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THE COMPETENCIES OF THE CIO. A 2016 ANALYSIS OF THE UNITED STATES OF AMERICA FEDERAL CIO COUNCIL MEMBERS' BACKGROUND

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The main goal of this paper is to present the competencies of the Chief Information Officer (CIO), taking into consideration not only the evolution in the area of information and communication technology (ICT), but also, the permanently growing recognition of its role during the latest decades in the public and private sectors (doubtless with the same evolution pace, and with an important advantage for the latter). An analysis based on the background of the 2016 membership of the USA Federal CIO Council is intended to depict a clearer image about how the technological knowledge is coupled with the CIO business roles and responsibilities, in order to ensure, in a timely manner, qualitative governmental services for the USA citizens.

Key words: CIO, Chief Information Officer, CIO competencies, USA CIO Council, USA CIO Council member.

1. INTRODUCTION

The latest evolutions in the area of ICT have forced the private managers, but, more importantly, the governmental authorities, to overcome the challenges of managing complexity brought by the important transformation processes and evolution steps that allow them to achieve their final goal, more efficiently and in a shorter time. All benefits associated with technological improvements have permitted the enlargement of cooperation between private and public sectors and in the benefit of citizens.

Computers and information technology have been used by governments for more than 50 years to automate activities. However, even if IT is not new, the arrival of the Internet has enhanced communications and enabled the digital supply of government services. Reforms in many areas of government have been facilitated by digital technologies such as: Internet access through computers – desktop, laptop and palmtop – mobile phones, information kiosks and digital television. Through these modern technologies, E-Government (defined by the Organization for Economic Co-operation and Development

as ‘the use of information and communication technologies [ICT], and particularly the Internet, as a tool to achieve better government’) is widely perceived to be fundamental to reform, modernization and improvement in the public sector [1].

The official role of CIO was present in organizations in the early 1980s, its appearance being mainly the result of the necessity to cope with information technology (IT) revolution. At that moment, with an increasing amount of time and money invested in information technology systems, executives had a growing awareness of their competitors using IT to gain competitive advantages and recognizing the need to become directly involved in the management of the new technology [2].

The private organizations have become more rapidly aware about the importance of the CIO in their structures, and experienced earlier the benefits of the executive officer responsible with information technology for internal processes and for delivering products or services to the people. Moreover, while private sector experienced the success of the implementation of the CIO, in the public sector, it was at a formative level. The governments were still trying to identify the problems, opportunities and challenges of such positions, using information and communication technology as an essential tool

in driving the modernization of public administration claimed by the sustainable development of our society.

Later on, as a direct consequence of the dependence of governments on ICT, the role of CIO has become more consistent for internal management, delivery of services to citizens and meeting the demands of the permanently growing digital environment.

Today, when ICT is viewed as an essential tool for driving the modernization processes of public administration in order to get a sustainable development of our society, effective CIOs must take care methodically of organization activity, by applying different formulas of success and by combining technical knowledge with businesses knowledge, in order to generate positive results.

After exploring the evolution and the competencies of the CIO, this paper will outline the main features of USA Federal CIO Council, initially from a normative framework perspective and then from the perspective of its 2016 membership background.

2. THE ROLE OF THE CIO

2.1. What is the CIO?

Broadly defined, the CIO is responsible for ensuring that the organization’s information and

technologies investments are on the same line with strategic business objectives. To this effect, the CIO position has emerged as the key executive for information assets, operations, and policy, but also as a responsible person for the effective oversight of organization's architecture and support, and for more modern features like internal network implementation, software development, and information management.

Even though the initial role of the CIO was a technological one, calling for a background in the information and communication technology (ICT) domain, the CIO responsibilities have been stretched out beyond its traditional role to include strong business background with important functions, both at tactical and strategic level within organization.

Synnott and Gruber first coined the CIO term in 1981 by defining it as the "senior executive responsible for establishing corporate information policy, standards and management control over all information resources" [3]. This was the first time when CIO was viewed not only as a technical expert, but also as a manager. From that moment, the specialty literature generally agreed to define the term of CIO based on its already mentioned identified attributions or by describing what he/she should do, while other authors

have supported the importance of the CIO with additional attributes.

The further studies, whatever how expressed their findings, the authors advocate generally that, even though the CIO profile will always be associated with technological issues, it must be seen firstly as a management executive.

2.2. The CIO in the public sector

The type of area (private or public) to whom one particular organization belongs is another fundamental point of reference in defining and understanding the importance of the CIO. There are various points of view of the specialty authors regarding the similarities and differences between the two sectors and, in order to better understand the CIO issues, it is necessary not only to comprehend public sectors' components but also to realize how it evolved differently over time.

On one hand, the private sector is made up of all size of organizations that belong to an individual or to a group of entrepreneurs, commonly referred as shareholders, are funded by the customers purchasing goods or services, and their ability to perform, operate and succeed are constrained or imposed by market forces. On the other hand, the public-sector departments, agencies and authorities are owned and funded collectively by the members of the governmental

and local communities, while the control is subject to the imposition of political forces (such as change of political party leadership).

Even if both sectors have the same function in terms of management (organizational purpose, developing objectives, planning, managing human resources, controlling the organization's performance), the differences are more prominent in relation to time perspectives, performance measurement, media relations, authority, legal and personal constraints. The internal characteristics of public agencies are viewed as distinctive in three main ways [5]:

- more bureaucracy: more formal procedures for decision making, and are less flexible and more risk-averse than their private sector counterparts;

- more red tape: an unnecessary and counter-productive obsession with rules rather than results, and with processes instead of outcomes (often regarded as a pathological side-effect of bureaucracy);
- lower managerial autonomy: managers in public organizations have less freedom to react as they see fit to the circumstances that they face, and public managers' discretion on personnel issues is especially low because rules on hiring, firing and promotion are inflexible.

The CIO roles and responsibilities in the public sector are evolving fast due to the increasing role of ICT for government processes and electronic services for citizens, emphasizing the importance of the CIO this sector, beyond that granted within the private sector.

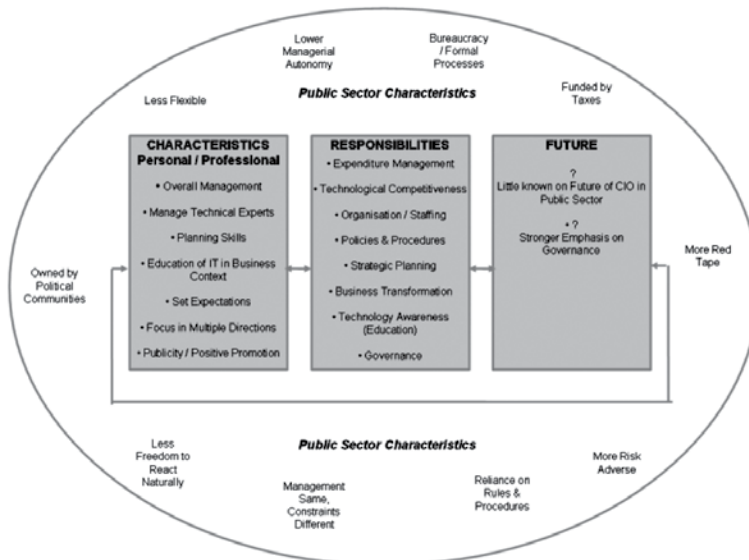


Fig. no. 1. Adapted model of the CIO in the public sector [6]

Based on the above-mentioned premises, a debate on the multidimensional and complex characteristics of both sectors should not impede the thought that the CIO positions in the public sector have been greatly outdistanced by the private sector's ones, due to the restrictions in which it operates and the future of the position (**Figure 1**). Nevertheless, the greater part of the available information about CIOs in the public sector is related to actual issues, being mainly about how they are key players in the reinvention process of governments or about how they struggle to implement the new technological era's instruments in order to better cope with the citizens' requirements.

The main reason for successfully raising the IT function to the top management level was that public sector leadership understood that technology is a strategic tool to improve processes in an exponential way, eliminating internal problems and re-work, and adding value, based on new social demands, global competition, tax crises, political competition, development of new technologies, demand for local government services. In some cases, there were four additional motivations for the creation of the CIO position:

- the globalization context;
- a change in paradigms and ways of thinking about IT;

- a customer-centric approach;
- business pressures related to efficiency and effectiveness of government procedures and services.

