On 30th November, 1917 Lieutenant Alfred Bibicas, a member of the 13th Balloon Company, was killed while dropping out of his burning captive balloon because his parachute was damaged by the burning parts of the balloon.

On 23rd March, 1918 Lieutenant Antal Boksay, a member of the 24th Reconnaissance Aviation Company, tested the German Heinecke I. parachute by jumping from 2000 m. [2: 32]

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On 8th May, 1918 Lieutenant Baron von Scholten, a member of the 20th Balloon Company, was killed while parachuting, due to a defective parachute. On 22nd August, 1918 Lieutenant Frigyes Hefty, 42nd Aviation Company parachuted from an altitude of 4,800 m after his plane was hit in an air fight and caught fire. On 6th September, 1918 Corporal Karl Thomas, 30th Aviation Company, jumped from his plane after a wing was hit. Both Hefty and Thomas managed to land without injury.

On 28th August, 1918 both Lieutenant August Selinger, a member of the 42nd Aviation Company, and Staff Sergeant Konrad Kraus, were killed for reasons that were never clarified; Lance Corporal Ludwig Thaler, 14th Aviation Company met the same fate on 18th September, 1918 because, his parachute was interfered with, as did Lieutenant Franz Sedelmeier of 22nd Aviation Company, on 12th September, 1918 for reasons unknown.

In 1936, a parachute factory was established in Hungary.

On 12th June, 1937 during the International Red Cross Rescue Conference in Budapest, a Medical Team with two nurses (Gabriella Medveczky and Margit Tatár) parachuted from an altitude of 800 m. [3] They were the first female parachutists in Hungary.

On 3rd May, 1938 the first military parachute training was organized for a special military detachment to carry out missions behind enemy lines.

In 1938, a Hungarian engineer, Ákos Hehs, created the first Hungarian parachute, called H 39 M. [4]

Establishment of Parachute Units

On 1st October, 1939, the *1st Parachute Battalion* and in 1944, the 1st Parachute Regiment were founded.

The unit had two parachute combat missions during World War II (WW II). Since WW II, the Hungarian parachutist units were the elite force of the Hungarian armed forces. These units were always used in difficult and dangerous situations when other units were not able to fight effectively. [5: 29–33]

After WW II, on 1st October, 1948 the first parachute company was re-established and in 1950 the company became the 62nd Parachute Battalion of the Hungarian Land Forces.

In 1949, the *Parachute Service* of the Hungarian Air Force was established.

On 30th November, 1954, the 62nd Parachute Battalion came to an end.

The third generation of the Hungarian parachutists started in 1959, by establishing a *long-range (LR) reconnaissance company,* and in 1961, it became the *34th Reconnaissance Battalion.* Later on, in 2006, the unit became the *34th Special Forces Battalion.*

On 30th July, 1957, a paramilitary organization (Hungarian National Defence Association) was established to conduct pre-military training for juveniles including parachute training.

Between 1960, and 1990, each of the five divisions of the Hungarian Land Forces had a Long-Range Reconnaissance Company. They had qualified military paratroopers.

In 1972, the *Search and Rescue Service* of the Hungarian Air Force with parachute capabilities was founded.

Changes after the Cold War

Since 1989, when the political changes took place in Hungary, the armed forces have been undergoing constant reduction.

In 1993, the *88th Air Mobile Battalion* was established with parachute capability. In the year 2000, the battalion became the *1st Light Mixed Infantry Regiment.* In 2005, the regiment was downsized to battalion level, called *25/88th Light Mixed Infantry Battalion.* [6: 128]

In 2004, there was a tendency to dismiss all special parachute units for financial and political reasons (joining the EU). With the assistance of Fellowship Association of Hungarian Parachutists (FAHP), the special parachute units survived the changes again, but the number of units and members of the units have been reduced.

By the end of 2008, there were three battalion size units and one Peace Support Training Centre with parachute capabilities and three air bases with parachute support staff and search and rescue capabilities. In 1st January, 2016 by merging the 34th Special Forces Battalion and 25/88th Light Mixed Infantry Battalion the *2nd Special Forces Regiment* was established. Altogether today there are 250 military parachutists in Hungary.

The 2nd Special Forces Regiment (2016–)

The 1,200-strong 2nd Special Forces Regiment was established in 1st January, 2016.

The soldiers applying to join the unit must first undergo a very rigorous assessment and selection process. The future members of the regiment all want to be among the best, but due to the very heavy physical and mental strain, only 10–15 percent of the applicants are able to meet the requirements.

The Special Forces Regiment can be deployed "by land, by water, under water and by air", both in Hungary and abroad. The Hungarian Special Forces enjoy international recognition, and, for example, they have led the special forces group of seven countries in Afghanistan for six months. [7]

Missions

The scope of the battalion's duties is defined by the Ministry of Defence in 229-50/2015. deed of foundation:
- execution of Special Operation missions under national and NATO command (Special Reconnaissance, Direct Actions, Military Assistance);
- contribution to Peacekeeping operations;
- participation in Peacetime or Combat Search and Rescue operations;
- conducting Military Operations to protect Hungary and its allies;
- organizing Task Force Groups and conduct special military operations in cooperation with Air Force and other Land Forces support units in case of emergency;
- conducting special tasks in case a traditional military unit is not capable of doing it;
- prepared to conduct military policing tasks.

Structure and organization

The regiment was made up of combat, combat support and combat service support sub-units. Two combat battalions fulfil the regiment's main tasks. [8]

The 34ᵗʰ László Bercsényi Special Forces Battalion (1939–2015)

History

The legal predecessor of the 34ᵗʰ László Bercsényi Special Forces Battalion is the *1ˢᵗ Parachute Battalion,* which was founded on 1ˢᵗ October, 1939 in Pápa. The second parachute unit was founded on 4ᵗʰ October, 1951 in Székesfehérvár and carried forward the tradition of airborne infantry. The unit was deactivated in 1954, and reactivated and reorganized in 1959, in Budapest as a *Long-Range Reconnaissance Battalion.* During 1961, the unit was equipped with the new Russian made D–1 type parachute. Within the frame of restructuring the battalion, it was redeployed to Szolnok in 1963. The unit executed the first parachute jumps from MI–8 helicopter in 1973, and from AN–26 airplane in 1977.

The battalion was named after Count László Bercsényi in 1990. The unit took part in securing the Southern borders during the Balkan War. [9]

Since Hungary joined to the North Atlantic Treaty Organization (NATO) in 1999, the 1ˢᵗ company of the battalion was assigned to the Allied Command Europe Mobile Force-Land (AMF-L). Between 2002–2003, with the reorganization of AMF-L, the company became a part of NATO Response Force (NRF) and carried out a mission in 2003, for six months' periods. Members of the battalion served in many peacekeeping missions like Cyprus – United Nations Peacekeeping Force in Cyprus (UNFICYP); Egypt – Multinational Force and Observers (MFO); Bosnia-Herzegovina – Stabilization Force (SFOR); Kosovo – Kosovo Force (KFOR); and Iraq – NATO Mission.

In 2004, one whole company was deployed to International Security Assistance Force (ISAF) mission in Afghanistan. The Reconnaissance Battalion completed its transformation to a Special Forces Battalion in 2006.

Some elements of the 34ᵗʰ Recce Battalion deployed several times to conduct special missions. Between 2004 and 2006, the Battalion provided the majority of the Light Infantry Company in Kabul, Afghanistan. Additionally, teams deployed into Iraq, as training teams to train the Iraqi Security Forces. In 2008, the Battalion—together with the 25/88ᵗʰ Battalion—provided the 4ᵗʰ contingent of the Hungarian Provincial Reconstruction Team (PRT) in Afghanistan. From 2009, again, together with the 25/88ᵗʰ Battalion they formed the first rotation of the Hungarian Operational Mentoring and Liaison Team (OMLT) in Baghlan Province Afghanistan. Also in 2009, the Battalion deployed teams to conduct special operations under ISAF command.

Missions

The scope of the battalion's duties is defined by the Ministry of Defence in 158/2005 deed of foundation:
  • solutions to unexpected events with the use of military force;

- execution of special operation missions under national and NATO command;
- combating terrorism (military aspect);
- contribution to peacekeeping operations;
- participation in peacetime or combat search and rescue operations;
- crisis management.

Structure and Organization

The battalion was made of combat, combat support and combat service support sub-units. Two combat companies fulfil the battalion's main tasks. In connection with the special organization within the unit, they are able to carry out special operation missions with small units (12 men group) up to platoon level.

Objective

To deploy in the European Union and NATO peacekeeping missions, in accordance with the national interest of Hungary. [6: 126]

The 25/88th Light Mixed Infantry Battalion (1993–2015)

History

The 88th Light Infantry Battalion was founded on 1st September, 1993 as an *Air Mobile Battalion.* After three years, it was reorganized and started its operation as *Rapid Reaction Battalion* on 1st March, 1996. Finally, within the frame of the reorganization of a new military force, the unit grew from a battalion to *a regiment* on 1st October, 2000. By 1st July, 2001 the unit achieved combat readiness. After that, the regiment was reorganized and on 1st September, 2004 started its operation as a *Light Infantry Battalion.* The battalion was under direct command of the 25th György Klapka Light Infantry Brigade.

Missions

The battalion was an armed tactical unit with armed and professional subunits in its organization. Its technical equipment was modified for air transportation and the soldiers are trained and prepared for implementing extraordinary tasks.

Within the range of battalion's tasks, are wartime missions as well as other military operations.

Missions in wartime:
- crisis management;
- special operations;
- special infantry tasks;
- airborne and air assault operation;
- combat search and rescue.

Other military operations:
- peace support operations;
- humanitarian relief;
- search and rescue;
- non-combatant evacuation;
- counter-terrorist operations.

Structure and Organization

The structure of the battalion consisted of combat, combat support and combat service support subunits.

Within the combat support subunits there were:
- combat support company (recce platoon, airborne, engineers platoon, mortar platoon, anti-tank platoon);
- a headquarters (HQ) company.

The battalion also had a logistic company and a medical centre.

The combat subunits consisted of three air assault companies.

During the foundation of the structure, the principal intent of the military superior was to establish a light infantry unit, which can be deployed anytime, anywhere, under any circumstances. Its mission implementation is characterized by considerable independence. [6: 129–130]

The 5/24th Gergely Bornemissza Reconnaissance Battalion (1949–2016)

History

The 24th Gergely Bornemissza Reconnaissance Battalion was one of the units in the Hungarian Defence Forces that conducted parachute training. It was established in Esztergomtábor in 1949. After being reorganized a lot, it was located at the István Dobó Barracks (Eger). The primary mission of the unit was to train reconnaissance soldiers able and capable of providing intelligence data at operational level. In 1962, a *Long-Range Reconnaissance Platoon* was established within the unit with the intention of extending the recce capabilities of the battalion. One year later this platoon was reorganized into *a company* composed of 6 LR teams which adopted parachutes as a way of deploying troops behind enemy lines. In 1963, the Long-Range Company started its training with volunteers selected from the enlisted. The training jumps have been conducted in different parts of the country, e.g. Balatonkiliti, Pér, Szombathely, Kaposújlak, Szolnok, Mezőkövesd, Verpelét, Kaposvár and Kecskemét. The aircrafts and helicopters that have been used by the battalion were: LI–2, IL–14, AN–2, AN–26, MI–2, MI–8, MI–17 and KA–26. [10: 140–161]

During the compulsory military service (1963–2004), approximately 1,600 para-soldiers were trained by the 24th Recce Battalion. In 2004, compulsory military service ended and therefore that year there was a milestone as regards parachute training as well. The new professional soldiers (mostly recruited from former enlisted and trained ones) meet the increased requirements; more than 80% of them have already completed the free fall course. From 1962

through to 2008, the soldiers of the unit conducted approximately 50,000 jumps. [10: 183]

In 2007, the battalion was deployed to the city of Debrecen and became a subordinate battalion of the 5th István Bocskai Infantry Brigade and was renamed to 5/24th Gergely Bornemissza Reconnaissance Battalion.

Missions

As a part of the Hungarian Defence Forces (HDF) Land Forces, the Battalion had to prepare the personnel for war operations, to ensure the readiness of combat and transport vehicles, as well as of the weaponry and technical equipment, to store and maintain material supplies, to prepare for mobilization in higher readiness state, to be capable of increasing unit size in a swift and organized fashion during mobilization, and to execute any warfare missions given to the organization.

Structure and Organization

- Headquarters;
- Support Subunits:
  - Combat Support Company;
  - Medical Centre.
- Combat Subunits:
  - 1st Reconnaissance Company;
  - 2nd Reconnaissance Company;
  - 3rd Reconnaissance Support Company.

The Peace Support Training Centre (2000–2016)

History

The Peace Support Training Centre (PSTC) was established on 1st October, 2000 as part of the 1st Light Infantry Regiment. The first task was to prepare military units for the missions of Cyprus – UNFICYP and Egypt – MFO. Later its tasks extended to NATO and EU missions as well. The PSTC is certified by the UN to organize International Military Observers Courses. By 1st May, 2004 the PSTC became an independent unit attached to the Joint Operation Centre of the Hungarian Defence Forces.

In 2005, the PSTC was transferred to the Land Forces Command which was renamed Joint Force Command by 2007. The PSTC is also responsible for organizing training for special forces including parachute training. On April 2007, the United Nations Department of Peacekeeping Operations (UN DPKO) issued a certificate to recognize that the international military observer courses delivered by PSTC meet the UN peacekeeping training standards.

Missions

- To train military units and officers for peacekeeping missions.
- To prepare military observers for peace operations.
- *To provide basic trainings for special forces units.*

- To organize conferences, seminars and military exercises on peace operations.
- To provide language trainings.

Structure

- Headquarters;
- Information Technology (IT) section;
- Operation section;
- Training section (including parachute trainers);
- Support section;
- Base/facility support section. [11]

Since the establishment of the 2nd Special Forces Regiment, all the special training conducted by them and PSTC previously, are not provided any more.

86th Szolnok Helicopter Base

The helicopter unit is based at an airfield with a considerable history in aviation, situated near the city of Szolnok and east of the Tisza river. Since the beginning of the 1940's the airfield has been used by military aircraft.

The 86th Szolnok Helicopter Wing was established on 1st August, 2004 from the 87th Bakony Attack Helicopter Wing and the 89th Szolnok Mixed Air Transport Wing. A reorganization took place in 2007, and the unit name changed again to 86th Szolnok Helicopter Base. [12: 9]

Main Tasks of the Base

- Providing air transport and air fire support during national and international (military) crises situations and during combat for Hungarian military units and personnel.
- Air rescue and search service in Hungary.
- Providing internal and international military air transport.
- Conducting operational and practising aviation.
- Provide training for pilots and air technical staff conducting activities relating to NATO.
- Flight Training in Canada programme.
- Providing air support and protection for army units.
- Conducting standby duties – carry out tactical airborne operations.
- Operating the Military Parachute School for the Hungarian Defence Forces.
- Participation and assistance during national disasters and environmental catastrophes.
- Providing logistical support to other units in the garrison.
- Providing air transportation to national and military VIP's.
- Preserve military aviation history and operate the Military Air History Museum in Szolnok. [12: 17]

Structure

- Headquarters;
- Operation Centre of the Base;
- Transport Helicopter Battalion (MI–8 and MI–17);
- Attack Helicopter Battalion (MI–24D, MI–24V and MI–24P);
- Training Air Squadron (JAK–52, AS–350B light helicopter);
- *Military Parachute School (company size)*;
- Aviation Engineer Battalion;
- Combat Service Support Battalion;
- Operations Support Battalion. [13]

59th Dezső Szentgyörgyi Air Base Kecskemét

The airfield has been operating since 1937. The predecessor regiment of the unit was established in 1951, and was equipped with MIG–15 and MIG–17 aircraft. In 1962, the regiment received some supersonic MIG–21, and in 1996, MIG–29 fighters. Since 2007, the air base has belonged to the Hungarian Defence Forces Joint Force Command (HDF JFC). In the same year, new Gripen fighter planes arrived to the unit.

Organizational Mission

Protecting the airspace, territory and troops of Hungary and its NATO allies, and securing its integrity in cooperation with the units and subunits of NATO and the Hungarian Air Force.

Main Tasks

- Continuous readiness in order to counter the activities of any aircraft that violates the airspace or the aviation regulations, as well as rescuing the crew of any troubled aircraft.
- Protecting Hungary and the member states of NATO and their troops against enemy air strikes.
- Visual air reconnaissance.
- Air support.

Immediate Reaction Forces

The purposes of this organization are:
- enforcing regulations on aircraft that violate the airspace or breaches the aviation regulations;
- provide air support to Hungarian and NATO Land Forces;
- carry out air reconnaissance;
- air transportation military personnel and units;
- rescuing the crew of any troubled aircraft by a platoon of parachutists. [14: 16]

In 2001, the Swedish and Hungarian governments entered into a lease-purchase agreement, with a further modification in 2003, which included 14 Gripen C/D (12 single-seat plus two twin-seat) aircraft. All Gripens were delivered in 2006 and 2007, and, by the end of 2008, the 14 aircraft were in operational service in the Hungarian Air Force.

Structure

- Headquarters;
- Fighter Squadron (JAS–39 EBS HU GRIPEN);
- Air Transport Company (AN–26T);
- Air Tactical Training Squadron;
- Air Engineer Battalion;
- Combat Support Battalion;
- Base Operation Centre;
- Logistic Battalion including a *Parachute Platoon.*

Pápa Base Airfield

The Pápa Air Base was established on 1st July, 2001 as part of national commitments in the NATO Infrastructural Development Program, and it is the legal successor of the HDF 47th Pápa Tactical Fighter Wing. It serves as a backup airfield for both Hungarian and NATO aircrafts and hosts Hungarian Air Force Search and Rescue helicopters. The Air Base was selected to be the Main Operating Base for the multinational Heavy Airlift Wing and its C–17 fleet in 2007. [15]

Mission

To host the NATO Strategic Airlift Command (SAC) and the Heavy Air Transport Regiment equipped with C–17 aircrafts.

To provide Rescue Service for the Hungarian Armed Forces with a parachute platoon.

Conclusions

Since the dissolution of the Warsaw Pact in 1990, Hungary is constantly trying to modernise and downsize its armed forces. Having inherited a legacy of a heavy, slow-moving Warsaw Pact force, it is trying to modify it into a more versatile and modernised NATO force. The Hungarian military has been downsized from 130,000 in 1989, to approximately 24,000 in 2008. Furthermore, the Hungarian armed forces undergo a structural adaptation, which includes the formation of an army composed solely of volunteers, the establishment of mission orientated organisations, and, finally, the construction of a new service culture.

The main tasks now of the restructured parachute and special forces units are to participate in NATO and EU missions.

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Missile Mathematical Model and System Design

István PAPP[1]

Recently, aerospace (flight) engineers, having more solid mathematical backgrounds, have become familiar with the newest results in control theory and are able not only to formulate control problems but also solve them without attracting the attention of control experts. Moreover, they try to apply new results in control theory to specific aerospace and missile guidance problems. As a result, control theory is losing its biggest supplier and, to a certain degree, this slows down its progress. [1] [2]
Keywords: *mathematical, control, missile, equations of motion*

Introduction

In general, a missile can be defined as an aerospace vehicle with varying guidance capabilities that is self-propelled through space for the purpose of inflicting damage on a designated target. These vehicles are fabricated for air-to-air, surface-to-air, or surface-to-surface roles. They contain a propulsion system, warhead section, guidance systems, and control surfaces, although hypervelocity missiles do not use warheads or control surfaces. The guidance capabilities of the different missiles vary from self-guided to complete dependence on the launch equipment for guidance signals. [2] [3]

The Missile Mathematical Model

Firstly, we need to define the concept of missile: a missile is defined as a space-traversing unmanned vehicle that contains the means for controlling its flight path. The guided tactical missiles are sometimes referred to according to their air speed relative to the speed of sound and their type of propulsion system. Generally, the highest rate of airspeed that can be reached safely and still ensure correct operation is considered as that missile's classification. [1]

The four general categories of guided missiles are:
- surface-to-surface;
- surface-to-air;
- air-to-surface;
- air-to-air. [1]

In essence, the general means of classification of a missile's airspeed is related to the speed of sound (or Mach 1), which varies with respect to the ambient temperature. Commonly, there are four groups that are considered in classifying a missile. These:
- subsonic: airspeeds less than Mach 1;
- sonic: airspeeds equal to Mach 1;
- supersonic: airspeeds ranging between Mach 1 and Mach 5;
- hypersonic: airspeeds exceeding Mach 5. [1] [3]

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Table 1. Comparison of Weapon System Characteristics. [1: 92]

Feature	Sparrow-type weapon	Bank-to-turn weapon
Guidance Mode	Skid-to-Turn	Bank-to-Turn
Control Surfaces	Wing Control	Tail Control
Autopilot Sensors	Accelerometers	Accelerometer
Maximum Acceleration	45g's (32 g's per axis)	100 g's in pitch, 10 g's in yaw
Guidance Delay	0.75 sec	0.40 sec
Launch Speed	0.5–2.0 Mach	0.5–2.0 Mach
Speed Range	0.5–3.0 Mach	0.5–4.0 Mach
Maximum Roll Rate	Not Applicable	±600°/sec

Especially the pitch/yaw plane rotational responses behave like a spring – mass damper system. Mathematically, this system reaction can be expressed in the form

$$\frac{d^2y}{dt^2} + 2\zeta\omega\left(\frac{dy}{dt}\right) + \omega^2 y = \omega^2 u(t) \tag{1}$$

Equation (1) can also be written in the usual frequency domain as follows:
$$y(s)/u(s) = \omega^2/(s^2 + 2\zeta\omega s + \omega^2) \tag{2}$$

In the above equations, the notations are:
y(s) – output,
u(s) – input,
ζ – damping ratio,
ω – frequency (rad/sec),
s – Laplace operator (rad/sec).