The functions of the CIO were gradually changing from purely operational to more strategic in nature. Structurally, the old IT department was replaced with a new CIO office at the executive level with new objectives:

- continuity and long-term vision;
- continuous improvement while focusing on the main business processes;
- establishing a technological vision for Executive Level Managers and Officials;
- cultural change (to introduce important changes in behavior and influence the expectations of individuals across the local government and to reduce individual resistance to technology and organizational change);
- IT training and development.

However, in order to better understand the impact of the transformation process, we have to mention some of the important challenges that the CIOs should face, mostly at the organization level, but also at the individuals level:

- staff deficiencies such as unmotivated personnel, lack of training, resistance to change, and low educational levels;

- mid-level public managers lack a vision about technology;
- lack of human and financial resources;
- absence of an adequate legal and regulatory framework (privacy of personal data, security, electronic signatures, electronic invoices, etc.);
- no collaborative and technological culture among government agencies;
- significant economic, social, educational, and digital divides among individuals and organizations.

3. THE COMPETENCIES OF THE CIO

3.1. The competencies of the CIO

In the specialty literature, the competencies of the CIO are greatly based on the information provided by private companies, mainly due to the recognition of its role in this sector. However, more and more internet-recorded examples around the globe worth mentioning when we speak about models of success in the implementation process of the CIO position within the public sector.

Many authors, from both private and public sectors, have tackled the competencies of the CIO, by describing what he/she should do or by looking at the relevant trends in the area, (like business environment, rapidly changing technology and increasingly IT demands for domestic/governmental users).

The preliminary ideas to define a CIO model occurred in the early '80s, with the goal to meet the challenges of the information systems function in the coming years. Based on the fact that the information management function has expanded incredibly, and with an even greater development in the near future, the public sector leadership initiated an extensive process to search and to develop a CIO model that should offer authority, by encompassing requisite personal and managerial attributes that CIOs must have [4]:

- considerable political, organizational and communication skills;
- involvement in, understanding of and experience in the overall management of the business;
- understanding of and the ability to manage technological experts;
- development of the appropriate human resource management skills;
- planning skills with particular emphasis on strategic planning and the management of change;
- increasingly sensitivity to the human, organizational and social impacts of the new technology, and the ability to proactively plan;
- having the skills to be a manager of managers.

These features indicate that the CIO is seen firstly as a management executive or business generalist and

secondly as a technological expert. Other authors advocate that the following qualities are ideal for a CIO profile [7]:

- honesty, integrity, sincerity, openness;
- business perspective, motivation, language;
- communicator, educator, motivator, leader, politician, relationship builder;
- continuously informed on developments in IT, able to interpret their significance to the business;
- change oriented team player, catalyst to business thinking.

Another description of the CIO is that of 'chameleon' with regard to their attributes and required skills [8]. Four specific characteristics are identified as attributes of the chameleon and,

in the same time, they express the required roles for the CIO:

- the ability to change is the ability to adapt to a constantly changing environment;
- the ability to see in multiple directions is reflected by the ability to envision the organization in a holistic manner;
- the ability to strike fast when required means the ability to remain ahead of the game on technological development;
- the ability to hang on when the going gets tough is the ability to endure the tough times when unrealistic expectations and failures occur.

We can define for these characteristics some skills that the CIO must own, with straight significance on the CIO position in a particular organization leadership (**Table 1**).

Table 1. The CIO skills and expertise

| Managerial skills and expertise | Technical skills and expertise |
|---------------------------------|--------------------------------|
| Strategic Planning | IT Acquisition |
| Financial Planning | Database Design and Management |
| Human Resource Management | Telecommunications |
| Communication | System Analysis |
| Project Management | Information Service Management |
| Leadership | Application Development |

The CIO is evolving together with the evolution of our modern society. It evolves from a technology leader to a critical transformer of organizations, which implies new skills, experiences and competencies.

Of course, the fundamental skills, like basic technical knowledge, are still considered to be a set of entry-level requirements for any CIO.

The new CIO (CIO 2.0) requires additional leadership skills, which

will define the future success in running an organization that is moving from an infrastructure and technology focus to another one that uses a process approach to offer agility and to respond rapidly to an increasingly fast-changing business environment. In the judgment of some authors [12], a balanced combination between:

- innovation (technology);
- coaching (listening, motivating

and developing a high-impact IT organization);

- management skills required in the new leadership role.

will enable an effective CIO. In order to support this idea, they mention some concrete leadership skills considered critical for a modern CIO:

- customer focus;
- total quality and performance management;
- organization and priority management;



Fig. no. 2: Development complexity of leadership skills

- motivating others;
- interpersonal communication.

Based on some long-term observations, they have discovered that the development effort required for each of the skills is not equal (Figure 2). Whereas a skill like customer focus is something that can be acquired fairly quickly, learning effective interpersonal communication is something that will take a lot more time before a person become fully skilled in that area. It may even be argued that both

motivating others and interpersonal skills are so critical to the role of new CIO and take such an effort to develop that they should be prerequisites. This would mean that these skills are integrated into the pre-screening of candidates and are tested during the assessment.

From the discussion of the attributes and skills of the CIO it is apparent that the CIO, to successfully integrate with the organizations executive team, cannot purely be a technology expert, but must also have

sufficient managerial skills. It is via the managerial skills that the CIO can effectively exploit the information and communication technology (ICT) within an organization and gain credibility for further investments.

Looking at the public sector characteristics, we can determine that the CIO role is permanently changing in concordance with the citizens' demands to have an improved access to tailored public services, greater accountability and transparency, and, at the same time, increased confidence in how governments handle their personal data and greater efficiency in services delivery. Due to the fact that legislation, politics and resources place very different demands on the public sector, there is a continuously need to create a function similar with that from the private sector, whose role should be to fulfill the requisite knowledge and competence in the needed domains of public sector.

A contemporary example of government modernization and transformation process around the world is the e-Government initiatives that are usually led by a CIO or an individual in a similar position. The role of CIOs in local governments is becoming increasingly important and more research about their actions and impacts is needed, not only from an academic perspective, but also for practical purposes. Currently, e-Government initiatives require a

high degree of specialization and knowledge about citizens' needs and government procedures. A strong CIO, with well-defined responsibilities, would help to make better decisions about the use of IT in government agencies. However, there are also important challenges and problems that CIOs face when performing their daily jobs. These challenges are not only related to technology, but also to the context in which their organization is embedded. Organizational, institutional, political, and other factors greatly affect the CIO's capacity to implement e-Government initiatives.

CIOs must have a broad skill set in order to be successful in their role as leaders of e-Government initiatives. The CIO is responsible for the ICT infrastructure, but application development and technical support responsibilities will be decentralized to lower levels like divisions and departments. He must have a people orientation and have to utilize communication, education, standards, and other indirect controls to perform the role of integrator and gatekeeper for new technologies. A review of the literature on CIO leadership reveals that communication with the people is important because it creates commitment across all stakeholders. The CIO must become an integral member of the top management team and have the corporate-wide responsibility for the information resources policy and strategy.

3.2. The CIO competencies: the USA approach

In their efforts to establish clearly the role of the CIOs, within the framework of a powerful legislative system, USA authorities issued in 1996 an official document (known as the Clinger-Cohen Information Technology Management Reform Act) that is defining a baseline of information resources management (IRM) knowledge requirements and duties at the level of US Federal Government.

The provisions of this act reflect that the CIOs, no matter if they are in civilian or military domain, shall have the appropriate qualifications to perform their duties, such as [9]:

- to have information resources management duties (primary duty);
- to monitor the performance of IT programs of the agency, evaluate the performance of those programs on the basis of the applicable performance measurements, and advise the head of the agency regarding whether to continue, modify, or terminate a program or project;
- as part of the strategic planning and performance evaluation process required:
 - to assess the requirements established for agency personnel regarding knowledge and skill in information resources management and

the adequacy of such requirements for facilitating the achievement of the performance goals established for information resources management;

- to assess the extent to which the positions and personnel at the executive level of the agency and the positions and personnel at management level of the agency below the executive level meet those requirements;
- to develop strategies and specific plans for hiring, training, and professional development, in order to rectify any deficiency in meeting those requirements;
- to report to the head of the agency on the progress made in improving information resources management capability.

The core body of the CIO competencies and their adequate learning objectives is periodically up-dated by the Federal Government, in order to ensure that critical knowledge areas affecting information resources management are captured. Significantly important is that the document is revised by considering the newest developing strategies and policies, continuous changes in technology, and other evolving IT/cybersecurity mission requirements.

The latest version of the above mentioned document [10] is

encompassing a core body of 12 competency areas identified by the US Federal CIO Council as fundamental to the effective management of federal technology resources:

- Policy and Organization;
- Leadership and Human Capital Management;
- Process and Change Management;
- Information Resources Strategy and Planning;
- IT Performance Assessment: Models and Methods;
- IT Project and Program Management;
- Capital Planning and Investment Control;
- Acquisition;
- E-Government (Information and Knowledge Management);
- Cybersecurity/Information Assurance;
- Enterprise Architecture;
- Technology Management and Assessment.

Each of the 12 competency areas has several subordinate competencies (see Annex A) and all subordinate competencies have associated learning objectives. The learning objectives form the foundation for curriculum development by the educational institutions offering approved programs under the CIO University Consortium umbrella. The objectives identify key concepts and capabilities to be taught and can also be used as a professional development guideline for both individuals and

organizations. Each individual's professional development roadmap can be achieved through a variety of methods, including formalized academic programs, mentoring, on-the-job training, professional details, and prior experiential assignments.

It is not expected that any one individual would master all management activities contained within these competencies. Areas of concentration would reflect individual job requirements, as well as personal development interests. Additionally, specific technical expertise outside the scope of these competencies may be required based on actual job roles. Federal Chief Information Officers should ensure that the knowledge, skills and abilities represented in each competency in this document are resident within their organization for overall staff productivity.

It is worth to mention that individual learning objectives have been mapped to the Office of Personnel Management's Executive Core Qualifications (where applicable), and attainment of these qualifications is required for entry to the Senior Executive Service. The mapping is provided to support multi-purpose leadership development for IT management and executive positions.

One important element to underline in the learning area is that the USA National Defense University CIO Program [11] is the recognized

leader in graduate education for Federal leaders and agency personnel. It directly aligns with the Federal CIO Council-defined CIO competencies and addresses the Clinger-Cohen Act and other relevant legislation mandates as well as the current administration's interpretations and implementations of these legislative actions. According to their main goal, the successful CIO graduates will be able to:

- lead within and across federal organizational boundaries by leveraging information, information technology, human, and financial resources to link critical decisions regarding resources, people, processes, and technologies to mission performance and information assurance;
- balance continuity and change in the development, implementation, and evaluation of government information resources and management strategies and policies while meeting legislative and executive mandates;
- build viable networks across defense, federal, global, and private sector partners;
- commit to lifelong learning and leadership development of self and others;
- communicate at the strategic level demonstrating command of the topic, logical organization, compelling argument, and excellence in English grammar and syntax.

Based on the elements presented in this chapter, we can conclude that the main development in the role of the new CIO is the shift from a traditional technology-centric role to a business-centric and innovation role. The skills and technical competencies that characterized the CIO of the past are still essential, but are no longer sufficient to fulfill all expectations of this function moving forward.

4. A 2016 ANALYSIS OF THE UNITED STATES OF AMERICA FEDERAL CIO COUNCIL MEMBERS' BACKGROUND

4.1. The Federal CIO Council

Initially established in 1996 as “information technology architecture”, by Executive Order 13011, Federal Information Technology Management Reform Act (also known as the Clinger-Cohen Act), the Federal CIO Council was codified into law by Congress in the E-Government Act of 2002. It serves as the principal interagency forum to improve agency practices related to the design, acquisition, development, modernization, sustainment, use, sharing and performance of Federal Government Information Technology [13][14].

In accordance with what it is mentioned in its charter, “the CIO Council aspires to promote a bright and prosperous future for the United States through the

strategic use of Federal Information Technology” [15]. Also, it seeks to improve government performance, effectiveness and efficiency, by protecting and defending resources, by proposing new ways to achieve the government’s goals with a better use of enabling technology in order to more effectually bring government services to the USA citizens.

The CIO Council is one element of an interagency support structure established to achieve Information Resource Management (IRM) objectives delineated in, but not limited to, the E-Government Act of 2002, and other related federal or governmental official documents like: Federal Information Security Management Act (FISMA-2002), Government Paperwork Elimination Act (GPEA-1998), Paperwork Reduction Act (PRA-1995), Government Performance and Results Act (GPRA-1993).

Correlating its legal framework with other related documents or studies from the specialty literature, we can conclude that the CIO Council is a strong source of knowledge and experience. It is continuously providing an important forum for governmental agencies to align their on-going activities and projects, and to work on new initiatives in order to better shape the future, by performing particular functions, directly, or through assistance for other structures, such as:

- develop recommendations for government IT management policies and requirements;
- establish government-wide priorities on IT policy and monitor their implementation and develop recommendations on IT standards;
- share experiences, lessons learned, ideas, best practices, and innovative approaches related to IT management and promote common management performance measures for agencies information resources management;
- identify, develop, and coordinate multi-agency projects and other innovative initiatives in order to reduce duplicative IT investments and drive the efficient use of IT resources across agencies;
- promote collaboration and community building among Federal Agency CIOs for purposes of sharing best practices, transferring knowledge and developing a unified approach for addressing Federal IT challenges;
- promote the development and use of common management performance measures for agencies information resources management;
- assess and address the hiring, training, classification, and professional development needs of government employees in areas related to IT management.

In accordance with its legal framework, the leadership positions within CIO Council are the following:

- the Chairperson of the CIO Council is the Deputy Director for Management for the Office of Management and Budget (OMB);
- the Director of the CIO Council is the Administrator, Office of E-Government and Information Technology, Office of Management and Budget;
- the Vice-Chairperson of the Council is elected by the Council from its membership.

The CIO Council leadership is responsible for:

- promoting the Council activities and status within the Federal IT community;
- convening the Council on a regular basis and presiding over Council meetings;
- acting as an advocate and elevating issues to the appropriate levels on behalf of the Federal CIO community;
- participating as leaders of the broader Federal IT community to help foster cross-agency collaboration and shared solutions above and beyond agency silos.

The membership of the Council comprises the CIOs, Deputy CIOs and Chief Technology Officers (CTOs) from the Federal executive departments, agencies and offices, as well as additional liaisons and ex officio members.

The Council has a number of standing committees where CIOs and their staffs can work on important issues and initiatives. The governance structure has been designed to provide maximum flexibility to create committees as requirements and priorities change. The Council supports and conducts ongoing information exchange with a number of self-organizing Communities of Practice (CoPs) which address important IT topics and issues. The 2016 committees are focused on Innovation, Cybersecurity and Workforce, and the IT topics and issues include the Privacy and Accessibility. By working within a structure that combines formal committees, short-term, agile working groups and communities of knowledge experts, the Council ensures that the most relevant and pressing Federal IT topics are addressed across the Federal CIO community.

4.2. The Federal CIO Council members' background

The main purpose of this part is to establish a possible career roadmap for a CIO model or, at least to draw some concrete conclusions with regard to the background of the members of the USA Federal CIO Council. In order to tackle this topic, I have analyzed all the available information found within members' CVs posted on the official website of

the Council [13]. With the purpose to establish the main elements to trigger the findings, I have selected firstly few indicators that could permit to draw several conclusions, and to establish, where possible, some patterns or trends. Chiefly, these indicators are related to the areas of expertise, from educational and professional perspectives. Nevertheless, their portfolios (in terms of money and people) and years of experience in some particular fields, and their awarded distinctions and titles represent other useful pieces of information that should add value to this analysis.

In order to accomplish my goal, I have analyzed the main details from members' CVs. The available information was valuable for my effort to establish the trends or for drawing some conclusions, even though, the complexity and variety of the educational system coupled with the diversity of the professional positions, sometimes, hampered the process.