The above continuous system can be constructed in a simulation as a feedback network that represents a load factor command system in pitch/yaw planes. Figure 1 represents a typical pitch/yaw network. [1] [4] [6]
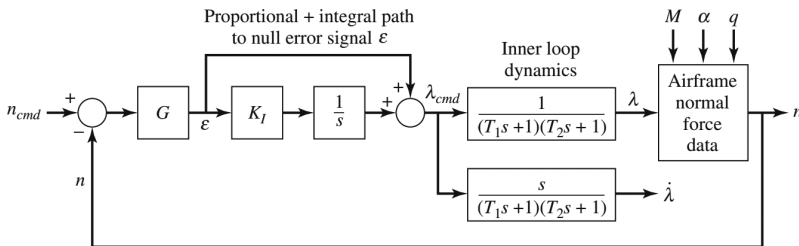
Figure 1. Pitch-yaw feedback network. [1: 93]

Assume for simplicity that the missile's motion is constrained in the vertical plane. Furthermore, we will assume that the missile can be illustrated as a point mass. Therefore, from the missile's balanced forces shown in the diagram below, we can write the equations of motion as follows.
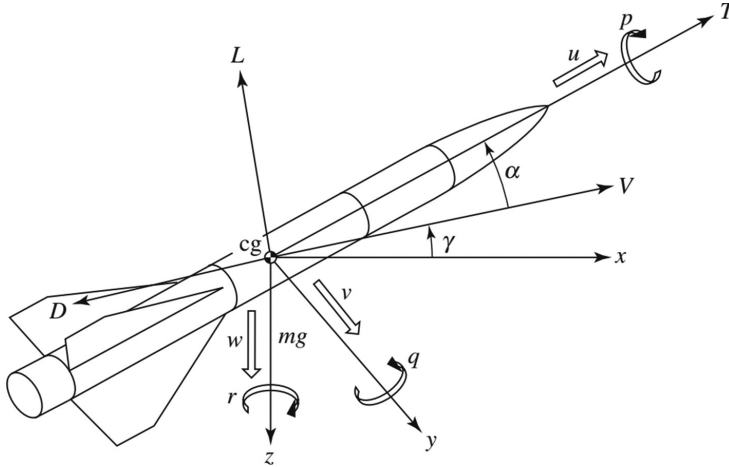
Figure 2. Missile balanced forces. [1: 98]

Based on Figure 2, we can write the following equations of motion:

$$\frac{dV}{dt} = (1/m)[T\cos\alpha - D] - g\sin\gamma \tag{3}$$

$$\frac{d\gamma}{dt} = (1/mV)[L + T\sin\alpha] - (g/V)\cos\gamma \tag{4}$$

$$\frac{dx}{dt} = V\cos\gamma \tag{5}$$

$$\frac{dh}{dt} = V\sin\gamma \tag{6}$$

Aerodynamic Derivative Coefficients:

$$L = \frac{1}{2}\rho V^2 S C_L \tag{7}$$

$$D = \frac{1}{2}\rho V^2 S C_D \tag{8}$$

$$C_L = C_{L\alpha}(\alpha - \alpha_0) \tag{9}$$

$$C_D = C_{D0} + kC_L^2 \tag{10}$$

where:
g – acceleration of gravity,
h – altitude,
k – induced drag coefficient,

m – mass,
D – drag,
L – lift,
M – Mach number,
S – reference area,
T – thrust,
V – velocity,
C_D, C_L – drag and lift coefficients,
C_{D0} – zero-lift drag coefficient,
$C_{L\alpha}$ – $\partial C_L / \partial \alpha$. [1] [5] [9]

System Design

Specifically, the guided missile is typically divided into four subsystems:
- the airframe;
- guidance;
- motor (or propulsion);
- warhead.

Firstly, the type and size of airframe is strongly dependent on guidance characteristics, motor size, and warhead size.

Secondly, the type of guidance that can be used is also dependent on the motor, warhead, and threat. More specifically, the type of guidance chosen is dependent on the overall weapon system in which the missile will be used, on the type of threat the missile will be used against, the characteristics of the threat target, and other factors. Guidance, as we have seen earlier, is the means by which a missile steers or is steered to a target.

The next category is the motor, which characteristics are dependent on guidance requirements, the threat, and the airframe characteristics.

Finally, the warhead is dependent on the threat and type of guidance. Commonly, the procedure is to size the guidance requirements (e.g., accuracy, response time, range capability) from the threat, select an airframe that can deliver the required aerodynamic performance, size the motor based on threat and airframe considerations, and size the warhead according to guidance and airframe considerations. [1] [2] [5]

Figure 3 we can see an air-to-air missile's general construction.
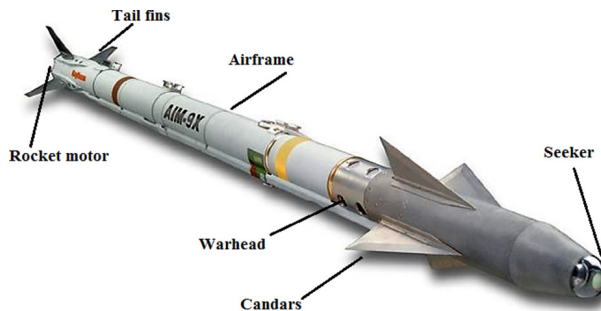
Figure 3. Air-to-air missile main parts.
[Edited by the author based on source 7.]

In addition to the above considerations, there are other basic factors that affect the design of any weapon system. These are:
- the threat;
- the operating environment;
- cost;
- state of the art.

Typically, the threat and operating environment are known or are given. Also, the state of the art is known. Therefore, the design effort of any missile centres on meeting the threat in the environment with the state of the art, at minimum cost. Consequently, three of these four factors are specified, with the fourth being either minimized (i.e., cost, state of the art) or maximized. [1] [2]

Figure 4 illustrates the above missile characteristics for an aerodynamic air-to-air missile.

1 Radome
2 Planar array active radar antenna
3 Proximity fuze antenna (one of four spaced at 90°)
4 Warhead
5 Fuzing unit
6 Fixed wings
7 Umbilical connector
8 Moving control fins
9 Nozzle
10 Rear detection antenna
11 Hydraulic power unit
12 Autopilot
13 Electric converter
14 Rocket motor
15 Guidance section
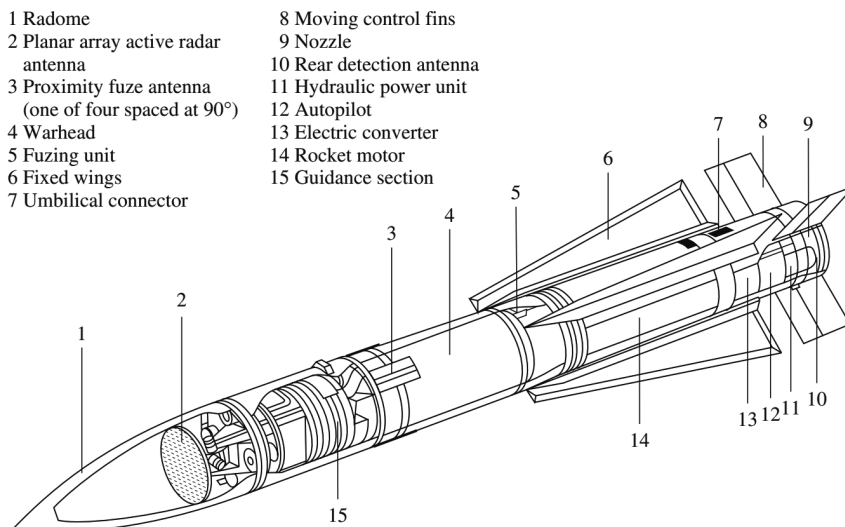
Figure 4. Basic missile construction. [1: 86]

In the development of the missile systems, a broad spectrum of engineering disciplines is employed with primary emphasis placed on the guidance and control subsystems. A comprehensive systems-oriented approach is applied throughout the system development. There are four basic phases in the development of a missile. Which are:
- concept formulation and/or definition;
- requirements;
- design;
- evaluation.

In diagram form, these four phases are shown in Figure 5.

Therefore, the missile system development cycle commences with the concept formulation, where one or more guidance methods are postulated and examined for feasibility and compatibility with the total system objectives and constraints. Surviving candidates are compared quantitatively and a baseline concept adopted. [1] [3] [5]
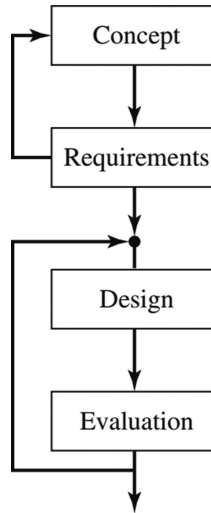
Figure 5. Missile development phases. [1: 89]

Conclusion

We can say that the process of guidance is based on the position and the velocity of the target relative to the guided object. The participants in the guidance process are also referred to in the literature as the evader and the pursuer, respectively. Most of the applications for the theory of guidance are in weaponry. The very fast progress of guided weaponry in the past fifty years would not be possible without advances in many technologies. One should mention internal combustion engines, rocket motors, inertial instrumentation (especially gyroscopes), aeronautics, electronics (especially microelectronics and radar), electro-optics, and computer engineering. [1] [6] [8]

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Processing Intrusion Data with Machine Learning and MapReduce

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These past years, cyber-attacks became a daily issue for enterprises. A possible defence against this kind of threat is intrusion detection. One of the key challenges is information extraction from this large amount of logged data. My paper aims to identify cyber-attack types as patterns in log files using advanced parallel computing approach and machine learning techniques. The MapReduce programming model is applied to parallel computing, while decision tree algorithms are used from machine learning.

I discuss two research questions in this paper. First, despite parallelization, are machine learning algorithms still able to provide results with acceptable accuracy measured by traditional data mining figures (accuracy, precision, recall, area under receiver operand characteristic [ROC] curve [AUC])? Second, is it possible to achieve significant performance improvement by measuring runtime execution of the algorithm by introducing several measurement points?

I proved that the machine learning model with two categories in the target variable is preferred to the one having five categories. The average performance improvement was 4–5 times faster for the whole algorithm compared to a single core solution. I achieved most of these improvements during the data transfer phase.

Keywords: *intrusion detection, parallel processing, machine learning, network security*

Introduction

With the rapid spread of the internet and related technologies, a new form of crime has appeared. This form evolved together with the technology it was based on. By today, it has grown so big, that it endangers business ventures, especially those that rely on the same technology to deliver value. News of website shutdowns, bank card id thefts and botnet attacks are increasingly common and concerning. What can business ventures do against such threats?

One solution is to stop these attacks before they enter crucial systems, like the internal e-mail server. The first initiatives were DMZs (DeMilitarized Zones) between the internet and the intranet to protect the latter from malicious codes coming from the former. A more advanced form of protection is to use intelligent Intrusion Detection/Intrusion Prevention Systems (IDS/IPS-es), systems that detect TCP/IP packets sent with harmful intent, and prevent the arrival of further packets. This detection/prevention is a complicated task, as the packets are disguised well. They usually follow detectable patterns, which is especially evident with denial of service attacks.

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According to source [1], IDS-es have several categories and types:

- *Network based IDS:* listen to network activity, when an anomaly is detected, send a warning to the operator. This way they are able to complement the functionality of a firewall.
- *Host based IDS:* configured to the system they were installed on, logging information about resource usage to raise warnings about a potential attack.

The types are the following:

- *Signature based:* These IDS-es protect against detected intrusion patterns stored in the form of signatures.
- *Statistics based:* These systems need a comprehensive definition of the known and expected behaviour of the system.
- *Supported by neural networks:* monitors general activity and traffic of the network, and creates a database. Similar to statistic based IDS-es, but with additional self-learning capabilities.

With signature based intrusion detection, pattern recognition techniques, such as machine learning, are used. „The aim of machine learning is to find a hypothesis best fitting initial observations—with the expectation that the learned pattern or connection could be applied to new observations as well." [2: 267] For intrusion detection, common pattern mining and classification are the most useful options. One example of classification algorithms are decision trees.

First I talked about processing the data, but storing them is just as important. In what structure is packet data stored on the server, what is the aggregate size of it, and how will this data be accessed again? Of all the questions, the structure and size causes the most trouble. In the case of intrusion detection, structure is moderate as packet information is stored in network logfiles in such a big quantity that it causes problems even to dedicated mainframe architectures. My suggested solution is cheap commodity hardware set up in a parallel processing architecture, and the MapReduce programming model.

In the MapReduce programming model, a function is performed on all observations of a given dataset, often a key assignment to help observation allocation. The observations are then distributed between the nodes and intermediate calculations are performed algorithmically. The final result is generated in the reduce step and is sent to one of the nodes or directly to the user.

The focus of my research consists of machine learning and parallel computing using MapReduce. Intrusion detection is a practical example where the results are used. Research questions which I deal with in this paper are the following:

1. Will the accuracy of models created by machine learning algorithms deteriorate due to parallel computing?
2. Will runtime performance improve by parallelizing the task?

I used a publicly available dataset in the research, and then I have written a customized computer algorithm to test my research questions. Model accuracy was tested with standard data mining figures, such as accuracy, precision, recall, F-score and wherever applicable, AUC. I evaluated performance improvement by inserting several measurement points during the execution of the algorithm.

I structured the article in the following way: first I will give a literature overview. Then, I will elaborate on the theoretical background and research methodology, from Map-

Reduce and the custom-coded program to the sampling of the selected dataset. Next, I will discuss the results of the test runs for both my research questions (accuracy and performance). Finally, I will discuss the findings and propose a trajectory to conduct further research on.

Literature Review

The argument for selecting source [3] was that they had written about the dataset of the SIGKDD '99 data mining competition, the dataset contained data for solving and testing intrusion detection problems, the problem I selected for my research as well. Source [3] introduced the reader to the goals and methods of IDS-es, and provided the most important conclusions of IDS research, such as accuracy, extensibility and adaptability. According to them, several categories of data mining exist that can help in performing intrusion detection: categorization, link and sequential analyses. In their research, they used all three. They called attention to the shortcomings of IDS-es too. In their final model the authors designed basic classifiers for detecting connections between features, then the linked features were grouped and assessed in a final model by an aggregate classifier.

The key conclusion of source [3] was that different intrusion types are better described by different indicators, and are detected by different models:
- *The traffic model:* for defence against Denial of Service (DOS) and fast probing attacks.
- *The host-based traffic model:* for defence against slow probing.
- *The content model:* to detect R2L and U2R attacks.

Next, the authors evaluated the accuracy of the aggregate classifier. The models found features describing probing and U2R attacks well. On the other hand DOS and R2L attacks had a significant standard deviation, feature generation and machine learning provided less convincing results.

Source [3] were the first who took a dataset of intrusions and attempted to analyse it by using machine learning. They proposed a model, which was able to identify attacks on the network. Their article was the first where the dataset from the KDDCup '99 competition was mentioned. Processing this dataset on a parallel architecture is where I attempt to provide new findings.

One potential machine learning algorithm family supporting IDS-es are decision trees. The idea behind them is that they translate complicated connections to a set of simple decisions. They are capable of detecting both linear and nonlinear connections, they can be considered as universal approximators in that regard. Decision tree algorithms start from a root node, select an appropriate variable from the dataset (based on calculations, the most common measure is information gain based on entropy), then split the dataset in two along a selected variable, so that the two parts are more homogenous, than the whole dataset was before. Repeat these steps until stopping criteria is met. This way, every observation can be assigned one single leaf of the tree. The category that has the most observations on a leaf becomes the prediction for future observations. Further readings on decision trees are found in sources [4] [5] [6] [7] [8].

Decision tree algorithms have many advantages:
- they automatically recognize variables with weak predictive power and omit them from the model. This is why decision trees are often used for preliminary variable selection as well;

- their scalability is good, can be used on large datasets;
- an easy to understand set of decisions could be generated from a path leading from the root to a selected leaf;
- decision tree algorithms perform comparably to many other classification models.

Their notable disadvantages:

- they have a tendency to overlearn, meaning they learn not general trends in the dataset, but specific observations of it. This causes poor accuracy when presented with new observations. This is avoided by combining two techniques: testing the model with new observations that were not part of the training, and by pruning the decision tree (by removing partial trees from the model);
- as a classification algorithm, decision trees perform worse on datasets with unequally distributed target variable. To fix this, stratified sampling could be used in a way that overrepresented values in the target variable are under sampled and underrepresented values are oversampled. This is important, because the problem of intrusion detection also involves unequally distributed datasets.

Taking all the advantages and disadvantages into consideration, I chose decision tree algorithms for pattern recognition on the KDD dataset.

Source [9] developed an IDS/IPS equipped with a machine learning algorithm to protect 802.11 Wi-Fi networks against DOS attacks. The two types of DOS attacks against Wi-Fi networks are authentication and authorization attacks. In the former, the attacker sends a lot of authentication messages, thus overloading the Wi-Fi AP (access point). The latter works similarly, except here the goal is to overload the MAC address table. The authors selected several machine learning algorithms: Bayesian networks, AdaBoost, alternating decision trees, SVM and RIDOR algorithm. The focus of the research was on the performance of the machine learning algorithms, with more emphasis on their precision and recall. From all the algorithms, RIDOR, alternating decision trees and AdaBoost performed best, surpassing 90% for both measures. Taking runtime performance into consideration, AdaBoost turned out to be the best choice.

The article shown several examples for supporting IDS-es with machine learning algorithms. A criticism towards it is that it dealt with network issues more, while potential for parallel machine learning remained mostly unexplored.

Source [10] developed a new decision tree algorithm for processing large datasets in a fast and memory efficient way. Several decision tree algorithms were developed before, but these had two issues: the entire training dataset had to be loaded in memory and parameterizing them was a complicated task. The improvement of source's [10] decision tree over the previous ones was that it did not store every training observation in memory, instead, loaded them one by one, and updated the leaves accordingly. If more than a set number of observations were assigned to a leaf, then a cut and reassignment was performed. The authors compared their new algorithm with the already existing ones. The new decision tree algorithm provided comparable or better results. Memory use was evaluated in separate tests. The new algorithm was very efficient in this regard as well.

Source [10] provided a new memory-efficient algorithm for use on commodity computers. Re-using the primary outcome of their research in a parallel environment is potentially beneficial, but the frequency of read cycles on the slow HDD storage remains a question.

Source [11] took a different approach. The article was about a decision tree algorithm implemented in a parallel architecture based on the Message Passing Interface (MPI) standard and the MapReduce programming model. The tree was built up on a central node, while the worker nodes were responsible for calculating the next cut variable. The algorithm collected (reduced) the information gains on the master node which chose the next cut variable. Both the decision tree and the worker nodes were updated according to this decision. The author used the first 15 observations of the iris dataset. Two tests were performed: the first on one multicore computer, the next involved several.

Source's [11] research brought up more questions than it answered. The usability of the results was reduced by the fact that observation count was too low in the tests. Unlike source's [11] research, I assigned the construction of decision trees to the worker nodes as well, simulating a decision forest algorithm. The selected dataset for my research was far bigger than what the author selected: I decided to test my assumptions on the KDD dataset.

Source [12] introduces and calls attention to the hardships during the evolution of parallel computing in his article. It starts with a historical introduction, and then three logically sounding yet bad ideas were introduced: Amdahl's law, "dusty deck" and attached accelerators.

Amdahl's Law: "If half of a computation cannot use even a second processor working in parallel with the first, then, no matter how many processors one employs, the work will take at least half the uniprocessor compute time. If the fraction of work that must be sequential, the Amdahl fraction, is f, then the speedup from parallelism cannot be more than 1/f." [12: 2] The main driving force behind parallelization is not the speed improvement, but the possibility and capacity of it. As complexity increases so decreases the importance of the Amdahl fraction.