When this study was handed, the Federal CIO Council was encompassing 33 members. However, during the initial stages of my research, were registered 43 persons on the Council official website. Looking again at the CIO Council membership, I have realized that the difference is represented by the Deputy CIOs that, with two exceptions, were eliminated from the Council website (and possible

from Council itself) although the legal framework permits their participation. The two Deputy CIOs remaining in the Council serve for the Office of Management and Budget, the agency that legally nominate the Chairperson of the Council, and for the Department of Homeland Security, the institution to whom is belonging the elected Vice-Chairperson of the Council. Most probably, the decision to keep these Deputy CIOs within the Council membership has the role to give the Council's leaders the necessary room for their assumed-by-law duties outside of the CIO community, while their original agencies are to be represented inside the CIO Council committees. Beyond that, the process to depict the conclusions was impeded slightly by the few missing CVs.

After exploring the CVs content, I could easily conclude that all members have graduated a diversity of university studies, by earning different degrees within various specialties. The percentages related to the foremost domains in which they have earned their bachelor's degrees are the following:

- 45% in technical domains (e.g. engineering, computer science, physics, chemistry);
- 25% in business or public administration;
- 14% in military domain;
- 16% in others (e.g. law, history, political sciences).

For the superior level of their educational path, the Council's members choose to apply for a master's degree in different domains, as follows:

- 48% in technical domains (e.g. engineering, IT management, research technology);
- 43% in business or public administration;
- 9% in others (e.g. law).

What is interesting to notice here, based on a trend analysis coupled with the reflection of these numbers, is that 52% of the members have continued their careers at the higher educational level, within their initial specialty (28% - technical, 20% - administration, 4% - others). On the other hand, the rest of them (approximately 20-23% from each of them) and those members that possessed different other backgrounds have decided to improve their knowledge and skills by obtaining a master's degree in the other key domain for a modern CIO background, but with an increase number in favor of business administration domain. Correlating all this facts, we can conclude that even though the necessity of expertise in the technical domain has been considered important, the interest to earn a degree in business or public administration increasingly affected their decisions to follow the higher education levels.

Different types of other certifications detained by Council's

members represent additional significant elements related to their educational background at which we have to look at. As an example, almost half of them hold a project management certificate, while others are leading to the idea of the multidisciplinary characteristics of their personal background. Moreover, many of them mention in their CVs the IRM certificates and the CIO certificates earned from the US National Defense University.

The discussion about Council's members experience is very provocative and implies many correlations. As a general fact, all of them have a professional experience of at least 20 years, with extensive experience in technological and/or managerial domains. With just few exceptions, their careers touched both the private and the public sectors that clearly have contributed enormously to their future professional development. Prior to be part of the US governmental agencies, more than 80% of them have worked in private universities or prominent multinational companies such as: Microsoft, HP, Dell, Lockheed Martin, Boeing, GMC, Ford, Walt Disney, PricewaterhouseCoopers, Ernst&Young. Within these high-level companies, they were serving as project managers or executive leaders (CEO – Chief Executive Officer, CIO – Chief Information Officer, CTO – Chief Technical Officer),

fact which demonstrates that many of them come from the high-level leadership. As a general aspect, almost all CIOs were responsible within their previous workplaces to give directions for day-to-day operations but, also to provide strategic guidance, oversight and management for IT investments programs of their agency. As a result, in time, they shaped their personal profile with powerful strategic leadership competencies and with some backgrounds firmly founded on delivering business value with technology.

Tracking their positions in time, I can say that, probably, after working in the private sector, for many of them it was like a new challenge to do performance in the public sector, a more rigid, but more demanding one. Moreover, they had to shift from one very competitive environment, represented by the private sector, towards one that requires a high level of coordination and inter-agencies cooperation under the US governmental umbrella. Most probably, their extensive corporate experience and their prior notable successes prevent them to fail in their new assignments whereas the level of competition is somehow diminished, but the requirements for a smooth governmental function are leading.

Equally important for their careers was to continuously value the opportunities to broaden their

area of expertise thru developing multidisciplinary competencies in other interconnected domains: enterprise architecture, strategic planning, investment control, budget and acquisitions, financial management, contracts and procurements, information operations, knowledge management, information sharing, information security, human resources management etc. Many of them are very keen to mention their personal competencies and to ensure that they were consistent with their former positions and achievements.

Another significant common element results from the analysis of their personal path after joining the governmental system. For at least half of them, once becoming part of the public system, and after serving at "lower" levels (CTO, Deputy CIO, Associate CIO, director, chief etc.) within a certain structure, they were promoted to the upper organizational levels or into another governmental agency, in order to keep them inside the system and to further value their knowledge and experience. As an example, I want to mention the situation of one remarkable CIO with his first governmental commitment within the Department of Homeland Security (DHS), while his initially workplace was in a private company. Currently, he is working for the Department of Energy, but after

joining the DHS, he served for the White House.

The next particular conclusion is related to the fact that some of the members were pioneers in different moments of their careers. Here, I have to mention the first CIO of the Department of Homeland Security, the first CIO of the state of Hawaii and the one who implemented the first National Call Centre to provide emergency financial assistance during a natural disaster.

Even though the above-mentioned information reflects the main characteristics of the CIOs, I would like to present another important indicator that, in my view, clearly underline the magnitude of their responsibility. Apart from having pivotal roles in their agencies, some of them are responsible to oversee impressive budgets that could reach 17 billion (Air Force CIO) with a huge number of personnel and assets in their portfolio. In these conditions, it is true that the complexity of the CIO role can appear overwhelming, and it is difficult to balance the operational, daily activities and the strategic component of the CIO role. Depending on the size and complexity of the organization, we can suppose that in their structure, it may be necessary to appoint a Deputy CIO or a Chief Technology Officer (CTO) to take care of the more operational aspects. This can give the CIO time to work on the strategic and coaching part of the

role and add value by managing the key business stakeholders.

As a last outcome of my analysis, I would like to mention that for the remarkable results during their professional career and as proofs of their performance, some members of the Council have been awarded over time by the US president and other different governmental agencies, or by professional publications, prestigious companies and international associations. They were also included in federal or international CIOs tops that prove, once again, the social appreciation of their abilities to be visionary executive leaders with global experience. Taking into consideration that one important feature of the CIO is to motivate people, I consider that this recognition of their professional achievements is an important element that encourage them to continue with energy and effort to find the best solutions to support their organizational future developments.

5. CONCLUSIONS

Because most businesses are so heavily dependent upon IT, a CIO is forced to work in a very modern and demanding environment. Due to the expansion of the CIO's traditional role, the job of a CIO has become more stressful, more business-oriented, and less hands-on.

The duties of today's CIOs require a set of particular skills that includes both a strong business background

and a core technical background. However, a CIO is not (or should not be) the lead engineer or programmer. The CIO is the business executive, charged with mapping ICT initiatives to the goal of the organization. To accomplish this, a CIO must be a positive leader, an effective communicator (skilled in both listening and speaking), a persuasive negotiator, and a customer-orientated individual.

The importance of ICT in government modernization and transformation is recognized by the governmental and political leaders. This makes the CIO one of the important pillar in public administration transformation plans that concurrently offer the opportunity for CIOs to redefine their role in order to fulfill these higher expectations.

The USA Federal CIO Council is focused on understanding the nature of this ever-changing environment and harnessing the combined expertise that exists across the federal government to evaluate and implement new technologies. As a consequence, USA is building and maintaining a leadership position for nation and citizens in the current information age in order to transform the federal government to one that is citizen-centered, results-oriented, and market-based, and to improve government's performance, efficiency, and effectiveness.

After analyzing the CVs of CIO Council members, I can conclude

that all of them have demonstrated strong abilities to build and sustain relationships between public and private sectors stakeholders, by leading innovative projects and inter-agency initiatives. Acting as change agents in modernization and transformation of governmental agencies, they all have the ability to manage large-scale projects and to implement technologies and business strategies, in order to serve better the interests of US citizens.