Dusty deck: from time to time in order to improve performance, programs have to be changed as their execution model changes. Automated reprogramming is not possible, as too many physical, mathematical and other theories and ideas lie behind the codes that are not referenced by the code.

The third bad idea was the use of attached accelerators. They indeed were capable of boosting the performance of general use computer hardware, but most attempts did not find a wide enough audience. There were several efforts at developing hybrid solutions, but then the programmer had to harmonize two low-level architectures, compared to clusters created from commodity PCs.

At the end of his article [12] introduced some ideas that were not wrong fundamentally, but for some reason did not become widespread enough. Examples are vector computers and shared memory computers. These two ideas live on in modern multicore processors.

Then he proposed some good ideas that are followed even today:
- it is always better to abandon old code and re-think algorithms if it results in better parallelization;
- data should be distributed to minimize communication and data transfer;
- there is no need for shared memory, only for a standard portable messaging layer;
- cheap commodity hardware is preferable;
- memory is the bottleneck, acquiring more computing capacity is cheaper. being harder to access, after a threshold, memory becomes more important in a parallel architecture;
- internal network should be well established with high bandwidth.

The article helped identify the pitfalls that need to be paid attention to when developing a parallel architecture, which are the proposals that look logical, but misleading, and which ideas work in practice.

Research Methodology

In this section I will detail the MapReduce programming model followed by the selected decision tree machine learning algorithm. After this, I will introduce the flow of the custom test program. Then I will elaborate on the dataset, its specifics and sampling together with the introduction of a conceptual hierarchy and my reasoning behind it.

MapReduce

MapReduce is a programming model first invented and used by Google. It is used to perform operations on large datasets as it allows programs to run on parallel clusters of commodity hardware. The following paragraph is based on the work of J. Dean and S. Ghemawat. [13]

The general parallel architecture based on MapReduce has one or more computer called masters which are responsible for resource management on the rest of the architecture. The remaining computers are called workers, and as the name implies, they do most of the calculations. First, a map function is carried out, which performs a function on all the observations of the dataset, most commonly a key assignment, to provide intermediate results. There might be additional calculations with these intermediate results, or the next step follows immediately. This step is the reduce step which calculates the final result using the intermediate result on the master computer. If more master computers are involved, then a second reduce might be performed, ending the MapReduce cycle.

Parallel Architecture

Parallelism took the number of processor cores of the computers connected as a basis; they are the execution threads of the program and the computing nodes of the parallel architecture. I have set up three configurations. The first involved one processor with two cores. I did this to create a basis for comparison; I carried out four runs in this configuration. I expected that the program would take the most time to run in this configuration. The second and third were the real research executions of the program, one single CPU with 4 cores, and two CPUs with 8 cores together. I changed two key factors, one at a time during the test runs: target variable class count (5 or 2 classes) and sample size (small or large). I repeated each run three times to reduce the chance of error. Altogether, the program executed 24 + 4 times, comparison bases included.

Bagging Algorithm

The MapReduce model is not present in my program in a pure state. Reduction is performed separately in a code snippet reminiscent of a bagging algorithm. Bagging has ties with machine learning; the dataset is separated into sections for training on several machine learning models. The models each then generate predictions on new observations, send these predic-

tions to a master node, then a simple voting is performed to generate the final prediction. It was confirmed that bagging can improve the accuracy of unstable machine learning models, such as decision trees. For additional material, check sources [5] and [7].

The Program

I created my test program in Java using a Java implementation of the MPI standard, called MPJ Express and the Waikato Environment for Knowledge Analysis Application Programming Interface (WEKA API). MPI is a general interface that allows programming of communication between different computers. I used MPI in my program, because it has method support for the MapReduce model. WEKA is an open source Java API for data mining, supporting, among others, decision tree algorithms. More information can be found on MPJ Express in source [14], and on the WEKA API in source [15].

The program executes a standard data mining process, but has some additions to it to make it run on a parallel architecture. First, the master loads a pre-sampled dataset, splits it, and distributes the splits between the workers. The workers then train their own decision trees using the samples they received and send a description of their models back to the master. The test phase is next, similar to training; the master sends slices of the test dataset to the workers to test their models. The workers in turn send back the confusion matrices. Next, as a form of validation, 10 observations are sent to every worker. They each make their own predictions on the observations and send them back to the master, where they will go through a simple voting to determine the composite prediction of the architecture, similar to a bagging algorithm. Finally, as the program ran, performance was measured and collected on the workers, and now is sent back in the final step to the master.

Sampling: Observations

To perform a machine learning task, like intrusion detection, data is needed first. The dataset of the KDDCup '99 data mining competition was chosen, being the most common for solving IDS problems with data mining. The dataset contained ~7 million observations of 41 variables divided into a training set (~5 million observations) and a test set (~2 million observations). This amount of data was more than what the program could handle. For this, first, I tried to use 10% samples, instead of the full datasets. These 10% samples were also provided for the competition. [16]

The 10% samples were still too much, in order to reduce memory load, I used a stratified split. This stratified split was done four times to provide a small and a large sample for both testing and training purposes. Another defining characteristic of sample usage was the number of categories in the target variable (5 or 2 categories). For a short summary, see Table 1.

Table 1. Sampling overview. Sampling was determined by two factors: their intended purpose and their size. [Edited by the author.]

Target variable	Training	Test	Sample size
5 class	3,000	5,000	S
2 class	5,000	3,000	
5 class	6,000	10,000	L
2 class	10,000	6,000	

Sampling: Target variables

Another, smaller issue was with the target variable, it had too many categories. To reduce the number of them, I used a conceptual hierarchy. This way, I could reduce complexity first to a 5 class variable, then to a 2 class variable. Table 2 shows the conceptual hierarchy I constructed.

Table 2. Conceptual Hierarchy. [Edited by the author.]

2 class	5 class	original
NO	*DOS*	back
		land
		neptune
		pod
		smurf
		teardrop
	norm	normal
YES	*probe*	ipsweep
		nmap
		portsweep
		satan
	r2l	ftp write
		guess passwd
		imap
		multihop
		phf
		spy
		warez-client
		warez-master
	u2r	buffer overflow
		loadmodule
		perl
		rootkit

There is one aspect of the conceptual hierarchy that needs explanation: DOS was chosen to be a "NO" category. What I wanted to achieve with the machine learning model, was to find the rarer attack types first, such as probe, R2L and U2R. Later, by creating a different conceptual hierarchy for the 5 class to 2 class cases, the machine learning model can be altered to detect DOS attacks specifically.

Results

Model Accuracy

The results were evaluated to answer the two hypotheses. My presuppositions were that the number of additional cores does not decrease model accuracy, and that sample size played no role either. The results confirm these, for details, see Table 3 and 4. The comparison basis is included for each set of tests. There are some abbreviations, for example 1p4c means the table is about the 1 processor, 4 cores architecture setup.

Table 3. Data mining model performance with 5 classed target variable, 4 processor cores.
[Edited by the author.]

1p4c	Small sample (3–5,000 obs.)				Large sample (6–10,000 obs.)			
	1. run	**2. run**	**3. run**	**1p2c**	**1. run**	**2. run**	**3. run**	**1p2c**
Accuracy	0.978	0.964	0.981	*0.984*	0.985	0.985	0.980	*0.987*
Precision	0.477	0.449	0.513	*0.511*	0.532	0.558	0.489	*0.576*
Recall	0.438	N/A	N/A	*N/A*	N/A	N/A	N/A	*N/A*
F-score	0.456	N/A	N/A	*N/A*	N/A	N/A	N/A	*N/A*

Table 4. Data mining model performance with 5 classed target variable, 8 processor cores.
[Edited by the author.]

2p8c	Small sample (3–5,000 obs.)				Large sample (6–10,000 obs.)			
	1. run	**2. run**	**3. run**	**1p2c**	**1. run**	**2. run**	**3. run**	**1p2c**
Accuracy	0.970	0.977	0.976	*0.984*	0.981	0.981	0.980	*0.987*
Precision	0.397	0.467	0.476	*0.511*	0.513	0.445	0.470	*0.576*
Recall	N/A	N/A	N/A	*N/A*	N/A	N/A	N/A	*N/A*
F-score	N/A	N/A	N/A	*N/A*	N/A	N/A	N/A	*N/A*

Table 3 and 4 show a good fit of the model based on accuracy. The number of cores or the sample size did not alter the outcome. Intrusion detection works better if the number of false positives remains low, as well as the number of correctly identified attacks remains high. This requirement is best described in the precision and recall (and F-score) of a selected model. With the target variable having 5 classes, the model was showing a mediocre precision (~0.5 or less) and recall, apart from one exceptional case, remained incalculable. The reason behind this was the low representation of some categories in the original dataset, R2L and U2R attacks were highly under-represented.

This required a second program execution, this time with stratified samples and a target variable having only 2 classes. The results of these runs are shown on Table 5 and 6. With only 2 categories in the target variable, recall and F-score became calculable, and a new measure, the area under the Receiver Operand Characteristic (ROC) curve was added.

Table 5. Data mining model performance with 2 classed target variable, 4 processor cores.
[Edited by the author.]

1p4c	Small sample (3–5,000 obs.)				Large sample (6–10,000 obs.)			
	1. run	2. run	3. run	1p2c	1. run	2. run	3. run	1p2c
Accuracy	0.785	0.791	0.772	*0.796*	0.795	0.792	0.809	*0.799*
Precision	0.959	0.975	0.866	*0.967*	0.965	0.902	0.903	*0.969*
Recall	0.483	0.490	0.508	*0.506*	0.507	0.539	0.585	*0.513*
F-score	0.642	0.652	0.641	*0.664*	0.664	0.675	0.710	*0.671*
AUC	0.735	0.766	0.783	*0.793*	0.811	0.789	0.776	*0.777*

Table 6. Data mining model performance with 2 classed target variable, 8 processor cores.
[Edited by the author.]

2p8c	Small sample (3–5,000 obs.)				Large sample (6–10,000 obs.)			
	1. run	2. run	3. run	1p2c	1. run	2. run	3. run	1p2c
Accuracy	0.793	0.782	0.788	*0.796*	0.797	0.756	0.777	*0.799*
Precision	0.893	0.931	0.903	*0.967*	0.936	0.895	0.881	*0.969*
Recall	0.546	0.493	0.525	*0.506*	0.529	0.442	0.512	*0.513*
F-score	0.678	0.644	0.664	*0.664*	0.676	0.592	0.648	*0.671*
AUC	0.789	0.719	0.784	*0.793*	0.772	0.771	0.757	*0.777*

By going from 2 classes to 5 classes, accuracy decreased by approximately 0.15, while precision increased to ~0.9. Recall and F scores became available, showing worse, but still acceptable results. The built model had a very low false positive rate, so it did not detect "NO" activities as rare attacks. However, it had more trouble detecting actual rare attacks as attacks and not as "not a rare attack" behaviour. Finally, AUC shown a good fit of the model, values were around 0.75.

Runtime Performance

The number of cores and sample size played a key role in determining runtime performance. My presumption here was that the bigger the sample size was, the longer it took the algorithm to handle the observations. Conversely, as the number of processor cores increased, the algorithm became faster, as more and more parallel threads could run. This is what the overall performance shows on Figure 1.
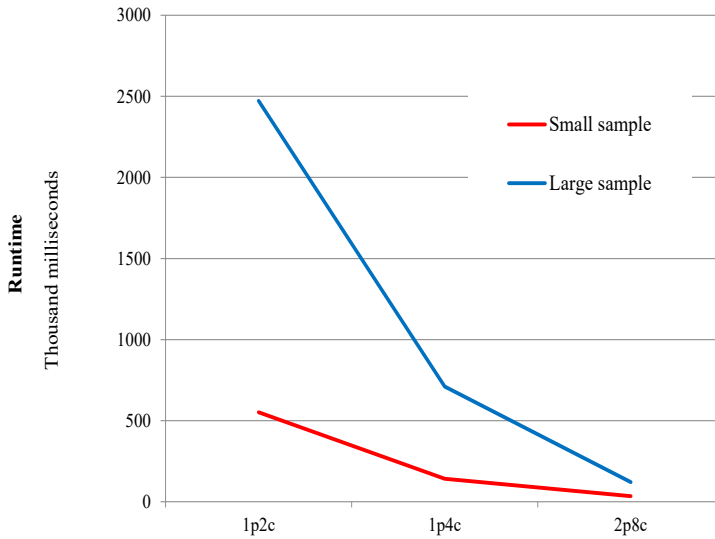
Figure 1. Change of overall performance. [Edited by the author.]

The overall performance shows the runtime of the entire algorithm from start to finish. The speed increase from 2 to 4 cores, as well as from 4 to 8 cores was as high as 4–5 times.

This is not the only result; a detailed picture can be acquired by looking at the different parts of the algorithm. Two received special attention, one dealt with data transfer, the other with the execution time of the decision tree algorithm. Results for data transfer are shown on Figure 2, 3, 4 and 5.
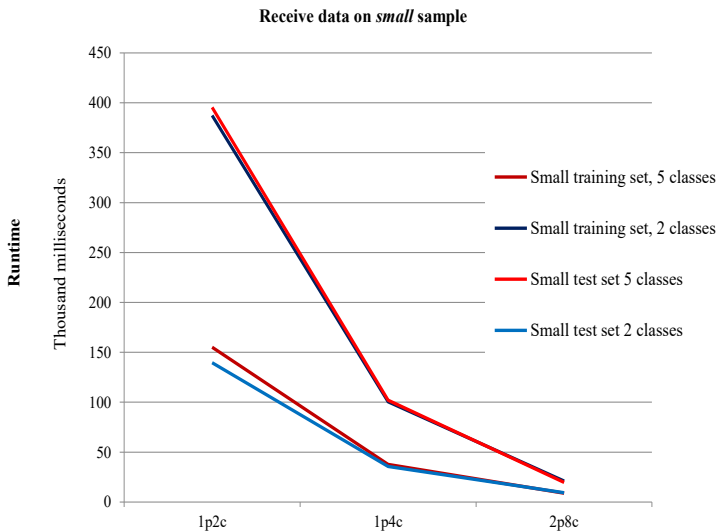
Figure 2. Data transfer measurements over number of cores per sample size (small sample).
[Edited by the author.]
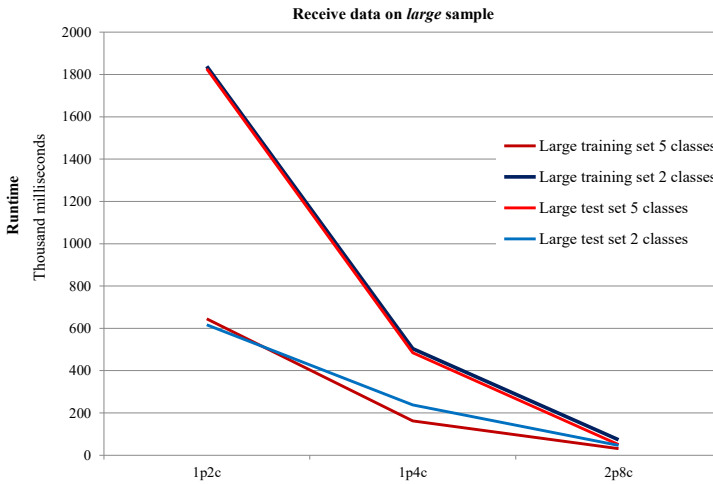
Figure 3. Data transfer measurements over number of cores per sample size (large sample).
[Edited by the author.]

Data transfer charts show a similar tendency to the overall runtime, except the scale is smaller. The charts also indicate a workaround of an error caused by the WEKA API, one that involved sample sizes. As a workaround, the training and test sets between the 2 class and 5 class executions have been switched around. Figure 4 and 5 provides a better insight into this. The charts also show that the data transfer took the most time to complete of all activities, more than 90% of total runtime.
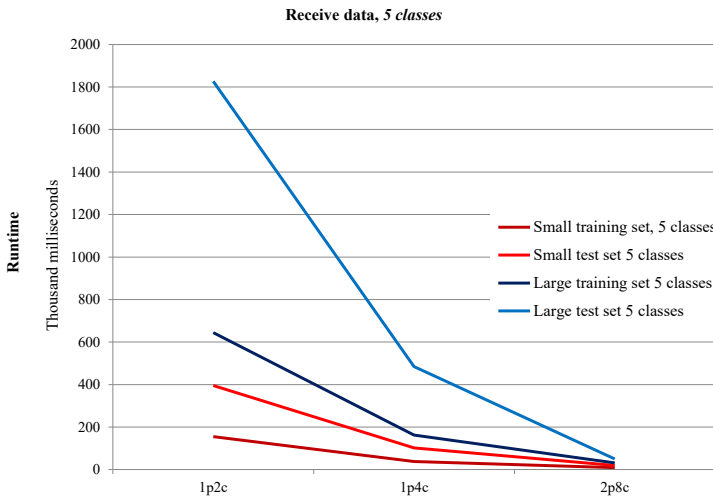
Figure 4. Data transfer measurements over number of cores per target variable classes (5 classes).
[Edited by the author.]
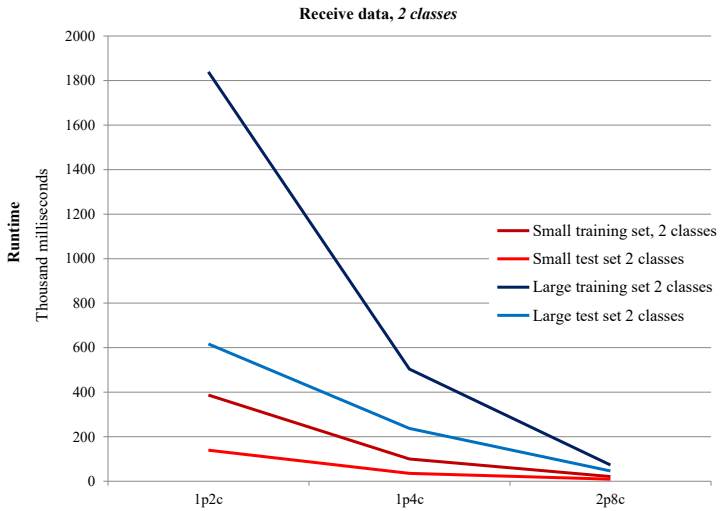
Figure 5. Data transfer measurements over number of cores per target variable classes (2 classes).
[Edited by the author.]

The performance measurement of the machine learning algorithm involved the training and testing of the model. The results of model training are shown on Figure 6 and 7 and for model testing on Figure 8 and 9.
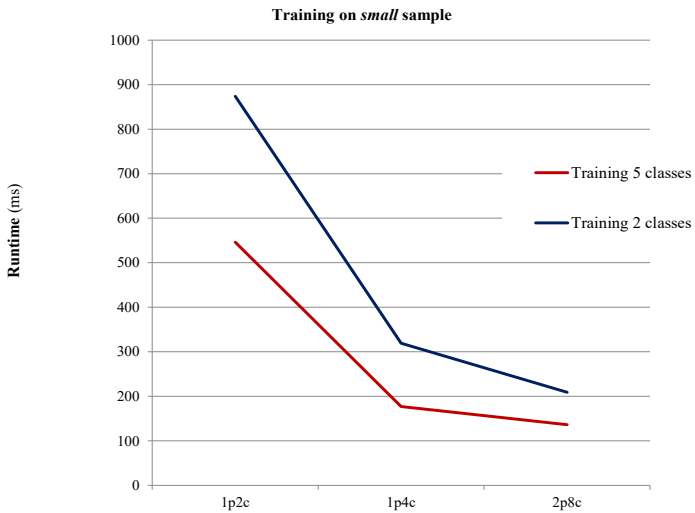
Figure 6. Training performance (small sample). [Edited by the author.]

Figure 7. Training performance (large sample). [Edited by the author.]

Training using a 2 class target variable has taken more time, than for a 5 class target variable. The fact that training and test sets were switched around played a key role here as well. Training sets on 5 classes contained 3 and 6 thousand observations, while on 2 classes it contained 5 and 10 thousand. This suggests that the opposite is true for testing performance, where 5 classes will take longer, and 2 classes will be faster.
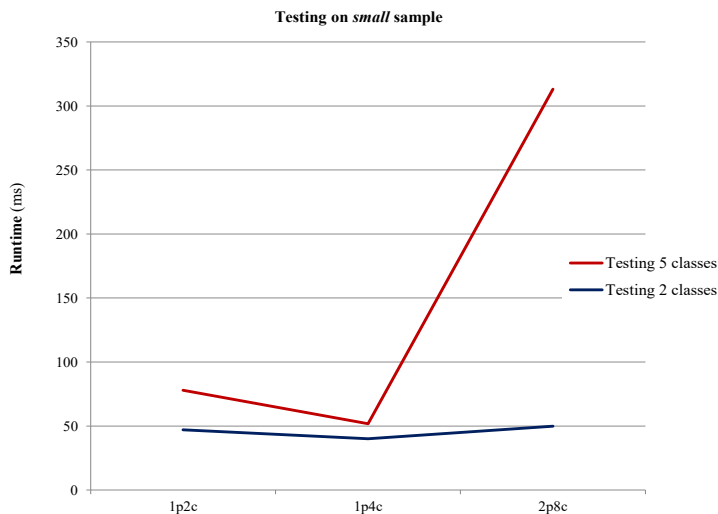
Figure 8. Test performance (small sample). [Edited by the author.]
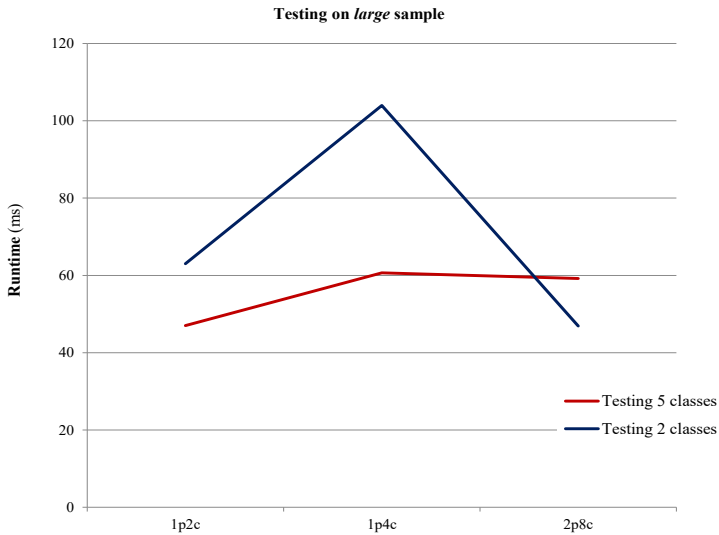
Figure 9. Test performance (large sample). [Edited by the author.]

This assumption is quickly disproven by looking at Figure 8 and 9. In fact, no tendency could be detected during model tests.

Discussion

With my research, I have tried to consider parallel processing and the application of machine learning on parallel processing architectures, asking two main questions, which could be interpreted as hypothesis:

1. Will the accuracy of models created by the decision tree algorithm deteriorate due to parallel computing?
2. Will runtime performance improve by parallelizing the task?

Looking from a strictly top-down perspective, both hypotheses were confirmed. On average, model accuracy did not decrease, not to parallelization. Looking at model accuracy from a closer perspective, one must choose how many classes their target variable should have. With 5 classes, accuracy reached high levels, but two more important measurements, precision and recall, shown sub-par results: one was dangerously low, and the other incalculable. With 2 classes, precision reached high levels and recall became calculable. A requirement towards an intrusion detection system is to have a low false positive and a low false negative rate, which is best described by high precision and recall values, therefore choosing a 2 class variable with the right stratified sampling may be preferable.

A potential topic to continue my research on would be a comparison between the different machine learning algorithms to see which performs best on the selected intrusion dataset. The idea is to take several algorithms, run them on several cores and then compare their performance either with the measures used in this research, or by using a different method. A different idea comes from a drawback of the program developed: individual machine learning model accuracy was easily determined, but a combined accuracy remained largely unexplored, my research only estimated it based on the individual results.

Runtime performance improved by 4–5 times on average. Taking a look at the detailed picture again, we can find where the majority of improvements came from. The time it takes to transfer data between processor cores improved the most, almost exclusively. Machine learning parts also indicated change, but compared to data transfer, it remained negligible. This confirms source's [12] statement about the importance of a high bandwidth network and the need for large amounts of memory to keep data on a storage with fast response times. This is an area worthy of further research.

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Remuneration of the Defence Sector Employees in the Context of Legislative Changes

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This paper focuses on the remuneration of employees of the defence sector in the context of legislative changes. Its target are the periods between 1999–2006 and 30. 6. 2015–2007. In a chronological survey, there are indicated the legislative changes and related ministerial regulations.

Keywords: *remuneration, legislation on employee remuneration, salary development*

Introduction

Employee remuneration is based on a well-articulated philosophy—the system of beliefs and guiding principles that correspond to the organization values and help put them into practice. This philosophy recognizes that if the management of human resources is about investing in human capital, from which it demands an adequate, reasonable return, then it is okay to reward people differently according to their contribution and benefits. The remuneration strategies and processes that need to be implemented, must be based on a business strategy. Remuneration is implemented within the corporate wage policy. The salary and wage policy is based on the overall strategy of the company, its market position, development plans, economic situation of the company, organizational structure, technical parameters, production and on the result of an agreement with the social partners. In terms of outside influences, it must respect legal conditions, conjectural situation and the situation of the labour market.

Remuneration in the Defence Sector

The remuneration of various professional soldiers of the armed forces is specific, it depends on the specific tasks and goals of these institutions and their organisational structure. The issue of remuneration of professional soldiers in the Army of the Czech Republic (ACR) has always been, and still is, a hot topic. The professional soldiers (hereinafter VZP) in the ACR are rewarded on the base of existence of a single salary system in the Czech Republic (CR) [1] as employees of the state, just like the soldiers in Germany or the UK, but unlike other professional armed forces, their remuneration has not been based on a link between the pay system and career structure. [2]

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The remuneration development in the defence sector in the period 1999–2015 can be divided into two periods, as follows:
- the first is in 1999–2006;
- the second is in 30. 6. 2015–2007.

Development of Remuneration in the Ministry of Defence (MoD) in the period 1999–2006

Throughout the period there was the basic Act 143/1992 Coll. On Salary and Remuneration for Work Readiness in Budgetary and Some Other Organizations and Bodies, as amended. [1] The Act had precisely defined what is considered to be a salary, on what charges and in what amount the employees are entitled (such as extra pay for work at night, on Saturdays and Sundays, public holidays, overtime and also pay for on-call). In Section 9 of the cited Act there are featured the amounts for rank premiums, including any amendments thereto.

This law was subsequently issued by the Government Regulation (NV) 79/1994 Coll. about the Emoluments of Staff of the Armed Forces, Security Forces and Services, Customs Administration, Members of the Congregation for Fire Protection, Employees of Certain Other Organizations, as amended. It regulated the provision of salaries of civil servants by determining the grade and so-called Salary scale, various bonuses and salary provision in other than the Czech currency. It included a catalogue of works and functions, according to which the private employees were classified in grades and steps. At that time there existed 12 grades, by educational attainment, which determined the catalogue of works for each function, and 12 steps according to the length of professional experience. The employee salary scale was then determined on the basis of qualifications and the number of years of professional (chargeable) practice. The salary scale was changed in the years 1999–2004 several times.

A specific example for better understanding: for the function—Chief of economic groups, including 10 grades, in 2000 the 6th step salary scale was fixed at 9,750 CZK. Changed from 1st January, 2001 namely by NV 496/2000 Coll., [3] it was modified to 10,340 CZK, from 1st March, 2003 by NV 69/2002 Coll., [4] adjusted to 11,450 crowns and on the first of January 2004 by NV 584/2003 Coll., [5] adjusted to 11,990 CZK. The cited government regulation also considered the defining conditions for personal allowances, extra pay for leadership at all levels of management and command in the army, special bonuses, rewards and other pay.

On the basis of published standards in the Ministry of Defence there were also issued an internal standard order of the MoD 33/1994 Bulletin, Principles for Remuneration in the Ministry of Defence, which closely regulated the bonuses in the defence sector. On 1st January, 2004, it came into effect NV 330/2003 Coll., On salaries of Employees in Public Services and Administration, as amended, which abolished the previous NV 79/1994 Coll. This normative dealt, like its predecessor, with the salary class, salary grade and pay fares, personal surcharge, additional fee for management, special bonuses, remuneration and other pay not only for VZP and civilian employees (hereinafter o. z.) of the MoD, but also for other employees in public services and administration. Part of this NV was not a catalogue of work since it also had come into effect on 1st January, 2004, in NV 469/2002 Coll.

On a Catalogue of Jobs in Public Services and Administration, as amended (hereinafter NV 469/2002 Sb.), the salary scale underwent the most notable changes around the norm.

The number of grades increased from 12 to 16, and due to many changes in the conditions for determining the amount of the salary rate, there was set up a 5-pay scale instead of one scale that had previously been applicable to all employees listed in NV 79/1994 Coll., For VZP of the MoD the amount of pay scales was determined in 2004 and 2005, according to Annex 4 NV 330/2003 Coll., and in 2006, according to Annex 3 of this normative act. The wage rates valid from 1st January, 2004, increased by 4.1 percent, since 1st January, 2005 there was a further increase of 7.0 percent. The wage rates valid from 1st January, 2006 are presented in Appendix 1.

Table 1. The pay scale according to grades and degrees in effect since 1st January, 2006 suppl. 3 NV 330/2003 Coll., where the first entry is the pay grade, the second the amount of years of creditable practice /until 1, 2, 4, 6, 9, 12, 15, 19, 23, 27, 32 and over 32 years, the next is the pay class. [8]

Pay grade	1	2	3	4	5	6	7	8	9	10	11	12
Years of creditable practice	1	2	4	6	9	12	15	19	23	27	32	<32
1	7,080	7,290	7,500	7,710	7,940	8,170	8,420	8,660	8,940	9,210	9,490	9,790
2	7,690	7,900	8,130	8,360	8,610	8,870	9,140	9,410	9,710	9,990	10,300	10,620
3	8,340	8,570	8,820	9,090	9,340	9,620	9,910	10,210	10,530	10,850	11,180	11,530
4	9,040	9,300	9,560	9,840	10,130	10,430	10,750	11,070	11,410	11,760	12,110	12,500
5	9,820	10,090	10,380	10,680	11,000	11,320	11,660	12,020	12,380	12,760	13,150	13,570
6	10,640	10,950	11,260	11,590	11,930	12,290	12,660	13,030	13,430	13,840	14,270	14,730
7	11,540	11,890	12,230	12,580	12,950	13,340	13,740	14,160	14,580	15,030	15,490	15,970
8	12,530	12,880	1,3250	13,640	14,070	14,460	14,900	15,340	15,800	16,300	16,810	17,320
9	13,590	13,970	14,380	14,790	15,230	15,680	16,150	16,650	17,150	17,680	18,220	18,790
10	14,740	15,170	15,590	16,050	16,530	17,010	17,520	18,060	18,610	19,180	19,770	20,390
11	16,010	16,450	16,930	17,410	17,940	18,460	19,010	19,600	20,200	20,800	21,440	22,130
12	17,350	17,850	18,360	18,900	19,450	20,020	20,630	21,250	21,900	22,570	23,270	24,000
13	18,820	19,370	19,930	20,500	21,100	21,720	22,370	23,060	23,760	24,490	25,250	26,040
14	20,420	21,010	21610	22,240	22,900	23,570	24,270	25,010	25,770	26,570	27,390	28,250
15	22,160	22,790	23,440	24,130	24,840	25,580	26,340	27,130	27,970	28,830	29,720	30,640
16	24,040	24,730	25,430	26,170	26,950	27,750	28,580	29,440	30,340	31,280	32,240	33,250

Surcharges for leadership in this NV were changed only in specific amounts, but also in the statement of management positions related to these charges. The forementioned NV first determined that the employee is entitled to only one of the special allowances, which did not involve premium for work in difficult and unhealthy working conditions and premium for work performed alternately in the morning, afternoon and night shifts. The amount of the special benefit of the employee is determined by the employer within the range which, under certain conditions, is the best for the employee. For the employees of the MoD, the amount

of special allowances specified in this normative did not change. Since 1st January, 2004 other special allowances for VZP and o. z. were newly regulated by the order of MoD 48/2003 and the order of the MoD 49/2003, which were very extensive like the previous order of the MoD 33/1994, so this article does not describe them in detail.

From 1998, until the end of 2003, VZP had, in each half of the calendar year, another salary, if he worked at least 65 days with the same employer in the same service or employment. The amount of so-called "13th salary" was the sum of the amounts of salary, rank bonus, extra pay for leadership, personal bonus and a special bonus, with the exception of the premium for employee exposure within the unit of multinational forces outside the country. It was provided only as a half of the amount to which the employee would otherwise be entitled.

Since 2004, there was provided an additional pay in full, which was noticeable for VZP of MoD compared to the half of the amount in previous years, however, providing an additional salary was fully abolished to 1st July, 2005. [6]

Development of Remuneration in the Defence Sector in 30. 6. 2015–2007

On 1st January, 2007 the Act 262/2006 Coll., The Labour Code, [7] came into force, which caused a "revolution" in the pay gap in the defence sector. The Labour Code replaced the previously valid Act 65/1965 Coll., The Labour Code, as amended. The main reason for establishing the new Labour Code was that the original code was changed 43 times, and became progressively hard to read. The new Labour Code regulates the remuneration of all employees in employment, those receiving a wage or salary. That means that the MoD applies only this law to o. z., as the VZP are employees in service. Of course, during the years 2007–2012 the Labour Code underwent several changes, but the changes in the remuneration stayed almost untouched. The changes were related to the field of occupational safety and health, labour relations and compensation expenses provided to employees in connection with their work performance.

The remuneration of VZP is still, to date, engaged in Act 143/1992 Coll., which has been modified several times, but since 2007, it has been determined not only the remuneration of o. z. of Defence Department but by the Labour Code. These changes resulted in the cancellation of all previously existing NV and order of the MoD, relating to remuneration in the defence sector, namely NV 330/2003 Coll., order of the MoD 48/2003 Coll. and order of the MoD 49/2003 Coll. The issue of remuneration of VZP was recently dealt by NV 565/2006 Coll. On the Emoluments of Professional Soldiers, as amended (hereinafter NV 565/2006 Coll.) and order of the MoD 44/2006 Bulletin, Internal Salary Regulation for Professional Soldiers (hereinafter referred to as order of the MoD 44/2006). For o. z. came into effect NV 564/2006 Coll. On Salaries of Employees in Public Services and Administration, as amended (hereinafter NV 564/2006 Coll.) and order of the MoD 45/2006 Bulletin, Internal Salary Regulations for Civil Employees of the Ministry of Defence (hereinafter referred to as order of the MoD 45/2006).

However, since 2010 there is a valid, for the defence sector, so-called Collective agreement, which replaced order of the MoD 45/2006. This binding agreement governs the relations among the o. z., Ministry of Defence, the Czech-Moravian Confederation of Trade Unions of Civilian Employees of the Army, a Separate Union Association of Employees of

the Ministry of Defence. It reflects mainly the working conditions of o. z. and their claims on employment, health and safety at work. The appendix deals with, among other things, the rewarding of staff, particularly special surcharges.

Apart from these norms, the remuneration in the defence sector in this period was also concerned by NV 469/2002 Coll., On the Catalogue of Jobs in Public Services and Administration, as amended, which was, from 1st October, 2010 replaced by NV 222/2010 Coll., On the Catalogue of Jobs in Public Services and Administration, as amended. Furthermore, from 1st January, 2011 came into effect the NV 223/2010 Coll., On the Catalogue of Works of Professional Soldiers, as amended, which means that the VZP, as the only public service employees, have their own catalogue of works.

As a result of the entry into force of the Labour Code, there was a significant limitation of the scope of the Act 143/1992 Coll., which, since 2007, regulates the provision of salaries and remuneration for work readiness only for the VZP. The contents of this law remained almost the same throughout the defined period. The only major change was the change in rank premiums from 1st January, 2011, which was a response to the amendment of the Act 221/1999 Coll., On Professional Soldiers, as amended, which was also due to a significant change in the rank designation for the VZP. For comparison, there are mentioned in Table 2 the rank premiums valid until 31st December, 2010 and from 1st January, 2011, including the changes in rank designation. From the table it is evident that not only the rank of Corps team, NCOs and sergeants, but also the rank premiums in all ranks corps underwent distinct changes.

Table 2. Rank surcharges for the VZP. [1: para 9]

Rank until 31st December, 2010	Rank Surcharge (in CZK monthly)	Rank since 1st January, 2011	Rank Surcharge (in CZK monthly)
Private	800		
Staff Sergeant	1,200	Private First Class	1,200
Sergeant	1,300	Corporal	1,300
Sergeant Major	1,400	Sergeant	1,400
Company Sergeant Major	1,600	Staff Sergeant	1,600
Warrant	1,800	Company Sergeant Major	2,000
Warrant Officer Class One	1,900	Warrant	2,300
Command Sergeant Major	2,000	Warrant Office Class One	2,600
Staff Sergeant	2,200	Command Sergeant Major	3,100
Staff Sergeant Major	2,400	Start Sergeant Major	3,700
Lieutenant	2,600	Lieutenant	3,100
First lieutenant	2,800	First lieutenant	3,300
Captain	3,000	Captain	3,500
Major	3,200	Major	3,700
Lieutenant colonel	3,400	Lieutenant colonel	4,000
Colonel	3,600	Colonel	4,300
Brigadier general	3,900	Brigadier general	5,100
Major general	4,100	Major general	5,600
Lieutenant general	4,300	Lieutenant general	6,100
Army general	4,600	Army general	6,800

The Government Regulation 565/2006 Coll., on Emoluments of Professional Soldiers, as amended, effective from 1st January, 2007 is based on the Law 143/1992 Coll. and follows the structure of, at that time invalid, NV 330/2003 Coll., so it consequently deals with pay fares, personal surcharge, additional fee for leadership, extra pay for work in difficult environments, special bonuses and rewards, and, therefore, there are again described only the essential changes related to NV 565/2006 Coll.

The salary scale again passed through the biggest changes in the regulation of government. For almost all VZP are paid according to the pay scale set out in Annex 1 of this norm. From 1st January, 2007, there was an increase in pay scales for the VZP up to 10%. From 1st June, 2009, there was implemented flat rate pay scales increase for VZP up by 3.5%, but from 1st January, 2011 the VZP wage rates for the first time in the history of the Czech Republic dropped by 10%. The specific pay scale for VZP from 1st January 2011, are shown in Table 3.

Table 3. Pay scale for VZP according to the pay classes and grades valid from 1st January, 2011 where the first item is the pay grade, the second—the sum of the years of eligible work experience until 1, 2, 4, 5, 6, 9, 12, 15, 19, 23, 27, 32 and over 32 years, the third—the pay class. [9]

Pay grade	1	2	3	4	5	6	7	8	9	10	11	12
Years of creditable practice	1	2	4	6	9	12	15	19	23	27	32	<32
1	6,680	6,930	7,190	7,460	7,750	8,050	8,360	8,670	9,000	9,350	9,700	10,070
2	7,250	7,530	7,820	8,110	8,420	8,730	9,080	9,420	9,770	10,150	10,530	10,930
3	7,860	8,160	8,460	8,800	9,130	9,470	9,830	10,210	10,600	11,000	11,420	11,850
4	8,520	8,850	9,180	9,530	9,900	10,260	10,660	11,060	11,480	11,910	12,360	12,830
5	9,250	9,610	9,970	10,350	10,740	11,150	11,570	12,010	12,460	12,940	13,430	13,950
6	10,020	10,410	10,800	11,210	11,630	12,070	12,530	13,000	13,500	14,010	14,540	15,090
7	10,870	11,280	11,700	12,150	12,610	13,090	13,580	14,090	14,620	15,170	15,750	16,350
8	11,800	12,240	12,710	13,200	13,700	14,220	14,760	15,320	15,900	16,500	17,130	17,780
9	12,800	13,280	13,780	14,310	14,850	15,400	16,000	16,600	17,220	17,880	18,550	19,260
10	13,880	14,400	14,950	15,520	16,110	16,710	17,350	18,000	18,680	19,380	20,120	20,880
11	15,080	15,650	16,250	16,860	17,490	18,160	18,840	19,550	20,290	21,060	21,850	22,680
12	16,340	16,950	17,600	18,260	18,950	19,660	20,410	21,180	21,980	22,810	23,670	24,570
13	17,720	18,390	19,080	19,800	20,550	21,330	22,130	22,960	23,830	24,730	25,660	26,640
14	19,230	19,950	20,700	21,490	22,300	23,130	24,020	24,920	25,860	26,830	27,850	28,900
15	20,870	21,660	22,480	23,320	24,200	25,110	26,060	27,050	28,080	29,140	30,240	31,370
16	22,640	23,490	24,380	25,300	26,250	27,240	28,260	29,330	30,430	31,580	32,770	34,010

The surcharges for guidance contained in this standard, which, compared with the previous NV 330/2003 Coll., were changed mainly in the number of management positions, which are entitled to them, because it deals only with the normative VZP. The NV 565/2006 Coll., newly do not assess a surcharge for work in difficult environments such as additional cost, so, since 2007, the VZP were paid regardless of the amount of the special allowances, if eligible. The surcharge of 400 to 1,400 CZK per month includes the VZP, if the exercise of the duties associated with difficulties arising from exposure to dangerous influence and measures to reduce or eliminate them. These include dust, chemical substances and mixtures, noise, vibration, biological agents that could endanger health, increasing pressure and radiation. The amount of this bonus is determined by the employer level of risk, intensity and the exposure times of their influence.