Looking back at all the above-mentioned considerations, I can conclude that the US system regarding CIOs role within governmental agencies is very well regulated, starting from the federal legal framework and finishing with the educational programs that should allow them to achieve the core competencies required to perform such a complex and demanding duty. This kind of approach could be an example for every one that intends to have solid investments in the future of their organization, community or nation.

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THE PATH TO JOB SATISFACTION. APPLYING THE THEORY OF PURPOSEFUL BEHAVIOR TO MILITARY CONDITIONS

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The aim of this study was to examine the relationships between, on one hand, personality and performance orientation and, on the other, job satisfaction and turnover intentions, using Barrick's et al. theory of purposeful behavior. Using a questionnaire, data about job satisfaction, performance orientation and turnover intentions were collected from 300 newly recruited Swedish soldiers. A path analysis gave partial, but not full support to the assumptions behind the theory of purposeful behavior model. No relationships were found between the personality traits of emotional stability and conscientiousness, nor to either performance orientation or directly to job satisfaction. On the other hand, performance orientation showed a consistent relationship to perceived levels of the job characteristics, which mediated the path between the person-related variables and the outcome variables. Performance orientation also showed a strong direct relationship to general job satisfaction, which, in turn, was strongly related to turnover intentions.

Key words: job satisfaction, performance, turnover intentions, military, path analysis, personality.

1. INTRODUCTION

Employee turnover is a major problem for organizations because recruiting, selecting, and training new employees is an expensive

and demanding task (Dick et.al.: 2004). Argote, Insko, Yovetich and Romero (1995) found turnover to be negatively related to productivity. There are different explanations for causes behind turnover or turnover

intentions. Several studies (e.g. Jaiswal, Dash & Mishra, 2016; Judge, Piccolo, Podsakoff, Shaw and Rich, 2010; Rynes, Gerhart & Minette, 2004) show the importance of pay in relation to turnover, as well as to job satisfaction and employee motivation. On the other hand, Ghosh, Satyawadi, Joshi and Sahdman (2013) suggest that commitment (normative and affective) and goal clarity are the best predictors of turnover intentions or intentions to stay in the organization. Tett and Meyer (1993) found that job satisfaction and organizational commitment predicted turnover intentions, but that job satisfaction was a stronger predictor. Turnover intentions can be explained as a psychological withdrawal, which eventually may lead to actual turnover (Jaiswal, Dash and Mishra, 2016). Lee and Mowday (1987) claim that turnover intentions are a robust indication of actual turnover, hence making turnover intentions a strong warning sign for actual turnover. Several studies have demonstrated a negative correlation between job satisfaction and staff turnover (e.g. Harrison, Newman & Roth, 2006; Saari and Judge, 2004). Yang and Bartlett (2004) demonstrated that turnover intentions were reduced by organizational learning culture and job satisfaction. The main conclusion is that satisfied workers are less likely to leave the organization. There is thus a relation between job

satisfaction, turnover intentions and actual turnover (Harrison, Newman & Roth, 2006; Kohler & Mathieu, 1993). Furthermore, Van Eetveldt et al (2013) showed that perceptions of career insecurity increased turnover intentions; the latter was also associated with lowered affective organizational commitment, which in turn increased turnover intentions. Younger workers seem more likely to change jobs than older, more experienced employees (Farber, 1999; Moynihan & Landuyt, 2008). DelCampo (2006) argues that younger workers are less likely to have established a good person-job fit, meaning that they are keener to seek other jobs that match their skills, interests and values. New employees also tend to have lower salaries, implying that they may be able to find higher paying jobs with other employers (Ippolito, 1987).

2. TURNOVER IN THE MILITARY

The armed forces highly rely on attracting young people. In 2010, the Swedish Armed Forces (SAF) replaced general conscription with voluntary basic military training. Therefore, the SAF became reliant on a sufficient number of people applying to join the organization voluntarily. Until 2010 conscription guaranteed the supply of personnel to the organization. Since 2010, however, SAF have had to compete with civilian employers in the labor

market for qualified personnel. Since the end of the Cold War, the SAF have also had a long period of downsizing the organization. This new recruitment scenario has made SAF pay attention to the psychosocial working conditions of its peacetime organization (Österberg & Rydstedt, submitted manuscript). Retaining personnel is a major challenge for the SAF, as the attrition rates are too high to keep the personnel system in balance. Several studies (e.g. Rydstedt and Österberg, 2013, Eighmey, 2006 and Manigart, 2005) display the challenges for armed forces in recruiting and retaining personnel in an all-volunteer forces system. There are also studies of turnover in the military context. Harrington, Bean, Pintello and Mathews (2001) showed that people were more likely to intend to leave, if they had lower levels of intrinsic job satisfaction, and Proyer *et al* (2012) found that a positive psychological functioning, e.g. meaningful life, correlated with work satisfaction. Lytell and Drasgow (2009) found that withdrawal intentions predicted voluntary turnover. Following the theoretical framework and the new situation for the SAF, the aim with this study was to examine, on one hand, the relationships between personality and performance orientation, and, on the other, job satisfaction and turnover intentions, departing from the Model of Purposeful Behavior - PBM (Barrick, Mount & Li, 2013).

3. SITUATIONAL AND PERSON-RELATED APPROACHES TO JOB SATISFACTION

According to Barrick *et al.* (2013), there have traditionally been two approaches to the analysis of work-related behavior or performance, either as situational factors at work or as a function of personal dispositions. The first approach mainly focuses on the meaning of work, and one prominent situational model is the Job Characteristics Model (JCM) (Hackman & Oldham, 1975; 1976). The JCM identifies five critical dimensions of work content: autonomy, skill variety, task identity, task significance, and feedback from the job. These situational factors are given primacy in the model, although their impact on wellbeing and motivation are understood to be mediated by the critical psychological states (*i.e.* perceived meaningfulness, responsibility and knowledge) of the workers. The validity of the JCM has received sound empirical support in several review and meta-analytical studies (e.g. Boonzaier, Ficker & Braam, 2001; Fried & Ferries, 1987; Humphrey, Nahrgang & Morgeson, 2007; Parker *et al.*, 2003).

The second cluster of theories concerns dispositional or person-situational approaches, like the person-job fit theory of Anderson, Flynn and Spataro (2008). Studies of job satisfaction over time

(Arvey et al., 1989; Brief et al., 1988; George, 1989) imply that job satisfaction relates to stable traits and inherent dispositions. Furnham and Zacherl (1986) found that extraversion correlated positively - and neuroticism correlated negatively with job satisfaction, as did Judge, Heller and Mount (2002). Furthermore, Staw and colleagues (1985; 1986) showed that individual job satisfaction was stable over prolonged periods of time, even if job changes occurred. In a meta-analysis Judge, Bono and Heller (2002) found consistent relationships over time between job satisfaction and the traits included in the Five-factor model of personality (FFM), particularly neuroticism (negative), conscientiousness and extroversion (positive). Zimmerman (2008) also shows how personality traits relate to turnover decisions.

4. THEORY OF PURPOSEFUL BEHAVIOR – AN INTERACTIONAL APPROACH TO WORK- RELATED PERFORMANCE

The Theory of Purposeful Behavior, represents a recent development in the interactional approach to the analysis of work-related behavior. More specific than earlier theories, it suggests that personal dispositions and job characteristics interact in influencing work outcomes (Barrick et al., 2013). The main assumption is that

personality traits make the individual prone to striving for the types of purposeful goals that match his/her personality. When the personal motivations associated with striving for these goals are supported by the job characteristics, a psychological state of experienced meaningfulness is reached. In order to study the relationship between these two motivational dynamics, Barrick et al (2013) propose the concept of achievement striving motivation as a mediator. It is described as “...*an employee's desire to complete things in a timely, careful, efficient way and... characterized by a strong focus on getting things done*” (Barrick et al., 2013:145).

The personality dimension of the theory consists of the traits from the FFM (Barrick & Mount, 1991; Costa & McCrae, 1992). These traits are proposed as interacting with specific job dimensions. Striving for purposefulness and experienced meaningfulness are understood as important aspects of psychological well-being, and the PBM implies that individuals are motivated to pursue their higher-order goals. This pursuit, in turn, is affected by situational factors (Barrick, Mount & Li, 2013).