In the years 2007–2012 it was still in force, that to the VZP belongs only to one of the special allowances, and the highest, which can be claimed, in addition to the special premium for service performed alternately in the morning, afternoon and night shifts in the amount of 400 to 1,000 CZK. This newly did not apply for a special allowance in other than Czech

currency in the amount of 700 to 4,000 per month, to which a VZP is entitled if included in the business unit of the multinational forces, or detached. The specific types and the amount of special allowances are given in Annex order of the MoD 44/2006.

The award, calculation of the individual components of salary, contributions to social and health insurance, including taxes on personal income, tax credits deductible, etc. were fundamentally the same for the VZP and even o. z. Another significant change in remuneration of VZP dates from 1st July, 2015 when there came into force an amendment to Act 221/1999 Coll., On Professional Soldiers. This change is more closely described in another article.

Conclusion

The remuneration of employees is one of the tasks of human resources management in any organization. A properly set up system of evaluation and remuneration gives employees a healthy level of motivation. Remuneration is dependent on the economic aspects of the employer. Due to historical and social aspects, the salary policy is not left to market mechanisms. Through legislation, the state sets the minimum wage, salary conditions of employees of state and public administration.

Remuneration of employees of the defence sector is dependent on the specific tasks, objectives and organizational structure of the resort. For MoD, there were two pivotal periods: *a)* the period between 1999–2006, *b)* the period from 2007–30 June, 2015. For the first period, there was the basic Act 143/1992 Coll., on Salary and Remuneration for Work Readiness in Budgetary and Some Other Organizations and Bodies, as amended, for the second period—the amendment to Act 262/2006 Coll., Labour Code and related legislative changes to departmental regulations.

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Impact of Leaders
The Impact of the Engagement of Local Government Leaders' on the Effectiveness of Participatory Planning as Found in the Local Community Academy Program[1] (2014–2015)

Róza SZÁMADÓ[2]

"Paradoxically, the enduring competitive advantages in a global economy lie increasingly in local things—knowledge, relationships, and motivation that distant rivals cannot match"
Michael E. Porter [1]

The relevance of the above quotation from an excellent author and economist, adapted to present day Hungarian local governments, is unquestionable. At the beginning of the 21st century, in a globalizing world, the demand for the direct inclusion of independent social groups and individuals and the maintenance of the communities within geographical localities have become a primary issue as opposed to the conditions under the alienating, technocratic, impersonalizing and centralized political regimes of the Europe of the second half of the past century. For this reason, the importance of the role of local leadership is magnified.

The program included training for the local governments in the convergence regions, and had three pillars. The first pillar includes 6 post graduate e-learning training programs studied by approximately twenty thousand public officers. The second pillar is the network of the so-called Local Community Academies, comprising the elaboration of strategic methodologies by local participants to be recommended to local governments. The third pillar supported the traditional classroom training for three hundred local government employees.

The program of the Local Community Academies (LCA) aimed to support the social inclusion, and the ability of strategy-making. This study aims to answer the following research question: "How did the engagement and involvement of local government leaders, affect participatory planning during implementation of the LCA program?" The relevant research method is an empirical analysis of survey data and final reports.

Keywords: *participatory planning, engagement, inclusion, successful community collaborations*

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1   This study is based on the surveys and final reports of Program ÁROP 2.2.22 titled "Training for the Local Governments of the Convergence Regions" conducted at the National University of Public Service, Hungary.

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Introduction

Background and Justification of the Topic

At the time of the political economic transition of Central Europe in 1990, there was a law defining the system of local governance with considerable administrative functions delegated to the municipalities. After two decades, in 2011, the CLXXXIX law on local governments (Mötv.) redefined their role.

Local governance significantly stepped out of public administration allocation, since some of its tasks had been transferred to the district (borough) offices from 2013 on. With the requirements of the Mötv. the local government system has changed, significantly, and in its new position:

- local governments have to fulfil their duties in a new way;
- they have to follow a task-based supporting system instead of normative financing;
- in the new local governance office system, the number of offices dropped;
- the county governments also have a new role in which they provide regional development tasks;
- instead of legal control, legal supervision was introduced with broader powers in local governance system.

As a result of the administrative reform, the focal tasks regarding local development are paid more attention to than state administration tasks. In order to achieve modern public management and services, in inclusive development, it is necessary to continue the reforms and to support and develop the stakeholders. The strengthening of the self-supporting capacity, the exploration, exploitation of the local resources, and application of the principle of self-reliance are the new expectations formulated in the Mötv. All this anticipates that the stakeholders responsible for the leadership of the settlements have to act not only as local politicians, but as urban managers as well, what is more, they should become mediators, experts and facilitators during the design and implementation of modern public services and during the involvement of the civil, economic and non-governmental actors if they wish to be successful in local development.

The readjustment of tasks between the central government and the local governments essentially limited the operation of the local governments as quasi-decentralized bodies. In quite a few magisterial and public service functions the local government used to be the supplier of the services financed and supervised by the central government.

The changes opened up the possibility for the local and county governments to focus on the organization and management of the local communities, the strengthening of the local economy as autonomous actors, rather than on the local suppliers of the functions of the state.

Adapting quickly and efficiently to the changing regulatory, economic and social environment has continuously been a challenge for local governments, especially when new expectations stemming from new functions are considered. Educating and training local government officials in order to increase their personal and professional skills will lead to vast improvement in their ability to meet these challenges.

In the light of the new circumstances the roles of leaders and leading bodies of towns need to be changed as well. For better local governance, a paradigm shift is necessary. Instead of

political leadership, the focus should move to managing local affairs, local leaders ought to become the managers of their communities and they should attempt to redefine their roles.

About the Program

In 2013–2015 a new type of post graduate training program was developed and piloted in Hungary at the Institute for Executive Training and Continuing Education within the National University of Public Service (NUPS). Although the pilot included methods which were established earlier, such as interactivity during the training, this was the first in the period when the principles of the European Union 2020 Strategy were declared regarding economic growth: smartness, sustainability and inclusiveness. (Figure 1) All of these were represented by the 3 pillars of the Program such as e-learning, class training and field training with the inclusion of the local population. [2]

ÁROP 2.2.22 Training for the Local Governments of the Convergence Regions
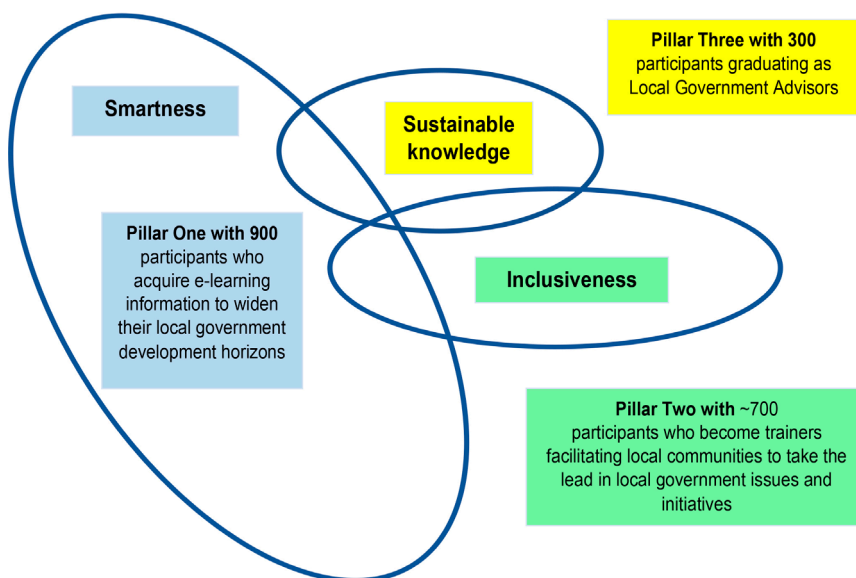
Figure 1. The realization of the "Flagship" Program meeting the requirements of Europe 2020 Directive and the call for modernization both in technological and social aspects. [2: 38]

The training program is meant for the local governments in the convergence regions, consisting of three pillars. The first pillar includes the annual post graduate e-learning training programs of approximately twenty thousand public officers. The second pillar is the network of the so called Local Community Academies. It comprises the elaboration of strategic methodologies by local participants to be recommended to the local governments. The third pillar supports the traditional training of three hundred local government employees.

Under the LCA program, 77 pilot trainings were conducted. The program had four objectives:

1. With trainer assistance, during workshops, the participants have to plan development strategies to follow in the forthcoming period.
2. Provide an opportunity for participants to experience the benefits of participatory planning and the advantages of workshops on which Community leaders can rely in order to correctly apply the new methodologies.
3. Implementation of increased and continually increasing public inclusiveness, ensuring the widest possible dissemination of the outcomes of synergy and multiplication.
4. The LCA methodology has to be reviewed and finalized in a way that is fitted to the local government practice and is relying on the experiences of the pilot program.

The LCA methodology followed the local actors step by step through the process of agreeing on common objectives, planning actions required to complete the design and the development of procedures for monitoring the implementation process. Methodology intensive sections (i.e. training – working together workshops in nature) and deepening of the sections (i.e. activity between training days conducted by the participants) are both included.

Table 1. Agenda outline of preparatory meetings for each workshop day. [3: 6]

Introductory meeting	**1. workshop day**	**2. workshop day**	**3. workshop day**
Introductory meeting	Vision for the future	Value program	Program Catalogue
Program description	SWOT	Goal system	Control
Stakeholder analysis	Programs	Program catalogue	Display

The program implementation data:
- representing 77 settlements, 4 of which piloting;
- 308 workshop days;
- 3 leading trainers and 1 consulting trainer;
- 18 trainers;
- 5 experts;
- 12 training assistants;
- a team of 6 professional consultants;
- a team of 10 project managers.

Documents and Data Used

Since the key objective of the ÁROP Program was the development of a practical methodology taking into account real local demands and to be used by municipal leaders, the execution of the Program was accompanied by a continuous monitoring that resulted in precise and detailed data for further analysis of the Program. During the implementation of LCA Pillar 2, the author of this study, as the leading trainer, had full access and insight regarding the qualitative and quantitative data collection results.

The primary data which were used for statistical analysis were continuously collected. The number of participants from the 77 settlements on each workshop day, the number of organizations represented and the number of local municipal leaders' attendances were all recorded as qualitative data. Local municipal leaders include mayors, notaries and other municipal executives or local representatives.

To validate the final methodology through practical experience there was full professional monitoring applied to each step of the process, performed by the trainers' daily reports. In the final stage of the program the trainers accomplished the evaluation of all the 77 settlements on the basis of a uniform criteria assessment. The results of the program implementation were then evaluated and summarized on the basis of the trainers' reports. [6] In addition, prior to the closing of the program, there was a follow-up monitoring and an impact assessment analysis performed by independent experts. [7] [8] The accurate recording of these findings and the attendance data allowed the survey regarding the presence and participation of the leadership, the commitment, the implementation and impact assessment to be presented in this study.

Research Theory and Methodological Framework

Participatory Planning[3] [4]

According to the United Nations Centre for Human Settlements (UNCHS) Habitat study participatory planning is a participatory process aimed at defining, proposing and an enforcing management plan on issues of common interest. Emphasis is placed on the management of planning as an approach that allows the integration of the knowledge of stakeholders, scientists and policy-makers, thus stimulating participatory research and action. Typically, participatory planning is an opportunity to tailor management rules at local/regional scale according to stakeholder needs. With the aim of contributing to the establishment of a bottom-up approach rather than the typical top-down approach, one can also integrate experience based and research based knowledge. Participation can be defined as "the process of decision-making and problem solving, involving individuals and groups who represents diverse interests, expertise and points of view, and who act for the good of all those affected by the decisions they make and the actions that follow". [4: 140] "Participatory planning aims to harmonize views among all of its participants as well as prevent conflict between opposing parties. In addition, marginalized groups have an opportunity to participate in the planning process." [5: 183]

The National Civic League (NCL), collaborating with others, conducted major studies in the early 1990's in the USA to determine why some communities were more successful than others in working effectively across political, social and economic boundaries.

Their research included over fifty in-depth studies of successful community collaborations. According to the NCL findings, the following issues have to be present or deliberately built into the process from the beginning in order for successful collaboration:

- Good timing and clear requirements.
- Strong stakeholder groups.
- Comprehensive. Are all the issues addressed and are the sectors, concerned with them, informed, included and well represented in order to avoid single sector domination?
- Credibility and transparency of the process.
- Commitment and/or engagement of high level leaders. If the mayor, for example, cannot be involved, does he or she delegate a representative with decision-making authority? Are the citizens or civic society organizations putting forth their best representatives for participation?

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3   Based on Building Bridges between citizens and local governments to work more effectively together through participatory planning, UNCHS Habitat.

- Support or acquiescence of "established" authorities or powers.
- Overcoming mistrust and scepticism.
- Strong management of the process. Has the process of collaboration been managed effectively?
- Interim successes. Have intermediate successes been achieved, built on, acknowledged and celebrated to provide encouragement and sustainability?
- A shift to broader concerns. [4]

Research Methodology

The examination of the completion of the above-mentioned 10 key elements—within the framework of the LCA program—is very interesting, though out of the scope of this study.

This study is primarily concerned with the fifth success factor namely "Commitment and/ or involvement of high level Leaders". The reason for this is that trainers and experts produced a variety of summary materials indicating that the commitment of municipal leaders was a key addition to the program.

The impact of commitment from leaders during the LCA program to success for grouping will be examined on the following issues:

- Is the presence of municipal leaders realized in the process and to what extent?
- What was the impact of participation from local government leaders with regards to the first goal of the program? (Work out development strategies with the settlements within the framework of workshops that provide guidance for the next period.)

The examination of inclusive local government operations, in this case through the involvement and commitment of local government leaders, is also a subject to personal and research interest.

Evaluation of Results

Analysis of Data and Documents Used as a Basis

Under the ÁROP 2.2.22. Project "Training for local governments in convergence regions" 77 settlements accomplished community based development strategies with the provided framework studied in the research.

During the LCA program 1 + 3 day schedules took place. The first day of the program was dedicated to preparation in which the allotted time of the vast majority of cases proved to be sufficient. However, there were a number of places encountered where the efficiency and working conditions of some groups required up to two days more. The second half of the last day of the programs aimed at disseminating local LCA results, for which the leadership of the neighbouring villages were also invited.

The program consisted of 308 workshop days. Each group work session made attendance sheets, in which the delegating organization and the position of the delegate was noted. Based on these attendance sheets, the attendance of local government officials and leaders can be measured.
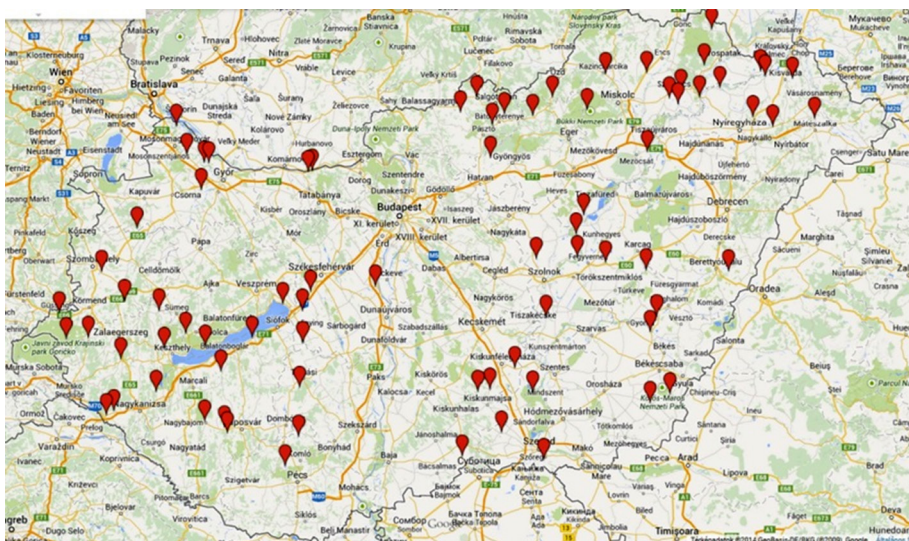
Figure 2. LCA locations in Hungary. [9]

The overall objective of the program was not only to implement local settlement LCA-s, but also to develop a final framework based on experiences in practice. Therefore, continuous monitoring and feedback were especially important.

The LCA trainers prepared their reports and evaluated the results after the program, both in general and in connection with their settlements. Using the materials from the results and experiences of the program, the summary document titled "LCA content analysis" was created.

The role of settlement leaders in the efficiency of the program was emphasized. The majority of trainers indicated that one key to the success of the program are the leader/s of the settlement. The commitment of the mayor and council to the LCA program largely determined the outcome of the program. If the mayor does not support or perchance is hostile to the program, the program will likely be a failure. [6]

Experts in the feedback conference for evaluating the entire program agreed in relation to the timing. "The timing was good, since the governments were required to accept their economic program within a fixed period of time. Municipalities with such legislative or other obligations in the future should pay attention to it." [6]

Concerning the efficiency of the strategy development workshop series "we can say that the project has significantly improved the strategic planning capacities of local governments; considering that the previous situation was characterized as mediocre in municipalities. It is important that governments and leaders have changed their approach to overall strategy and see the benefits of creating professional strategy", [7: 46] according to the monitoring report [7] and the post impact assessment. [8]

Leaders interviewed in the post impact assessment agree that local government improved their abilities to accept new strategies internally and strategies are thought of as more important issues than before. Two thirds of the interviewees thought that it became much more important, the remaining third said it became more important than previously.

Has involvement improved ability to...
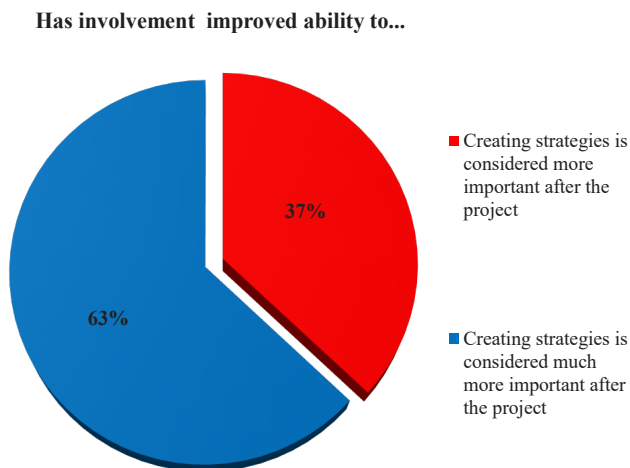
Figure 3. The necessity of creating strategies.[4] [7: 52]

Evaluation of Results[5]

During the program, 308 workshop days were organized and 3,008 participants took part in them. 303 of them were local government leaders, which represents 10% average leadership presence based on the time sheets.

Each of the 77 municipalities prepared relevant documents for at least a strategic base material. The distribution of strategic documents (49 pieces) and other materials (28 pieces) is illustrated in the Figure 4.
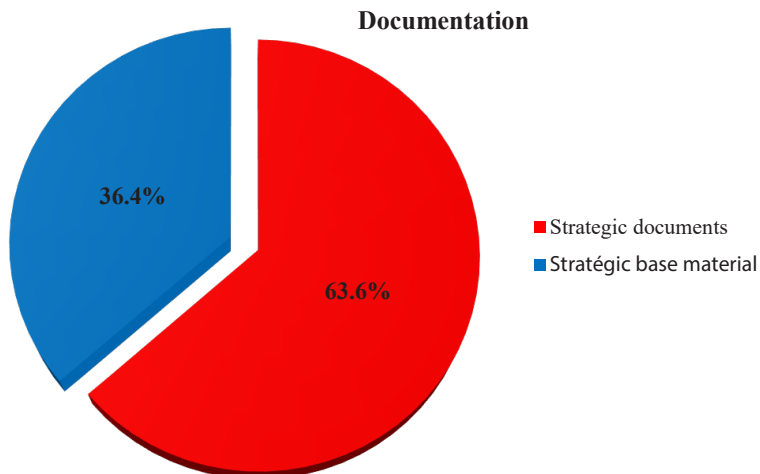
Documentation

Figure 4. The distribution of the documents. [6: 1]

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4   According to reports of trainers.
5   According to reports of trainers.

The trainers in their final reports (with the exception of 5 cases) evaluated the accomplished documents. According to the trainers the quality of the created documents is outstanding. The trainers rated the documents on a scale of 1 through 5. Most of those (66 pieces) were graded 4 or 5. The next table shows their distribution.

Table 2. The quality of accomplished documents according to the trainers. [6: 2]

| Type of document	Number of copies	Average quality
Complete strategical documents	31	4.58
Strategical documents still in development	16	4.50
Strategical base documents	25	3.96
Summary	**72**	**4.35**

During the post LCA program assessment it was revealed if the settlements will use the accomplished documents.

Will the settlement use the strategic document?
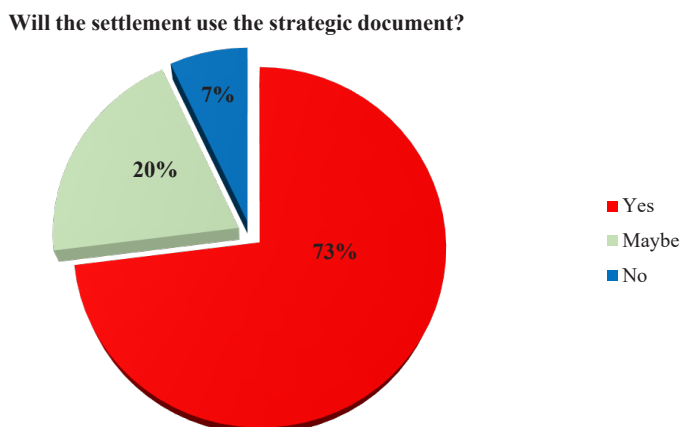
Figure 5. The use of the accomplished documents.
(Based on source [6] edited by the author.)

The overwhelming majority of ideas and action plans had formal post-program effects, because the local officials built them into their various strategies. This was mainly done for economic programs; however, some have been included in the Integrated Urban Development Strategies.

There are cases where some parts of the documents were incorporated during the discussions of budget. An example of this would be the formation of community gardens. In three cases the local government will not use the document. The reason for this are as follows:

• Poor quality of strategic preliminary materials.
• The municipal leadership and the delegates showed little or no interest in the program.
During the process the trainers evaluated the degree of perceived support of the local government management (mayors, clerks, board members) in 64 cases.

Support from the local goverment leadership

Figure 6. The support from local government leaders perceived by the trainers. [6: 11]

Based on the chart it seems that the majority of government leadership supported the program, which is in line with the results of monitoring and assessment. The complete lack of managerial support was reported by 5% of the trainers.

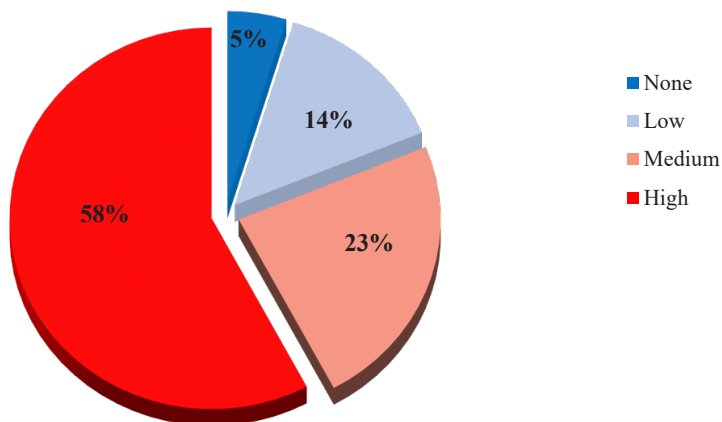The objective of the survey was to reveal the impact of the leadership commitment and participation on the success of the LCA. The settlements were the basic units of the research. The leadership commitment and the participation were measured by the number of attendants, the number of attendants from the public sector, and the number of the local leaders (mayors, notaries, executives, representatives, see Table 3).

Table 3. Measuring variables of the commitment and participation. [Edited by the author.]

Variable	Description	Measure
Number of attendants	Workshop attendants form the settlement	scale
Number of public service attendants	Public service attendants from the settlements	scale
Number of local leaders	Local leaders from the settlement	scale

There were 77 settlements in the sample. Their average population number was 2246.22, with a deviation of 1194.10

The parameters of the commitment and participation for the 77 settlements can be seen in Table 4. The number of attendants varies from 16 to 104. There were 38 or more attendants from half of the settlements. The average number of public sector attendants is 23.87, with 9.87 digressions from the average. The average number of the local leadership attendance is 1.92, with 2.85 digressions.

Table 4. Parameters of commitment and participation. [Edited by the author.]

Variable	N	Min	Max	Med	Avg	S.D.
Number of attendants	77	16	104	38	39.06	14.74
Public sector attendants	77	9	54	22	23.87	9.867
Local leadership attendants	77	0	14	1	1.92	2.85

Note: N = samples size, Min = minimum, Max = maximum, Med = median, Avg = mean,
S.D. = standard deviation

Efficiency was measured with the readiness of the strategic documents and their application. (Table 5)

Table 5. Variables in measuring efficiency. [Edited by the author.]

Variable	Description	Values	Measure
Readiness of strategic documents	Is there a strategic closing document?	0: no 1: will be 2: yes	ordinal
Application of strategic documents	Is it applied by the local government?	0: no 1: occasionally 2: yes	ordinal

As an integration of the above two parameters, a new one was calculated, efficiency. The new parameter measures efficiency on an ordinal scale. There were 4 settlements with missing responses, so the sample consists of 73 elements in this aspect. On the basis of the responses the frequencies of the values can be seen in Table 6. The most frequent response "0: there is no strategic closing document or application" occurs with 38.4% of the respondents. The median of efficiency is 3, i.e. half of the respondents have 3 or 4 efficiency level. It means there will be a strategic closing document applied, or there is a strategic closing document that is applied occasionally, or there is one applied already.

Table 6. Parameters of efficiency variable. [Edited by the author.]

Variable	Values	Frequency	Relative frequency, %
Efficiency	0: there is no strategic closing document applied	28	38.4
	1: there will be strategic closing document, but not applied	0	0
	2: there will be a strategic closing document to be applied occasionally, or there is one but not applied	2	2.7
	3: there will be a strategic closing document to be applied, or there is one with occasional application	18	24.7
	4: there is a strategic closing document applied	25	34.2
	Sum	73	100.0

The connection of commitment and participation was examined with the efficiency variable, the Spearman Correlation Coefficients and its significance test.[6] Table 7 shows the results. There were positive correlations found in all 3 cases. Regarding the number of attendants: 0.041, regarding the public service attendants: 0.065, regarding local leadership attendance: 0.069, i.e. the higher the leadership commitment and attendance, the stronger the efficiency is. However, in neither case was there a significant correlation found with the Spearman Correlation Coefficients (on 5% significance level).

Table 7. Correlation between commitment, participation and efficiency. [Edited by the author.]

	Efficiency			
	N	**rho**	**sig**	
Commitment and participation	Number of attendants	73	0.041	0.728
	Public service attendants	73	0.065	0.588
	Number of local leadership attendance	73	0.069	0.560

Note: N = samples size, rho = Spearman's rho

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6   The efficiency variable was measured on an ordinal scale, while the variables of commitment and participation were measured on a ratio scale; therefore, the Spearman Rank Correlation Coefficient is suitable to indicate the connection.

The non-significant state of the correlation coefficient draws attention to the fact that commitment and attendance are not enough to guarantee efficiency to explain which requires further variables to take into account.

This study aims to answer two questions based on results of the LCA program:

1. Is the presence of municipal leaders realized in the process and to what extent?
2. What was the impact of participation from local government leaders with regards to the first goal of the program? (Work out development strategies with the settlements within the framework of workshops that provide guidance for the next period.)

The answer to the first question is clear from the data on participation. Among all of the participants roughly 10 percent were local government leaders. This was sufficient during the program for the key success factor set up by the NCL.

The answer to the second question consists of many parts:

1. Out of the 77 settlements 74 succeeded in developing strategic documents which is 97%. (Figure 4) There were 46 completed development strategies and 28 collections of documents capable of being turned into acceptable strategies. This output is very significant.
2. The local government accepts the LCA development strategy. (Figure 6)
   Yes: 73%   Partly: 20%   No: 7%.
   These results speak for themselves and the complete or partial incorporation of 93% of the designs and results of the program indicate a serious impact on local leaders and a significant success for the program.
3. Home municipality support (According to the trainer: What was the level of openness and supportive behaviour on behalf of the local government representatives?) (Figure 7)
   High: 58%   Medium: 23%   Low: 14%   None: 5%
   The degree of support by local government leaders supports the findings of the post impact assessment, which stated that local government leaders perceived the effects of the program to be significant regarding the improvement of strategic planning skills and abilities.
4. The timing of the program
   The LCA programs were conducted soon after the 2014 local government elections, which increased the involvement and commitment from the leadership according to opinions of reports and assessments. The main reason for this is that settlements needed to create economic programs, which would benefit from the workshop documents compiled during the program. This claim is supported by the high number of incorporated documents.
5. Executive isolation, rejection
   In the three settlements where there was no leadership involvement, interest and/or the program was rejected, no appreciable quality document was elaborated and submitted to the Local Government Council.

All three of the correlation coefficients are low, implying a weak connection, however, in all three cases there was a positive relationship demonstrated. This means that the higher the engagement and participation, the better performance indicators are forecasted. Nonetheless, the correlation coefficients being not significant calls attention to the fact that, participation and commitment of the leaders by itself does not guarantee effectiveness. More variables need to be studied to explain effectiveness.

Conclusions

Overall results of the program show that the leaders of local governments' involvement and commitment have a significant impact on the participation and performance of the design process. According to the findings of the program, special attention should be paid to the involvement and commitment of the local municipality leaders. Further studies should be conducted to explore deeper relationships between the efficiency factors presented on participatory planning in order to reduce the risks therein.

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Fences and Border Protection: The Question of Establishing Technical Barriers in Europe

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The security environment of the 21st century confronted the international commu-nity with unprecedented challenges. One could say that we are only facing current negative trends with slowly evolving responses. However, these statements seem to contradict some facts that prove, that although there are deficient aspects to the current security structures, we are able to effectively handle many of the national and international challenges. Over the centuries, installation of various walls, wall systems have repeatedly defended the integrity of an area, the community of people living there from armed groups or offensive units. We can also find examples where population movements and bilateral territorial conflicts weakened—the relatively stable—great powers, which in order to avoid further intrusion and considerable social changes, designed a so-called "buffer zone" on their external borders to defend their sovereignty. There is no question that the current border restriction processes try to rehabilitate a long-time frequently used scheme for the protection of nationals, which was in recent times burdened by sad associations, such as the Berlin Wall. This is proven by the fact that only since 2000, more than 25 walls were built for security purposes. In my analysis, considering the present processes, I highlight the security challenges of 21st century Europe and the tightened border security measures generated by the fears and threats. I also stress the impact of the recent wave of migration in the transit states' and western countries' security system, as well as outline the activities of the Eastern European and Baltic states in response to the deteriorating relationship with Russia.

Keywords: *migration, border fence, border security, Europe, Ceuta and Mellila, Calais Jungle, southern closing of borders*

Historical Background

Considering Europe's past, the wall which served various purposes during the reign of the Roman Emperor Trajan (28th January, 98 – 8th August, 117) back during the Roman Empire was among the first defence systems in the world. [1: 4–9] The *limes* was gradually built and modified from the first century onward. The approximately 3,000 kilometres line initially served as a military logistics road, but over the decades it was reinforced to become a com-plete border-defence installation. The Roman Empire and its values were defended by a wall system consisting of three elements, as well as increased natural boundaries and "manpower supervision". The first stage of the structure was a mound of earth and a hedge fence, later

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this form was reinforced with stone walls. Invasions by barbarians[2] were hindered also by a ditch system built on both sides, as well as frequent watchtowers. [2: 26–34] Although the primary purpose of the *limes* was much more to highlight the cultural divide rather than to exclude a direct threat. Hadrian, in 122, ordered—in fact, according to sources built with his own strength—the 120-kilometre long, 4.5-meter high and 3-meter wide physical barriers, with watchtowers, specifically against the non-defeated Barbarians. [1: 4–9] [1: 11] [1: 59] In terms of effectiveness, there is no question that the high level of protection contributed to the gradual formation of today's civilization, culture, religion and politics, our western values and identity.

In the Asian continent, we may find older samples for the merger of defence lines and trade routes. The multi-staged Great Wall of China began to be built in 400 B.C., including ramparts, the increasingly stable and monumental fortification was built until the 14–17th century. The visitable parts were mostly made during the Ming Dynasty (1368–1644). The approximately 7,897-kilometre long wall's height is 10 meters, its width 5 to 8 meters. The purpose of setting it up was on one hand to protect the Silk Road where outstanding trade took place, to protect the economic interests of China, one of the most flourishing Asian cultures and to assure its cultural and social power. [3: 9–28]

Three centuries after the reign of the Ming Dynasty another version of the partition walls separating two areas—the German Democratic Republic (GDR) and the Federal Republic of Germany (FRG)—were set up. The Berlin Wall sliced in half western and eastern parts of the city between 1961 and 1989, for almost three decades. The total length was 156.4 kilometres, of which 43.7 kilometres lay directly between the two German parts. The structure's fortification dynamically followed the stages of the bipolar confrontation. The initial simple barbed wire barrier continuously expanded and eventually grew to become a fortress in line with the intensification of estrangement. The wall in the final stage was a 3.5-meter high and 1-meter wide barrier, with watchtowers, minefields and ditch system reinforced as the second defence line, all these claimed the lives of about two hundred individuals. [4] The memory of the Berlin Wall, the Second World War and the associations with subsequent instability left a deep impression on the population of Europe. The legacy of hermetically separated families, political and military instructions caring little with human lots are reflected in the current security situation as well. At the same time, we must recognize that parallels between the circumstances of the Berlin Wall and the current migration challenges are irrelevant. The similarity of the Berlin Wall and the current structures is only in that they aim to close the borders in order to conserve the current social structure.

The memory of the Berlin Wall and the separation between the communist East and the "capitalist" West presented some deterrent effect for the construction of similar barriers in Europe, while in the rest of the world, these protection systems were used in response to multidimensional security challenges. As a result of globalization, financial and commercial transactions increasingly blurred the physical borders of states. In accordance with changes in terms of travel limitations, more and more people reached remote continents. Simultaneously with the expanding travel conditions, intractable social and domestic political processes were launched across the Middle East and Africa. The security situation was worsened by the influx of weaponry, technological innovations affecting the defence industry and infor-

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2   The Romans called everyone barbaric who did not live in the empire, and did not embrace the culture. This term did not yet carry a negative connotation, it simply served to distinguish the Romans and other peoples.

mation technology, as well as the often "too advantageous" image of the West in the media. Western states were reflected as a kind of paradise for the inhabitants, which the migrant population sooner or later wished to "conquer", or at least benefit of its means. This desire placed increasing migratory pressures on the western states, which they were not able to fully handle. Therefore, increased surveillance and border protection has become very important, although this was contrary to the liberal values of Western civilization. The 11st September, 2001, terrorist attacks though highlighted the high vulnerability of these societies. As a result of the change in US foreign policy, increased security measures were applied for guaranteeing the security and power of the nation.

Simultaneously with these processes, most of the continents of the world built a buffer zone with barriers and a variety of advanced tools. Even if some have almost only symbolic value, among the installations many play a decisive role even nowadays.[3] [5] Tightened border-protection has become a commonly used tool[4] [6] [7] that was further enhanced by migration pressure—peaking in the summer of 2015, coming from the Middle East and Africa—as well as the sharpening Ukrainian conflict.[5] [8] As a result, currently 65 wall systems operate in the world. [9]

In order to maintain security and curb illegal immigration a decision was made to close the borders and tighten border controls in several European countries. In the following chapters I intend to present these examples in chronological order, highlighting the need for the closure of the southern border of Hungary and the common characteristics of European border security provisions.

Ceuta and Mellila, the European Union and Africa's Legal Borders

Ceuta and Melilla have experienced migratory pressure since the early 1990s. The first settlement came under Portuguese rule in 1415, and on 1st January, 1668, Portuguese King Alfonso VI officially handed over the city to the Spanish monarch, Charles II, who, in turn, acknowledged Alfonso's rule over Portugal. Melilla was occupied by Spanish troops as part of a campaign launched in 1496. [10: 99–101] [11: 77] [12: 37]

When Morocco became independent (1956), the two cities remained under Spanish rule as its exclave, so when the country joined the European Union, the settlements were the southernmost boundary of the integration. Considering their geographical situation, it seemed easier for migrants to get to Europe, rather than to set out on a much more dangerous Mediterranean Sea journey. Additionally, those migrants who arrived in one of the two cities, according to the formal system, the rules of the European Union (including the highly-cited Dublin III regulation on the admission of refugees and rules of their treatment) apply. Therefore, the cities had to face a growing influx of immigrants in the 1990s, hence in 1993, Ceuta

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3   As an example, I could mention, the border between Pakistan and India, which is being upgraded by the opposing parties continuously.

4   The latest walls include the common border wall of Somalia and Kenya, with which Kenya aims to guard against infiltration of Al-Shabaab and other terrorist groups from Somalia, similarly to Tunisia, who began reinforcing the border with Libya.

5   Influencing process also involve the weak economic and employment opportunities in the Middle East and Africa, the presence and activities of terrorist organizations in the region, activity of the various armed groups, organized crime or the formation of the attractive, but not always realistic Europe picture.

erected an 8.2-kilometre long, 3-meter high fence. Since that was relatively easy to overcome for migrants, in 1995, the city further strengthened the height to six meters. [13] The migrants turned to Melilla, so in December 1996, the city built a 12-kilometre long, three-meter high fence. Thereby both exclaves closed the southern borders of the European Union with a physical barrier.

The construction cost about EUR 60 million, funded in part by EU grants. In 2006, the Union allocated a further EUR 40 million to Morocco for the efficient management of the migration crisis, by which the fences were expanded with additional elements (such as motion detection systems). [14:13–48] Including this amount of aid, between 2007 and 2010, Spain spent the largest amount—among the member states—of sums to be allocated for protection (EUR 120 million in total). [15] Three parallel fence lines defend the exclave's frequently besieged borders, it reaches a height of 6 meters, with occasional roll-wire lines, infrared motion sensors and CCTV cameras. In addition, the effectiveness of protection was further increased by the use of manpower, because police—500 guards per shift—are on duty along the fence. [14] The situation of Ceuta and Melilla became particularly problematic on several occasions during the 2014–2015 crisis, combined with news about acts of smuggling and organized criminal activity.

Not far from the Moroccan border, migrants prepare for the climb over the 6-meter high fence while residing in crowded refugee camps. During that time, they collect sufficient financial backing to cover the sums for the route from the exclaves to Europe. Moroccan authorities are trying to control the activity of organized criminal groups and suppress the activities of people smugglers, during which it is not uncommon that they physically abuse refugees. [16: 45] In spite of these facts, many people are still trying to get over the fence every year, as it is shown in the figure below.

Table 1. Number of illegal migrants, Ceuta and Mellila (2000–2016). [42]
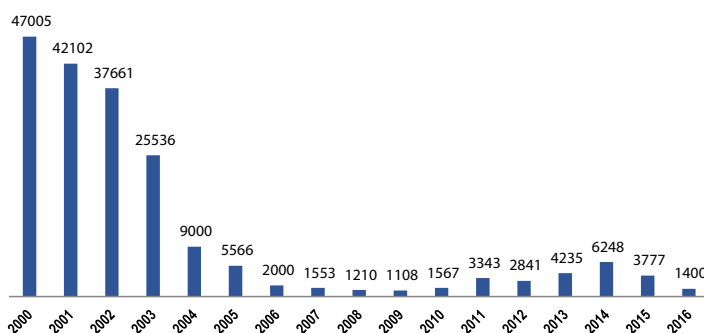
Greece – Turkey

In 2012, to relieve the already perceptible migration pressure, Greek authorities also closed their shared border with Turkey, where a fence was built, which is located in the Evros river valley, lying 10.5 kilometres in length. [17]

In November 2012, Greece also completed a 4-meter high fence system consisting of six serial barbed wire lines with thermal sensor cameras and continuous patrol service. An im-

portant difference compared to Ceuta and Mellila is that a simple line of barbed wire placed in a cylindrical column is not really much in depth, thereby getting close to the fence is easier. Countering this, Greek authorities have set up two lines of fencing system. One runs directly on the border, the other lies on the territory of Greece. The fence has a concrete foundation, it is well-built suggesting a longer-term maintenance intent. The security system was set up within the framework of the Frontex's[6] operation ASPIDA.[7] [18]

In addition to the construction of the fence, Greek authorities strictly checked Patra and Igoumenitsa ports, forcing migrants to travel further to Italy or other European countries. The operation was very successful, as the number of captured illegal border crossers declined from 2,000 people per week in August 2012, to 10 per week in October 2012. [19] Therefore, in 2013, the then Greek Defence Minister Dimitris Avramopoulos said that the government's decisive acts are demonstrated by the results, because illegal migration has been almost completely wiped out from the territory.[8] [20] However, we must add that the increasing level of illegal immigration phenomenon was not stopped by tightening of border protection, but its route changed, the centre of gravity shifted to the Aegean Sea, and some of the migrants tried to get to Europe not over the Greek, but the Bulgarian border.