While the theory of purposeful behavior departs from a personality trait perspective, the model also integrates social-cognitive dispositional assumptions. The individual is assumed to be motivated and driven by “*superordinate implicit goals or personal agendas*”

(Barrick *et al.*, 2013:133), rather than by personality traits or situational conditions directly. These higher-order goals derive from a person's situational interaction rather than being a direct reflection of either of them. *"A central tenet of theory is that personality traits – through the pursuit of higher order implicit goal – and job characteristics jointly influence experienced meaningfulness of work"* (Barrick, Mount and Li, 2013:138).

While personality traits are supposed to affect the direction of the

higher order goals, it is the impact of these higher order goals rather than the traits *per se* that is expected to interact with the proper type of job characteristics to bring about motivation and job performance. The theory is thus based on two sets of testable assumptions – that different personality traits drive specific types of higher order goals, and that these goals interact with job characteristics to determine positive attitudes. The Theory of purposeful behavior can be explained in the model below.

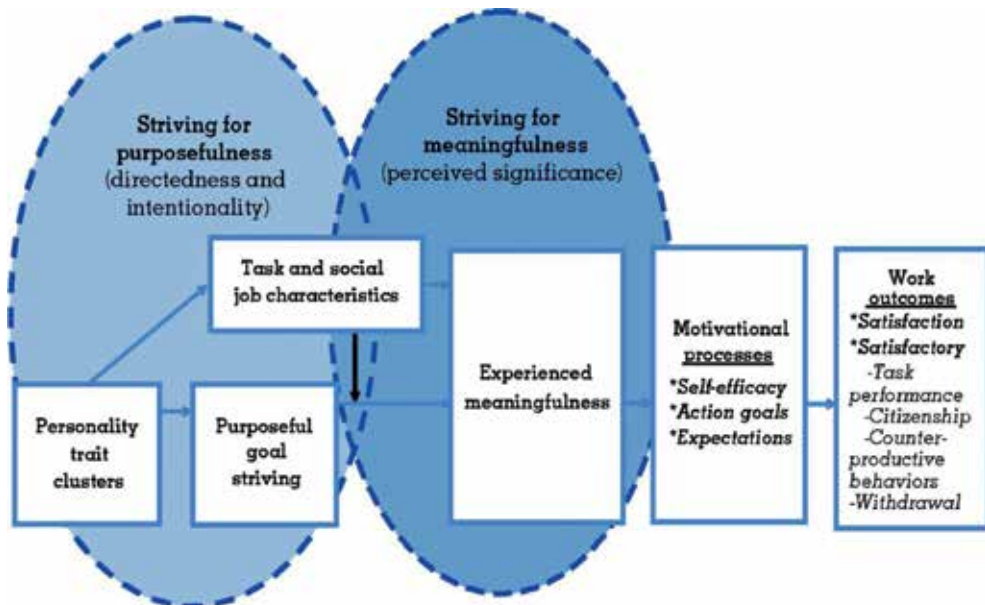


Fig. no. 1. Striving for purposefulness and meaningfulness

Source: Barrick, Mount and Li. 2013:134

According to the theory, for the two personality traits on which the present study focuses, namely conscientiousness and emotional stability, it is suggested that they relate

to motivation for achievement striving (Barrick *et al.* 2013). The following two hypotheses in accordance with Barrick, Mount and Li (2013) propositions were analyzed:

H1. Conscientiousness and emotional stability are positively related to higher order achievement striving motivation.

H2. The relationship between the higher achievement striving motivation job satisfaction are interactively related to three job characteristics: task identity, feedback from the job, and feedback from others.

5. RESEARCH METHOD DESCRIPTION

5.1. Participants and questionnaire administration

Questionnaire responses were obtained from 300 soldiers employed during 2012 and 2013. They represented all three fighting services. Six units (two from each fighting service) were invited to participate in the study and five of them responded positively. Due to the low response rates (less than 15 responses per unit), two of the units were excluded from the study. The response rate for the three remaining units (one from each fighting service) was 42 %. There were only private soldiers included in this study as they constituted a new group on the labor market, contracted soldiers, thus no officers were included in this study.

The sample mainly included men (91%) and the mean age was 24 years; 40% had completed basic military training and 60 % conscription. 60 % was employed in the Army, 25 % in the Air Force and 15 % in the Navy. A

description of the sample is shown in **Table 1**. The number of personnel in total in the SAF divided into branch in 2013 was as follows: Army 13 078, Navy 3 254 and Air Force, 3 741.

The data was collected with assistance from points of contacts at the different units. Each soldier/sailor was handed a questionnaire and an addressed envelope. To guarantee that the participants responded anonymously, the participants sealed and posted their own questionnaire. The questionnaire contained written information about the study. All participants were treated in accordance with the ethical principles of human research formulated by the Swedish Research Council (2002).

5.2. Ethics

Informed consent was obtained in advance, and participants were able to opt out at any time. Data collection was carried out by officers at the military units. The authors had neither access to personally identifying information nor points of contact. The study underwent an ethical examination at the Swedish Defense University institutional review board.

5.3. Instrument description

The questionnaire included some initial demographic variables and the other contents are presented in the following. For testing our hypotheses, we used The Job descriptive Survey (JDS) for measuring job

characteristics, where a 7-grade Likert scale is used, ranging from not agree at all, to totally agree is used. Performance orientation comprise of an own created index with two questions from the JDS, and two questions from Fors-Brandebo et al (2012). The Single Item Measure of Personality were used for measuring personality

5.3.1. The Job descriptive Survey

The (JDS) was developed by Hackman and Oldham in 1974,1975 and was modified in 1980. The JDS is based on a theory of how job design affects work motivation, and offers measures of (a) job dimensions, (b) individual psychological states, (c) affective reactions of employees to the job and work setting, and (d) individual growth need strength (Hackman, 1974). The core job characteristics are: Skill Variety: The degree to which a job requires various activities. Task Identity: The degree to which the job requires the workers to identify and complete a work piece with a visible outcome. Task Significance: The degree to which the job impacts other people's lives. Autonomy: The degree to which the job provides the employee with freedom, independence, and the option to plan out the work and regulate the procedures in the job. Feedback from job itself: The degree to which the worker is provided with clear, specific, detailed, information about the effectiveness of his/her job performance.

The three basic psychological critical states theoretically promote high performance, motivation, and satisfaction at work. The critical states are that a person must experience the work as meaningful, valuable, and worthwhile, and feel responsibility for the result of the work and finally that a person should have knowledge of the results of the work.

5.3.2. Job characteristics

These were measured by JDS Hackman and Oldham's (1974, 1980). Feedback from job itself: from Hackman and Oldham (1976), refers to the degree to which people learn how effective they are at work. Feedback at work may come from other people such as supervisors, peers, and customers, or it may come from the job itself. (Chronbach alpha. 57) Task identity: from Hackman and Oldham (1976), refers to the degree to which a person is in charge of completing an identifiable piece of work from start to finish.

5.3.3. Personality

It was measured using the Single Item Measure of Personality (SIMP), (Woods and Hampson, 2005), which is a short form of the Big Five or the FFM. The SIMP showed a mean convergence of $r=0.61$ with longer scales of Big Five measures, as well as acceptable reliability compared to longer scales. For emotional stability, the median value was 7.0 (SD 1.65) and for conscientiousness 4.17 (SD

1.70) respectively, on a nine-point Likert scale. The SIMP is constructed as follows:

“How much does each description sound like you?”

“Generally, I come across as:”

Emotional stability ranges from *“someone who is sensitive and excitable, and can be tense,”* to *“someone who is relaxed, unemotional rarely gets irritated and seldom feels blue.”*

Conscientiousness ranges from *“someone who likes to plan things, likes to tidy up, pays attention to details, but can be rigid or inflexible”* to *“someone who does not necessarily work to a schedule, tends to be flexible, but disorganized and often forgets to put things back in their proper place.”*

5.3.4. Performance orientation

We used performance orientation as a proxy for achievement striving (Barrick, Mount & Li, 2013). Our index for achievement striving comprised

do”. The second two questions were derived from a qualitative interview study, by Fors-Brandebö et al (2012): *“I feel that my work contributes to accomplishing the unit’s task”* and *“I feel that I am able to put my skills to good use”*.