Bulgaria, Turkey

In 2012, only 1,700 migrants arrived illegally in Bulgaria, but the number in 2013, increased to 11,158 people, so the government decided to build a fence system on the Southeast borders with Turkey. [17] The decision was made after a significant increase in the number of arrivals, mainly from Syria in 2013. The majority of Syrians arrived via Turkey to Bulgaria, from where they progressed further through the Eastern Mediterranean route. The closing of borders, therefore, was necessary because of guiding migratory pressures and to discourage illegal border crossings. [21] The construction plans were announced in November 2013. The plans included a 166-kilometre long fence system designed for the country's border with Turkey, in Yambol county. Until 2015, 33 kilometres, [22] until March 2016, a 100-kilometre long section was set up on the border. As for the structural conditions, the razor wire fence is 3-meter high, embedded in concrete columns and further strengthened by a camera system used in the previously mentioned borders as well.[9] [17]

At the same time border control was further secured, 1,572 police officers and 141 SUVs were reallocated for the routes most used by migrants. Additionally, they strengthened their cooperation with the Turkish border agencies as well. The effectiveness of the fence has been demonstrated since 2014, compared to the previous year, and according to Frontex data, in the first quarter of 2016, compared to the previous year, the number of illegal migrants decreased by 84%. [23: 10] Because of the success and the persistent migrant pressure, the Bulgarian leadership decided and started to construct a new fence on the Greek-Bulgarian border as well. [24]

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6   The EU's border security agency, set up in 2005.
7   The mandate of the operation ASPIDA was to defend the sea borders of Europe and intercept the illegal border crossings on the Greek-Turkish border.
8   At the same time in the Spring of 2016, as the EU Commissioner for Refugees he condemned the European states building fences, claiming that the "closing of borders is not the solution for the migrant crisis."
9   The Bulgarian system was mainly set up by the financial help of the EUROSUR – The European Border Surveillance System.

Great-Britain

Britain built a security fence in northern France near Calais, at the entrance of the "Eurotunnel" in November 2014. The cause was primarily the gradually growing number of migrants since 1999, from France. The Calais "jungle", the nickname for the refugee camp, became overloaded, and the law enforcement bodies gradually lost their influence. As a result, the camp already presented a major security challenge for the two countries. [25] While the leadership of London argued that the problem should be solved by the French, in September 2014, they offered to help by setting up the fence system. The British political leadership thought this kind of defence infrastructure would be able to stop the growing number of refugees and redirect them to the border crossing stations. [26]

The fence was built in November 2014, but has not lived up to expectations. That is why it has been extended, so that a length of 3.2 kilometres, and a high of 5 meters defended the Channel Tunnel, thereby the fence became nearly unbeatable. A barbed wire fence was set up and equipped with CCTV and infrared sensors and continuous patrols were also launched. Despite this, the authorities were not able to handle the increasingly stressful situation, so in August 2015, as a further strengthening, 500 police officers were deployed—both British and French—to safeguard the frontier zone. [27] According to the tunnel's operators, the fence was successful, [20] but a further construction of a new wall was again reported in September 2016. [28]

Border Control of the Baltic States

The Baltic states' motives are not necessarily tied to migratory pressures. While tightening border security is conducted in parallel with border provisions of the other states, their measures are linked to the deteriorating relationship between Russia and Western states, as well as the sensed political pressure of Russia on the Baltic Sea. [29] However, it is not insignificant that immigrants to Europe tried to reach the Schengen area through Russia from 2014, and onwards, creating another reason for which increased border control was necessary for the Baltic states (especially Estonia and Latvia). [30]

Estonia announced a structure in August 2015, scheduled to be an about 108-kilometre long and 2.5-meter tall barbed wire fence on one-third of its border with Russia. Enhancing the protection of the fence with a variety of radars and cameras, as well as motion detection systems, the fence will be one of the best-guarded installations, also including the planned use of unmanned aircrafts. The project costs more than EUR 70 million for the Estonian government. [31]

Latvia also announced the raising of a 90-kilometre long fence in 2015, aiming to reduce border crossings. By the end of the year a total of 10 kilometres of the planned fence was completed, while the remaining 80-km section is planned to be constructed in 2018. The security line has a defence purpose against trafficking, migration and the pressure presented by Russian foreign policy. The Latvian government budget allocated the amount of EUR 20 million for the fence. [32]

Hungary and the Southern Closure of the Borders

The government of Hungary ordered the closing of the southern border on the 17th June, 2015, because of the hardly manageably threats from the south. The Parliament, on the 6th July, 2015, adopted the 213/2015. (VII. 31.) resolution, according to which the area and the concept of the "temporary security closing of borders" were also accepted. According to this "the temporary security closing of borders: the facility owned by the State, which is located in the area under paragraph 1 and constructed in order to protect the order of the state border." [33]

The structure was built by the Hungarian Defence Forces, the closure of the Hungarian-Serbian border region stretches about 170 km, as planned it was completed on the 17th September, 2015. It is a four-meter high barbed wire fence with deployed military-police patrols. On the Hungarian–Croatian border section, the planned 105 kilometres was completed on 21st October, 2015. In parallel with strengthening the borders, migratory routes gradually refocused, so after the closure of the borders, the Serbia–Croatia–Slovenia–Austria route took over the role of the original Western Balkans' migratory route (Serbia–Hungary–Austria). According to data presented by the Hungarian Police on a monthly basis in 2015, the number of illegal immigrants decreased significantly since the completion of the fences. [34] The border wall was therefore a top priority for reducing the number of migrants arriving in Hungary, which is not only seen as a fundamental national defence task of the government, but an initial step in the revival of the failed (but extremely useful) Dublin Regulation III control system.

Macedonia

In November 2015, Macedonia also ordered a tightening of border security in the areas bordering with Greece. [35] Its primary aim was to check the large number of migrants from the unstable regions of the Middle East (mainly Syrians, Iraqis and Afghans). Following strengthened border controls, the government ordered a ban on migrants from Afghanistan, Pakistan, Iran and the African states and prescribed a requirement for increased control of Syrian and Iraqi migrants. The border controls were tightened further in January 2016, and at the request of Slovenia, they closed the western border of the country.

However, this step resulted in an increasingly chaotic situation among the continuously increasing amount of residents in refugee camps in Greece, where thousands of migrants wanted to cross indirectly to Macedonia. Among them, the settlement of Idomeni soon emerged, which formerly served as a staging point, prior to crossing the border. The facility became Europe's largest refugee camp in a few weeks. The inmates of various nationalities also repeatedly clashed among themselves and with local people and the Macedonian law enforcement agencies. The tense situation was resolved in May 2016, when the Greek forces closed refugee camps and evacuated the 8,500 residents from the area immediately. [36] Meanwhile, the country launched the establishment of a second, parallel fence on the Greek border that aims to continue the management of the migrant situation in the country. [37]

Austria, Slovenia, Croatia

After the completion of the fence on the Schengen border of Hungary, Austria—although previously sharply criticizing the Hungarian construction—also announced the closing of the Slovenian–Austrian border, not aiming to discourage migrants, but to direct them towards the checkpoints. [20] Since the closing of borders in Hungary the guided migratory wave went through Croatia and Slovenia to Austria, a significant number of migrants arrived suddenly in these countries.

Austria ordered the setting up of a "gate" (fence) in November 2015, however, the government emphasized that passing through Austria remains an open possibility. The "gate" meant a 4-kilometre long 2.2-meter high fence on the border with Slovenia at Spielfeld, completed by the reported deadline. [32] In July 2016, another fence's construction plan was announced in Austria, now stretching 100-kilometre long by the Hungarian border, which only comes into effect if a similar migration pressure to 2015 develops. [38]

In November 2015 Slovenia also began closing some sections of the border with Croatia—near Veliki Obrez for example. [39] The wire fence was also prepared by the scheduled deadline. The President, Miro Cerar claimed that they do not want a hermetic closure of the borders, but their aim is to navigate refugees in the right direction. [35]

Norway

Norwegians are also considering steps to curb illegal border crossings coming from Russia, similarly to the Baltic States. Although the migration pressure decreased significantly based on data from Norwegian Immigration (UDI), [40] the government announced in August 2016, that during the year, a 200-meter long and 3.5-meter high fence is to be raised at the Schengen area's northernmost crossing point, in Storskog. Although many people criticize the fence construction, its size is dwarfed by the 196-kilometre long common border fence built by the Russians. [41]

Conclusion

The examples presented also show that the country's have not found a single universally applicable and internationally recognized, and in all aspects accepted management method for the recent security challenges. The issue of setting up physical barriers is often conflicted with humanitarian principles (for example integration and protection of refugees), even though the primary purpose of which would be precisely to protect those human values and central principles that are the foundations of the rule of law and the international community. However, due to rarely experienced mass migration and radical organizations' expansion, local solutions cannot be managed without international backing. Because of the security risks they create, collective and effective control methods should be developed both on national and international levels. Closing the borders, strengthening border controls in Europe today aims to limit the complex processes and the emerging cross-border threats with a historically recallable and many times proven-to-be successful tool. Because of the asymmetric threats, transnational organized crime, infiltration of members of terrorist organizations as well as

threats from the East, liberalized border crossing conditions are difficult to control and not applicable for the effective preservation of today's security level. Setting up border walls and reviving controlled immigration methods however, can led to a reduced number of similar, security-hindering processes. We must see that countries mentioned in the analysis do not only strengthen border control for self-interests, but also to protect other European countries, existing administrative and social structures as well as European regional stability and security. However, whether these old-new methods will be effective and durable we may not yet know…

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Role of Strategic Thinking in Corporate Identity

Ajmal WAHEED,[1] Noor ul Ain BAIG[2]

In this paper, an attempt has been made to unveil how strategic thinking contributes to corporate identity and survival. The instrument used to collect the data was a questionnaire which included a scale on creativity, pragmatic opportunism and intellectual informatism. The sample included the middle and top management of the telecom organizations in Pakistan. The questionnaires were distributed to 125 respondents and an 80% response was received. Results showed that strategic thinking has a fairly positive effect on corporate identity (CI). Among the creativity, intellectual informatism and pragmatic opportunism and when regressed with CI, pragmatic opportunism has the strongest effect on CI; creativity has a fairly positive impact on CI, whereas, intellectual informatism does not show significant impact on CI. Hopefully, this study will be informative for management about learning how they can use the available yet unfound opportunities and information within their creativity to build and maintain a good corporate identity.
Keywords: *corporate identity, strategic thinking, strategic planning*

Introduction

Strategic thinking has become an inevitable aura in the realm of successful business management. It is mainly due to the rapidly increasing complexity and competition in the environments in which the organizations are operating. These fast-paced alterations in the external environment have not only affected the pattern of thinking but also the way in which organizations react and maintain their identities. Although reacting in a special way to the changes around them helped the organization it could not bring the feeling of achievement for which efforts have been put into the resources. Therefore, the need for attaining intellectual and creative approach arises towards the factors directly affecting the organization for clearer and sound decisions, more than ever. In the current turbulent and global environment, thinking strategically has become the need of the hour. Strategic thinking involves the capability to think beyond the obvious scenes so as to grasp the vibrant corporate opportunities in the environment, to fit the role to be played, to move ahead. It is about conceptualizing, visioning and understanding the future forces on which the organization is dependent.

Though much research has been conducted on strategic thinking, it has not been studied earlier with its effects on the corporate identity of the organization. Earlier studies have emphasized the impact of strategic thinking on the factors internal to the organization but this research spotlights the impact of strategic thinking on both the factors, i.e. a factor internal

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to organization on corporate identity and a critical factor external to the organization. Consequently, creativity, pragmatic opportunism and intellectual informatism are of substantial importance while making the decisions and policies in the telecom sector of Pakistan because due to the competitive environment among telecom organizations, gaining the market share has become a vital concern of creating and holding strong corporate identities.

This paper aims at unveiling how strategic thinking contributes to corporate identity and survival. No matter what is the size of an organization, either small, medium or large, the responsibility of thinking strategically to build the corporate identity now also rests with the management. This paper comprises of seven sections. After this brief introduction in section 1, the literature is reviewed in section 2 which leads to the conceptual framework. Hypotheses are developed in section 3 and in section 4; methodology applied in this paper is discussed. The next section illustrates the results obtained. The results are then discussed in section 6, which follows the conclusion.

A Review of Literature

Strategic Thinking (ST)

Organizational success has always been dependent on devising strategic plans that are based on strategic thinking. Although strategic thinking and strategic planning are seen side by side in the literature they obviously are different from each other, hence strategic thinking plays a vital role in the overall performance of the organization. Bonn supported strategic planning is a complete process that happens after a safe process of strategic thinking. [1] Although strategic thinking and strategic planning are equally important for effective strategic management this article holds a strong grip on the concept Bonn provided, supporting the theory that strategic thinking and strategic planning are two diverse concepts and also that strategic thinking leads to strategic planning. [1] Literature on strategic thinking did not provide any evidence on how strategic thinking is best defined. Yet Fairholm and Card provided a holistic and precise description of what strategic thinking is by stating that strategic thinking is to understand the fact that the world may not always work in linear and methodological ways. [2] It supports that everything around an organization does not always work in accordance to the capabilities of an organization, therefore, organizations and employees must be agile, flexible and wise as they adapt plans to meet emergent, ambiguous and odd situations.

Skarzauskiene suggested that strategic thinking helps in formulating effective strategies considering the situations and circumstances demanded by external environment and internal operations. [3] Such useful analysis in turn provides the space for favourable actions to extract the maximum benefits from the potential fertility. As Snyman and Kruger mentioned that apart from competitive analysis organizations need to learn from environments like (a) understanding the industry; (b) identifying its competitors; (c) determining strengths; and, (d) weaknesses along with capture and exchange of information. [4] In this regard, Snyman and Kruger also argued that not only capture and exchange of information is important but its smooth flow and productive use is also a concerning issue. Strategic thinking is not a one-step action rather a continuous process. [4] Bonn also found that strategic thinking is closely associated with acting in an ongoing and entangled process. [5] Abraham suggested whether a company has one person, a group, or everyone doing strategic thinking. [6] The important

thing is that it is done continuously and that the opportunities, alternative strategies, or different business models are periodically shared with other key people in the company. Only then is the company in a position to take appropriate action and only then can it reap the immense benefits of strategic thinking. Competitors pass by any organization unless it has a philosophy of continuous improvement. Tavakoli and Lawton supported the thought that in today's world of accelerating change, establishing and sustaining competitive advantage depends on flexibility and a wide spread spirit of innovation within the organization and knowledge management. [7] Thus, it is important for an organization to think creatively while formulating the policies so that the organizations needs to think strategically to move beyond the vicious circle of fellow-following.

It can be concluded that strategic thinking not only affects the financial status of an organization but also has an influence on the corporate identity of the organization as well. Consequently, strategic thinking can be termed as strategic if it includes finding new ways (creativity) of grasping the unseen and potential opportunities (pragmatic opportunism) to achieve goals through productive use of information (intellectual informatism). Klijn and Tomic also found creativity among the basic requirements for operating a business successfully. [8] Thus, it can be said that *creativity,* as supported by Williams, [9] is the deviation from the conventional ideas that emphasize novelty and innovation while pragmatic opportunism means tracking and grabbing the opportunity everywhere that is being in a position to notice that something can be done better, quicker, cheaper, differently, more conveniently, faster and more reliably. Hence, pragmatic opportunism highlights the idea of grasping the potential opportunity and extracting the fruit out of continuous alteration until a suitable strategy found through use of different analogies. Intellectual informatism stresses that not only the capture and exchange of information is important but its smooth streaming and intellectual use is also essential.

Corporate Identity (CI)

As individuals have their identities, similarly organizations also enjoy their identities among other organizations. [10] [11] Ashman and Winstanley argued that unlike the individual identity, corporate identity is owned by the organization collectively. [10] So, corporate identity is not the matter of the mission of the organization but it needs the unified and aligned practices of the entire organization. Moreover, employees of an organization also play a vital role in creating the corporate identity for their respective organization. Castro, Lopez and Saez also found that different human aspects of a business activity like customers, suppliers, managers or employees constitute corporate reputation. [12] Therefore, the social reputation of an organization is made up of the perspectives of its indirect stakeholders as investors, customers and the community in a broader sense. It can be, to some extent, figured that social reputation and corporate reputation play an important role in strong corporate identity. Hooghiemstra's point of view is that corporate identity is how an organization presents itself to the audience and that the activities and operations of a company are fundamental to the building or harm of a corporate identity. [13]

Corporate identity is an on-going process that keeps evolving with time, this is especially is the way how an organization presents itself to its every stakeholder and it, apart from the organizational practices, includes the name of the organization, logo, corporate slogans, etc.,

also play a role in building the corporate identity because they provide the clues to be remembered by its stakeholders. [14] [15] [11] Motion and Leitch further stated that corporate identity is a continuous process and evolves with time. [11] The organizational philosophy, [16] along with its advertising behaviours, [17] provides the basis for the image of an organization to the stakeholders outside the organization. Corporate identity of an organization is the composition of organizational ethos, culture, conduct and attitude that characterizes the distinction of the organization in respective industry and provides the attribute of organizational differentiation accompanying the unique and unified social existence. [10] [15] [11] [18] Motion and Leitch also mentioned that corporate identity attracts the audiences and it is the outgrowth of well executed media projection of the organization. [11] Eventually, corporate identity of an organization can be defined as the image, perception and ultimately the experience of the stakeholders, external to the organization, about the respective organization.

Decisions made by the leaders and the employees of an organization according to Aspin and Champan have a major impact on the corporate identity. [18] For that reason, it is vital that the decisions should be made carefully and intellectually in the organization. Similarly, it is also reported that corporate identity is the result of the decisions of a very few influential internal actors of the organization and the experiences of all the stakeholders of the organization. [19] [10] Bosch, Elving and Jong mentioned that the way strategies are devised inside the organization play an important role in the consistency of the corporate identity. [15] Therefore, it is evident that apart from the methods and techniques of making strategies, their ways of execution and communication to the stakeholders also plays an important role in the built or knock of corporate identity. Corporate identity keeps changing and transforms itself over time according to the decisions taken within the organization. For this reason, strategic thinking is not only important for the good performance and success of the organization but also for the good of the corporate identity of an organization.

Conceptual Framework

The literature review above on strategic thinking and the corporate identity led to the following conceptual framework.
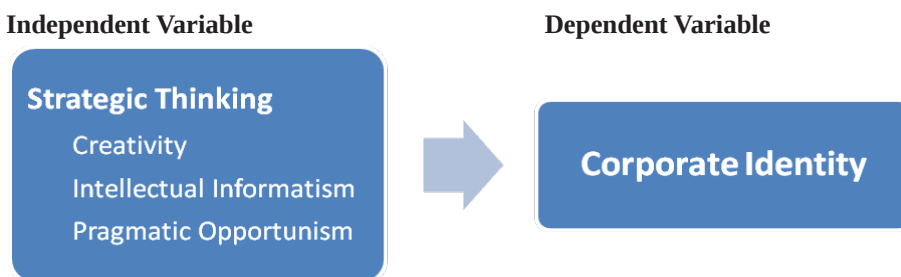

Figure 1. Strategic thinking and the corporate identity. [Edited by the authors.]

The conceptual framework developed above includes the independent variable of strategic thinking that is further divided into the dimensions of creativity, intellectual informatism and pragmatic opportunism. These facets were taken for defining the strategic thinking because

corporate identity being the dependent variable was more understandable with the new ideas, smooth flow of information and grabbing the opportunity. Since these facets are processed inside the organization but their sources lie outside the organization so is corporate identity. Therefore, the corporate identity (dependent variable) was studied under the influence of strategic thinking (independent variable).

Hypotheses

- H1: ST has a significant impact on CI.
- H10: ST has no significant impact on CI.
- H2: Pragmatic opportunism has a positive impact on CI.
- H20: Pragmatic opportunism has no positive impact on CI.
- H3: Creativity has a positive impact on CI.
- H30: Creativity has no positive impact on CI.
- H4: Intellectual Informatism has a positive impact on CI.
- H40: Intellectual Informatism has no positive impact on CI.

Methodology

This part of article includes the research methodology for the strategic thinking and corporate identity. Methodology comprises of the development of the scale, explanation of the data collection method, sampling method and the respondents.

This article tags along the quantitative research method. The instrument used to collect the data was a questionnaire. The questionnaire included the scale on creativity, pragmatic opportunism and intellectual informatism. The items on pragmatic opportunism and the intellectual informatism were picked up from the predetermined questionnaire used by Skarzauskiene, [3] while that of creativity and corporate identity were developed with Cronbach Alpha of 0.84. Strategic thinking and corporate identity were measured using five point Likert scales. The questionnaire included a demographic sheet towards its end.

The sample of telecom organizations was judged to be selected because telecommunication has become a big industry in the last decade in Pakistan. People usually like to stereotype others regarding the network used by them. Moreover, corporate identity was defined as the image, perception and the ultimate experience of the stakeholders; therefore, the sample included the middle and top management of the telecom organizations, who were the customers of that very telecom network also. The questionnaires were distributed to 125 respondents but the response rate ended up being 60 percent only. The respondents were surveyed through questionnaires that were self-administered by the researcher to make sure more factual results. The data was analysed using the software SPSS. First of all, the relationships of the facets of the variables were explored using Pearson's correlation. Secondly, the independent variable and its facets were regressed against the dependent variable to test the hypothesis.

Results

The statistical results found that strategic thinking has a fairly positive effect on corporate identity. When corporate identity (CI) was regressed with strategic thinking (ST), the results

showed 35.8% results (adjusted $R^2 = 0.358$) and $R^2 = 0.366$ which indicates that the 36.6% change in CI is due to the change in ST, as shown in Table 1. The significance of the regression model is 0.00 (i.e., $p<0.05$), this indicates that the regression is significant, that is, there is a useful positive relationship between the CI and ST. The value of p is taken as 0.05 for reference as mentioned by Sikaran. [20]

Table 1. Regression for ST. [Edited by the authors.]

Model	b	SE	β	t	p
ST	0.58	0.09	0.60	6.5	0.00

$R^2 = 0.36$
$\Delta R^2 = 0.35$

Note: p<0.05, β = Standardized Coefficients, SE = Unstandardized coefficient standard error b = slope of the line, t = calculated difference represented in units of standard error, p = calculated probability and is used to determine statistical significance in a hypothesis test

The results showed that ST increases when CI increases which indicates a positive linear relationship ($F = 42.1$, $df = 1$ and $p = 0.00$). The correlation matrix in Table 2 indicates that there exists a fairly strong relationship between ST and CI. The correlation value of 0.605 at 99% confidence interval indicates a moderately strong and positive relationship between ST and CI.

So, the equation of regression for CI and ST becomes

$CI = 1.91 + (0.60)\ ST$ (1)

where:
- $Y = CI$,
- $b0 = 1.91$,
- $β = 0.60$,
- $X = ST$.

Table 2. Pearson Correlation for ST and CI. [Edited by the authors.]

Scale	I	II
I (ST)	–	0.605**
II (CI)	–	–

*Note: **p<0.01, *p<0.05*
H1: ST has a positive impact on CI

Moreover, the overall equation shows that one unit change in ST leads to 0.39 unit change in CI. In addition, the significant value of correlation matrix in Table 2 also helps deducing the fairly strong positive relationship between ST and CI so the H1 is accepted.

Among creativity, intellectual informatism and pragmatic opportunism; when regressed with corporate identity (CI), pragmatic opportunism has the strongest effect on corporate identity ($β = 0.33$; $p = 0.010$), creativity a little stronger ($β = 0.32$; $p = 0.025$) while intellectual informatism has the weakest effect on CI ($β = 0.05$; $p = 0.691$) as shown in Table 3.

Table 3. Regression Table for Pragmatic Opportunism (po), Creativity (c) and Intellectual Informatism (if). [Edited by the authors.]

Model	b	SE	β	t	p
po	0.29	0.11	0.33	2.66	0.010
C	0.25	0.11	0.32	2.28	0.025
if	0.04	0.09	0.05	0.40	0.691

$R^2 = 0.39$

$\Delta R^2 = 0.37$

Note: p<0.05, β = Standardized Coefficients, SE = Unstandardized coefficient standard error b = slope of the line, t = calculated difference represented in units of standard error, p = calculated probability and is used to determine statistical significance in a hypothesis test

The equation for regression becomes

$CI = 1.89 + (0.32) C + (0.33) po + (0.05) if$ (2)

where:

- Y = CI,
- b0 = 1.89,
- β1 = 0.33,
- β2 = 0.32,
- β3 = 0.05,
- X = ST.

H2: Pragmatic opportunism has a positive impact on CI

Resulting values of the regression show that one unit change in pragmatic opportunism causes 0.33 units increase in the CI as show in Table 3. The value of 0.570 and 0.01 significance (p<0.05) of Pearson's correlation matrix at 99% confidence interval also supports the fact that pragmatic opportunism has a fairly strong and positive impact on CI. Therefore, H2 is accepted.

H3: Creativity has a positive impact on CI

When creativity is regressed with CI, the R^2 value shows that 33% change in CI is due to the creativity as shown in Table 3. The correlation matrix also shows 0.576 at 99% confidence interval that reveals the presence of fairly a positive impact of creativity on CI. Therefore, H3 is also accepted.

H4: Intellectual Informatism has a positive impact on CI

Since the correlation matrix shows a positive relationship between intellectual informatism (0.401 at 99% confidence interval) the regression table does not show as significant an impact of intellectual informatism solely on CI as that of pragmatic opportunism and creativity. It shows that only 5% change in CI is due to intellectual informatism and significance is 0.691 (p>0.05), as shown in Table 3. Although a good relationship could not found p-value helps rejecting H4. Hence, H4 is rejected.

Discussions

The empirical results of the strategic thinking and corporate identity showed a causal relationship between strategic thinking and the corporate identity. Hence, pragmatic opportun-

ism, intellectual informatism and creativity can be turned into the competency of the organization. It will be useful for strategic and organizational practices because this is the genuine addition in the literature that inspired the author while reading different articles for research. Strategic thinking as defined by pragmatic opportunism, intellectual informatism and creativity reveals the actual values practiced and trends followed. As the results showed significance for pragmatic opportunism ($p<0.05$) and creativity ($p<0.05$), this means that better results for corporate identity can be obtained when intellectual informatism ($p>0.05$) is excluded. Furthermore, if the research is conducted with the organizations that follow strategic thinking a pleasant picture will await corporate identity. Secondly, the organization in Pakistan, where strategic thinking is finding a way in organizations, has shown tremendous results, and thus a better and enhanced idea will be achieved in developed countries.

Therefore, this article will be informative for middle and top level managements about learning how they can use available yet unfound opportunities and information with their creativity to build and maintain a good corporate identity.

Conclusion

This article evaluated the importance of strategic thinking along with pragmatic opportunism, creativity and intellectual informatism with reference to corporate identity. Corporate identity has shown a dependence upon how the opportunities can be tracked and grabbed (pragmatic opportunism), the need for smooth streaming (intellectual informatism) and the strategic use of available opportunities and information in such a creative way (creativity) that it finds a way out to success.

The empirical findings of Regression and Pearson Correlation that were run to test the strength and relationship among the variables revealed that the corporate identity of an organization can be significantly improved if pragmatic opportunism, creativity and intellectual informatism, that constitute the strategic thinking, are improved. In the theoretical framework, it has been argued that strategic thinking is critical to extract the available information in such a way that it creates opportunities. In addition, nothing needs be extracted that can be used fluently with creativity. Therefore, it is necessary to keep an eye on things happening around us and to get the relative information to create an opportunity that ultimately leads to better corporate identity.

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What the NATO Alliance Is Currently Advocating and Delivering in the Counter Terrorism Arena[1]

Imre POGÁCSÁS[2]

The fight against terrorism is still based on the nation-state framework, but international organizations have a greater focus on the prevention of terrorist acts. The European Union is not a military organization, it is involved mainly in prevention and combating crime and terrorism financing operations, and to resolve the consequences of an attack. In contrast, NATO is mainly focused on the fight against terrorism from a military perspective. It is important to emphasize that the fight against global terrorism can only be successful if comprehensive, international, multilateral action is taken, which includes military operations, in addition to political, economic, legal, diplomatic and social tools.

This analysis will seek to determine how those facts influence the NATO Counter Terrorism (CT) task and whether they are sufficient to justify making it a NATO core responsibility.

Keywords: *terrorism-counter terrorism, global security, role for NATO, strategic and military concept, collective defence, international responsibilities*

Introduction

The current NATO role is countering terrorism, showing how NATO could tackle the threat posed by worldwide terrorism today and what the Alliance is currently advocating and delivering in the Counter Terrorism arena. The events of 11th September, 2001, launched a new phase in NATO's history, because after these terrorist attacks the Alliance implemented, for the first time, Article 5 of the Washington Treaty, in addition to a long-term NATO mission. This attack changed the international security environment and it brought a scope of challenges that the international community is still facing today.

In order to illustrate the main steps of the characteristics of NATO's fight against terrorism, we first need to define what we mean by terrorism. The word terrorism, originates from the French Revolution where the Jacobin dictatorship of terror used the term "régime de la Terreur", basically meaning the usage of violence and threats to intimidate or coerce, especially for political purposes. [1] Although the concept is not new, it still has no internationally accepted definition.

For the purpose of this analysis it is necessary to define terrorism and counter-terrorism. There are numerous definitions available, but the most relevant to NATO is the Military Committee Concept as follows:

"Terrorism: The unlawful use or threatened use of force or violence, instilling fear and terror, against individuals or property in an attempt to coerce or intimidate governments or societies, or to gain control over a population, to achieve political, religious or ideological objectives.

Counter-Terrorism: All preventive, defensive and offensive measures taken to reduce the vulnerability of forces, individuals and property against terrorist threats and/or acts, to respond to terrorist acts. In the frame of the NATO Comprehensive Approach, this can be combined with or followed by measures enabling recovery after terrorist acts." [2: 5]

Today terrorism is a major issue for the security of all NATO allies. The recent Paris, Brussels and Berlin events, terrorist attacks, showed that the world can no longer remain indifferent to terrorism. Terrorist groups seek to undermine state power, which includes the intimidation of the population. Their use of unpredictable and destructive practices threatens the sense of security; an ancient Chinese saying defines the essence of terrorism: "Kill one to warn a hundred". [3]

Terrorism involves consideration of both international and domestic aspects. It affects energy security, critical infrastructure, maritime security, usage of Internet and cyberattacks, weapons of mass Destruction (WMD) and it has been connected with organized crime and narcotics related issues. [4]

The current threat is multipolar, unpredictable, in some cases invisible, and can be referred to as hybrid. "The concept of 'hybrid threats' is not new, nor is the idea that it conveys completely original—namely, the combination of conventional and unconventional methods of warfare so as to confuse an adversary." [5: 1] The question is what is NATO's present and future contribution to the fight against terrorism, based on its current core tasks and strategy. How should NATO's role evolve better in order to counter terrorism?

Where we are, what is the Role for NATO?

Since 1949, the global security and international environment has constantly been changing. NATO has had to develop its strategy to adopt to major challenges by updating Strategic Concepts (SC) as follows: [6]

- 1949: just after creation of NATO;
- 1957: after Germany entered NATO;
- 1968: after France withdrew from military structures of NATO;
- 1991: after the Cold War ended;
- 1999: after the first-round enlargement to CEEC[3] and the occasion of the 50th anniversary of NATO;
- 2010: as a response to NATO enlargement since 1999.

The SC has been modified six times but the core tasks and principles for NATO do not list part CT as a core responsibility. Currently NATO's primary purpose is to defend the freedom and security of all its members by political and military means and it remains an essential source of stability for the Alliance. The current Strategic Concept adopted at the NATO Summit in Lisbon on 19–20th November, 2010, states that the Alliance will continue to effectively fulfill three essential core tasks: collective defence, crisis management, cooperative security. [7] All three tasks contribute to safeguarding Alliance members in accordance with international law.

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3   CEEC (Central and East European Coalition)

The SC clearly identified terrorism as a permanent growing threat for NATO's security. As a consequence, the Alliance decided to "enhance the capacity to detect and defend against international terrorism, including through enhanced analysis of the threat, more consultations with our partners, and the development of appropriate military capabilities, including helping training local forces to fight terrorism themselves." [8: 17]

This means that CT is already a part of the Defence and Deterrence core task of NATO, but not explicitly stated.

The evolution of NATO's response on CT

Based on the title of this analysis we need to know how history shaped NATO's strategy to countering terrorism from 1999 to 2016. The 1999 SC defined terrorism as a risk affecting NATO's security but practical measures were not adopted by the Allies. Due to the terrorist attack in New York this changed, and NATO launched its first ever CT operation called Operation Eagle Assist. It was followed by a second CT operation, Active Endeavour, which was a maritime surveillance operation in the Mediterranean, together with anti-terrorist patrols and escort. [9] The next evolutionary step was the endorsement of the Prague-Package at NATO's 2002 Prague Summit, where the Alliance articulated their enhanced contribution to CT.

Following that NATO adopted a Military Concept for Defence Against Terrorism (DAT), that includes five nuclear biological and chemical defence initiatives, tasks for protection of civilian populations, together with Civil Emergency Planning Action Plan, as well as the NATO Response Force principles. [10]

At the 2004 Istanbul Summit the Alliance decided that collective defence remains their core purpose, even though the threats that NATO faces had changed significantly. NATO endorsed the creation of the DAT Programme of Work (POW) to develop its capability to tackle asymmetric threats. [11]

At the Riga NATO meeting in 2006, the Alliance strengthened their commitment to the Afghanistan mission and they also recognized that the military itself is not enough to create Afghanistan's long-term stability. [12] To emphasize it, Mr. de Hoop Scheffer,[4] said at the meeting: "It is winnable, it is being won, but not yet won." [12]

Two years later in Bucharest the leaders of NATO continued the open-door policy and reaffirmed solidarity to ensure operational capability in Afghanistan. They also confirmed the implementation of Iraqi Security Forces. The Communiqué of this meeting covers "an agreement to work on the development of options for comprehensive missile defence architecture, the role of arms control, disarmament and non-proliferation, the importance of the NATO Response Force, the Alliance Ground Surveillance capability, a new policy on cyber defence, principles of the Allied approach to energy security and many others", aside from CT. [13]

At the Lisbon Summit in 2010, the leaders of NATO member states adopted the alliance's new Strategic Concept, "that (is being) able to defend its members against the full range of threats", determined NATO internal reform, agreed on the future operations in Afghanistan, and the creation of European missile defence. In addition, NATO's relationship with Russia was re-evaluated. [7] The 2010 Summit summarized as Active Engagement, Modern Defence is a very clear statement and vision with strategic objectives for the next decade.

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4   NATO former Secretary General

It states that collective defence, crisis management and cooperative security remain the Alliance's essential core tasks, even though the security environment has changed. [8: 7–17]

The Defence and Deterrence chapter of the Concept included the following activities related to CT: [8: 7–17]

- enhancing the capacity to detect and defend against international terrorism, with enhanced analysis of the threat;
- more consultations with NATO partners;
- developing appropriate military capabilities, including helping train local forces to fight terrorism themselves.

At the Chicago Summit in 2012, NATO agreed to continue counter-piracy Operation Ocean Shield, Operation Active Endeavour, which contributed to the fight against terrorism, and to a non-Article 5 Maritime Security Operation. It supported a strategic air and maritime lift for the African Union's (so called AU) Mission in Somalia (AMISOM). The NATO leaders also agreed to the development of the AU's long-term peacekeeping capabilities. Allies enhanced their commitment to fight terrorism with determination in connection with international law and the principles of the United Nations (UN) Charter and endorsed NATO's Policy Guidelines on CT to enhance NATO's ability to prevent, deter, and respond to terrorism. [14]

In connection with CT related issues the Wales Summit in 2014, discussed the Ukrainian crisis, the fight against the Islamic State of radical Islamist armed groups, the military future of the Alliance, defence spending amongst allies and the end of combat operations in Afghanistan. Due to the Ukrainian crisis, the Allies raised the level of contingency, and agreed to establish a Very High Readiness Joint Task Force that can deploy within a few days. In order to ensure that our Alliance is ready to respond to the new security challenges, they approved the NATO Readiness Action Plan as well. The Allies agreed to increase the defence budget and work towards the NATO guideline of spending 2% of GDP on defence expenditure by 2020. Besides that, NATO decided that troops, were to remain in Afghanistan after 2015, even when they were drawing down forces to complete the ISAF (International Security Assistance Force) mission by 31st December, 2014. [15]

The Wales Summit welcomed the extension of the mandate of the counter-piracy operation off the Horn of Africa. They reviewed strategic options for the future of Operation Active Endeavour as in the Article 5 maritime operation in the Mediterranean. This Summit had more intentions concerning Terrorism and CT than previous ones, because it separately dealt with countering the threat of ISIL/Daesh terrorism: "If the security of any Ally is threatened, we will not hesitate to take all necessary steps to ensure our collective defence." [16: para 33] On the other hand, the fight against terrorism issue will continue to improve capabilities and technologies, including the defence against Improvised Explosive Devices and CBRN threats. NATO will keep terrorism and related threats high on the security agenda. [16: para 79]

NATO Allies have made two important decisions in connection with the terrorist threat and the alliance's action against terrorism at the 2016 Warsaw Summit. They extended the alliance's mission in Afghanistan to strengthen the training of Afghan forces as a part of projecting stability over 2016. They also decided to establish training and counter terrorism centres in Iraq (Baghdad centre), as well as Tunisia and Libya in order to support the fight against the Islamic State. The Warsaw Summit of Heads of State and Government agreed that training Iraqi troops inside Iraq and Jordan was more effective against terrorism than sending their military forces against ISIS. [17] The alliance emphasized that collective security and

territorial defence are once again NATO's core mission, so as a response to Russia's provocations, they agreed to send multinational troops to its neighbouring countries. [18] The head of States agreed that "go back 10 or 15 years and the changes that have unfolded are momentous. In the post-cold war and post-9/11 period, the idea had taken root that if NATO did not act out of area it would soon be out of business." [19] President Obama summed things up by saying: "We're moving forward with the most significant reinforcement of collective defence any time since the Cold War". [20]

Conclusions

NATO's attitude since the 9/11 events has changed in relation to terrorism, despite the fact that the fight against terrorism is not its core task. We are discussing the core responsibility of NATO on CT, but it is important to know that NATO has three core tasks, which include several responsibilities. It is argued that countering terrorism is already part of the Defence and Deterrence core task of NATO, even though it is not explicitly stated. Hence CT is already one of the core responsibilities of NATO, even if it is not a core task.

Having analysed the evolution of NATO strategies and the NATO Summits outcomes, it is clear that the most important commitments on the fight against terrorism appeared after the Warsaw and Wales Summits.

In connection with the fight against terrorism, the NATO Summit declarations do not include any specific military tasks for CT. However, the Allies emphasized continuing, enhancing their commitment to support the continuation of dialogue and cooperation with its partners. Specific military operations on countering terrorism continue as Operation Ocean Shield and Operation Active Endeavour.

Why can we not find any specific NATO's core military tasks on CT in these documents?

The answer is given by NATO in the Wales Summit Declaration which explains that the comprehensive political, civilian, economic, military approach is essential in crisis management, cooperative security and collective defence. The Wales Summit declaration states: "NATO has a role to play, including through our military cooperation with partners to build their capacity to face such threats, and through enhanced information sharing. Without prejudice to national legislation or responsibilities, the Alliance strives at all times to remain aware of the evolving threat from terrorism." [16: para 79]

Based on my analysis, if NATO wishes to continue the fight against the terrorism, the following proposals need to be considered:
- to continue, and enhance training to build more effective security forces in a crisis like Iraq, Afghanistan, Libya etc. together with UN-EU NATO's partners;
- to improve capabilities and technologies on DAT POW including IED and CBRN threats;
- focus more on domestic support for Collective Defence and Crisis Response operations together with the UN;
- to continue dialogue and cooperation between NATO and the EU;
- to rewrite and rethink Article 5 in order to determine how NATO could defeat and respond to the cyber and hybrid attacks in Collective Defence relations according to the actual Treaty.

A terrorist attack is an unexpected event, requiring proactive, co-ordinated reaction. Prevention requires robust investigative capacity and preparedness on both regional and local level.

In order to analyse how the terrorists are recruiting and facilitating within networks very powerful investigation tools are required with enhanced border security tracking and identification systems. NATO alone cannot achieve this, so those are the objectives that the UN Security Council Resolution 1373 (2001) sought to pursue to achieve following the terrorist attacks of 11th September, 2001. [21: 2]

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[3] KAUFMANN, S. A., JOHNSEN, S.: Co-Evolution to the Edge of Chaos: Coupled Fitness Landscapes, Poised States, and Co-Evolutionary Avalanches. In. LANGTON, C. G., TAYLOR, C., FARMER, J. D., RASMUSSEN, S.: *Artificial Life II, SFI Studies in the Sciences of Complexity,* 325–369. Boston: Addison-Wesley Publishing Company, 1991.

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