5.3.5. Turnover intentions

An index of four questions was used for turnover intentions (Cronbach’s alpha .84). *“I look around for civilian employment”*, *“I want to be trained and then leave the SAF”*, *“I will not stay long in the SAF because of the low salary”* and *“I have decided to leave the SAF”*.

5.4. Results

In an initial analysis, there was no significant relationship between the two personality measures and the measure of Performance orientation. The correlation between performance orientation and Emotional stability was .07 (n.s.),

| Scale | Cronbach’s alpha | Mean | SD | Range |
|------------------------------------|------------------|------|------|-------|
| Task identity (3 items) | .58 | 4.39 | 1.13 | 5.33 |
| Feedback from agent (3 items) | .70 | 4.40 | 1.18 | 6.0 |
| General job satisfaction (5 items) | .80 | 4.26 | 1.24 | 6.0 |
| Turnover intentions (4 items) | .84 | 4.52 | 1.72 | 6.0 |
| Feedback from job (3 items) | .57 | 4.65 | 0.99 | 6.0 |

Table 1. Descriptive statistics for the scales in the Job Description Survey (7-graded response scale) and for turnover intentions.

of four questions (Cronbach’s alpha .74). The first two are recovered from Hackman and Oldham’s JDS: *“In this job it is difficult for me to be concerned about whether or not it is done properly”*, and *“I feel a very big personal responsibility for the work I*

and with Conscientiousness .02 (n.s.). This clearly disproves Proposal A and Hypothesis 1. Naturally, the two personality variables also had no effect on Performance orientation in a tentative path model and, consequently, were not included in the final model.

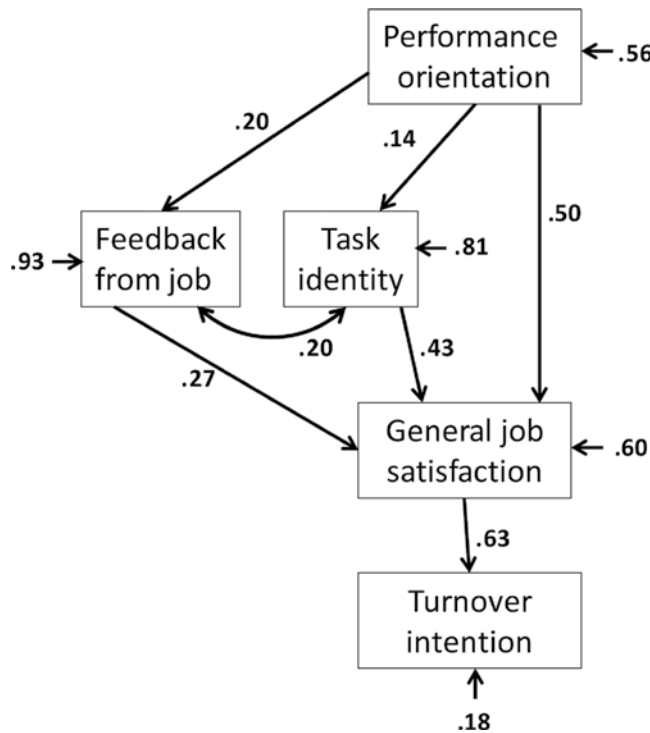


Fig. no. 2. Path model of relationships between *Performance orientation*, *Feedback from job*, *Task identity*, *General Job satisfaction* and *Turnover intentions* (XY standardized estimates)

5.5. Discussion

The aim of this study was to examine, on one hand, the relationships between personality and performance orientation, and, on the other, job satisfaction and turnover intentions, departing from Barrick's *et al.*'s (2013) Theory of purposeful behavior. The empirical analysis gave partial, but not full support to the assumptions behind the theory. No relationships were found between the personality traits of emotional stability and conscientiousness, either directly to performance orientation, or to job satisfaction. On the other hand, performance orientation showed a consistent

relationship to perceived levels of the job characteristics, which mediated the path between the person-related variables and the outcome variables. Performance orientation also showed a strong direct relationship to General Job Satisfaction, which, in turn, was strongly related to turnover intentions.

In contrast to the suggestions of the Theory of purposeful behavior, the personality traits analyzed (emotional stability, conscientiousness) were not related to performance orientation, nor to perceived job characteristics, or to job satisfaction. One possible reason for this may be the skewed distribution for neuroticism in our

sample, due to the psychological screening that precedes basic military training. Individuals that score high on neuroticism are excluded from employment in the SAF. Apart from the use of SIMP for the personality assessment, a possible explanation for the lack of a relationship between the personality traits analyzed – and performance orientation, job satisfaction and turnover intentions – the impact of homogeneity, and the low variance for emotional stability due to the selection criteria, could also explain the non-significant relationship. Our sample had undergone psychological screening before entering the SAF, hence there was a restricted range in our sample, mainly regarding neuroticism, because the psychological screening discriminates against those who score low (reversed score) on neuroticism.

On the other hand, our construct of performance orientation showed a significant relationship to job satisfaction, as well as an effect on the outcome, mediated by the job characteristics feedback from job and task identity. Thus, the findings in this study favor a process view rather than a trait view on the relationship between personal disposition and work-related behavior and attitudes. The low correlation between task identity and feedback from job, with the outcome variables, may possibly be explained due to that high performance orientation may overrun job content. The transition to an all-volunteer force in Sweden

also implied a new mindset among those already in the military system. Officers raised in a conscript system, suddenly needed to see recruits as future colleagues instead of conscripts that would eventually leave the military. This different view may have been hard to accept among some of the officer corps, leading to issues of job satisfaction not being considered of great importance. The new system based on voluntary participation could inflict other demands on the organization not present during conscription. Our data suggests that performance orientation is of great importance, and one reason could be that those joining the SAF are more performance oriented and motivated to use and develop their skills, compared to mandatory conscribed soldiers. The new system also entails recruits being employed and contracted for short or long terms, instead of doing conscription for some months and then leaving the organization. At the soldier level, this could suggest that individuals are more inclined to do their best and perform well at work compared to conscripts.

5.6. Practical implications

These findings have practical implications for the SAF. Firstly, dropouts from basic training and secondly, the large proportion of recruits who leave the SAF after a short period, produce an unsatisfactorily high attrition rate. The problems for

the SAF in retaining personnel are costly and alarming and highlight the importance of job satisfaction. As our results show, general job satisfaction correlates negatively with turnover intentions. For the SAF this means that providing their employees with meaningful work tasks, giving soldiers responsibility and, most of all, facilitating performance orientation must be prioritized. Those joining the Swedish military have done so on a voluntary basis and our results suggest that providing these, mostly young, people with a work environment that generates performance orientation is significant in order to retain personnel. Much money is spent on attracting recruits, but if the SAF do not provide sufficient job satisfaction, the swing door effect will continue to generate many vacancies. Performance orientation has a strong relationship with general job satisfaction. This can be related to the fact that during the first years of voluntary service in Sweden, the psychological qualities of recruits were better than the last years of conscription (Jonsson, 2013). This suggests that individuals at soldier level generally had a desire for greater self-esteem and higher order needs. The apparent importance of performance orientation highlights important issues for the SAF. It is of great importance to provide motivated individuals, who have joined voluntarily, with duties that match their desire for

high performance. Cutting down on training and opportunities for soldiers to train as they fight seems to have a significantly negative impact on this group. If the SAF provides opportunities for contracted soldiers to perform at work, a greater proportion of them will stay in the organization.

5.7. Strengths and limitations of the study

To our knowledge, this is the first study that empirically tests Barrick, Mount and Li's (2013) Purposeful Behavior Model (PBM), deriving from the Theory of purposeful behavior. Though we do not test the model in full, we make partial use of the model to study job satisfaction and turnover intentions with this new theoretical approach. The importance of performance orientation adds another dimension to job satisfaction in general and the theory of purposeful behavior model in particular. Furthermore, our findings have implications for the current labor market, as the demographic distribution of many Western countries populations looks quite similar; an aging population and significant competition for good quality, skilled youth.

There are though some limitations in this study that need to be addressed. We had no independent measure of turnover and we do not know how many people actually left the SAF.

However, Lee and Mowday, (1987) argue that turnover intention is a strong mental precursor for turnover, and therefore we argue that turnover intention is equally harmful to the organization. We created our own index called performance orientation, which is not exactly Barrick, Mount and Li's (2013) original measure achievement striving. We argue that the input components of our index resemble these of Barrick, Mount and Li's (2013). However, this fact might have biased the results. The alfa values for two of the subscales deriving from Hackman and Oldham's JDS (1974) were low, thus the reliability can be arguable and lowers the information given by our path analysis. However the JDS is a standardized scale, leaving no space for altering the scale.

As far as we know, there have been no studies of job satisfaction within the Swedish military, which narrows generalization of the findings. However, this topic needs to be studied further. As for the nonexistent findings for the personality variables, a study using different facets of personality, e.g. derived from the FFM instead of broader instruments such as the SIMP, should be conducted. The fact that the data is cross sectional also means that we cannot draw any causal conclusions from this study.

All the data in our study is self-reported and it is limited by the fact that it cannot be independently verified. Self-reported data could

contain several potential sources of bias that should be noted as limitations; selective memory and exaggeration could be possible sources of bias.

6. CONCLUSIONS AND FUTURE RESEARCH

Many organizations struggle to attract, recruit and retain their personnel, and the recruitment pool in many Western countries is getting smaller. This study provides a new way of looking at the ability to retain personnel. The outcomes obtained may help organizations in general and the Swedish armed forces in particular, to attain a lower degree of attrition. To establish the working conditions to meet the demands of those voluntary applying for the SAF in line with their performance orientation is crucial to retain personnel.

There are several studies indicating a relationship between personality and job satisfaction (e.g. Judge, Heller & Mount, 2002; Judge & Bono, 2001). In our study, personality does not have a relationship with job satisfaction. Future studies should address personality in relation to broader samples where there has been an initial screening and hence a lack of normal distribution scores within the sample. Our sample consisted of young, newly recruited soldiers. For this reason it would be interesting to study the relationship between job satisfaction,

turnover intentions and performance orientation at higher organizational levels. Even though the PBM departs from a trait perspective, Barrick, Mount and Li (2013) assume that the impact of behavior from traits is mediated by cognitive constructs (in this case performance orientation). While this study cannot confirm this assumption, it is an important task for future research to further elaborate the role of traits, as well as cognitive processes in the analysis of work motivation and performance. Future research should also address the element of performance orientation at different levels because this seems to be of importance in reducing turnover intentions. Furthermore, there is a need for longitudinally designed studies to gain a better understanding of the factors behind turnover intentions and performance orientation.

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A COMPARATIVE STUDY ON IMMIGRANTS' INTEGRATION POLICIES IN ROMANIA AND SWEDEN

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The immigration crisis in Europe has brought an intensive debate over EU nations' shared responsibility toward integrating foreigners fleeing insecurity. In this context, Eastern EU countries have shown a lot of anxiety and reluctance to opening their societies to immigrants. The nature of this fear, beside the emerging threat of terrorism, is strongly linked to prejudices, and maybe to a chronic lack of know-how on integrating people without historical (or any other) ties with the host nation.

This paper offers a comparative study between integration policies for immigrants in Sweden – a top ranking country in the Migrant Integration Policy Index (MIPEX) 2015 – and Romania, with the aim to determine areas to improve the latter's approach toward this issue.

Key words: immigration, integration, mobility, discrimination, multiculturalism, Romania.

1. INTRODUCTION

International migration has recently affected the European Union (EU) at an unprecedented level and posed serious economic, social and demographic challenges to the EU states. The EU response to the migrants' crisis has been confused and divisive, characterized by squabbling over sharing responsibility, border closures and criticized measures. Many EU governments focused on preventing arrivals and deflecting responsibility to neighboring countries. What is more, even the Schengen space, if not the EU establishment itself,

were threatened by this crisis, as Donald Tusk, the European Council President, warned (Associated Press: 2016).

As immigration to wealthy European states has a long history, and the phenomenon was accepted (in its legal way) as contributing to EU's socio-economic development, a coherent approach to migration at European level has become more than ever necessary, in the form of a common policy.

The first multiannual program in the field of Justice and Home Affairs was agreed in Tampere, Finland, in 1999 for a five-year period. The following programs -

Hague, 2004 (Official Journal of the EU C 236:2005) and Stockholm, 2009 (Official Journal of the EU C 115:2010) - have promoted objectives for strengthening freedom, security and justice in the EU.

The European Pact on immigration and asylum was adopted in the October 2008 European Council, proposing five political commitments to be implemented through concrete measures: (1) *to organize legal immigration to take account of the priorities, needs and reception capacities determined by each Member State, and to encourage integration*; (2) *to control illegal immigration by ensuring that illegal immigrants return to their countries of origin or to a country of transit*; (3) *to make border controls more effective*; (4) *to construct a Europe of asylum*; and (5) *to create a comprehensive partnership with the countries of origin and transit in order to encourage synergy between migration and development* (EUR-Lex:2008a).

Further debate *integration* has often been fractious, pitting those who favor more assimilation-wise policies, in which the newcomer adopts dominant values and a perceived common identity, against those who argue for variations of multiculturalism, based on respect for the newcomer's cultural identity and protection of cultural diversity (Sunderland, 2016).

Starting from the ratings of the Migrant Integration Policy

Index - MIPEX, edition 2015 - (CIDOB&MPG:2015) and using comparative analysis tools, this essay investigates differences in migrant integration policies between Sweden, a top rated country in this respect, and Romania, a country with an emigration rate much greater than immigration. As the policy areas in the field are too broad to cover, for the purpose of this paper we will focus especially on a comparative study concerning *the participation of immigrants in the political life* of the receiving nation.

This subject draws special attention as marking the most significant difference on the analyzed countries' MIPEX 2015 rankings, where Sweden is standing for the 7th position out of 38, while Romania holds the last position.

2. THE EUROPEAN UNION IMMIGRATION RULES AS A COMMON DENOMINATOR. BASIC INTEGRATION PRINCIPLES

Immigration rules are not the same in every EU country; most of them have both EU rules and their own national regulations.

The EU has been developing a common immigration policy for Europe since 1999, as the agreement that the EU should have common, EU-wide, immigration and visa rules, emerged. (1) The common European

immigration policy seeks to provide a flexible framework that takes into account EU countries' individual situations and is implemented in partnership between the EU countries and institutions.

It sees *integration* as the key to successful immigration, postulating a series of conditions to which EU countries should adhere in order to enhance the participation of immigrants in the economic life and improve a diversity-prone social cohesion, such as:

- consolidate the EU framework for integration;
- support the management of diversity and the evaluation of the outcomes of integration policies in EU countries;
- promote integration programs targeted at new immigrant arrivals;
- ensure equal advancement opportunities in the labor market for legal non-EU workers;
- apply social security schemes equally to immigrants and to EU nationals;
- develop means to increase the participation of immigrants in society;
- review Council Directive 2003/86/ EC on the right to family reunification;
- continue applying the EU asylum policy, while developing the measures further, in particular through the Policy Plan on Asylum (EUR-Lex:2008b).

A communication from the Commission to the Council, the European Parliament, the European

Economic and Social Committee and the Committee of the Regions of 1 September 2005 on the *Common framework for the integration of non-EU nationals* provides common basic principles for the creation of a coherent European framework for integration of non-EU nationals.

It was a first step in the establishment of a coherent framework for integration, proposing concrete measures at EU and national level for putting the Common Basic Principles (CBPs) in practice, together with a series of supportive EU mechanisms. In this respect, a first set of enablers have been underlined, aiming a strengthened ability of the host society to adjust to diversity, engaging private bodies, promoting trust and good relations within neighborhoods, and encouraging cooperation with the media. Thus, the reference principles for CBPs are: (EUR-Lex:2005)

1. "*Integration implies respect for the basic values of the EU*". It emphasizes civic orientation in introduction programs at national level. At European level, the integration of non-EU nationals is included in programs of the Fundamental Rights Agency (FRA).

2. "*Employment is a key part of the integration process*". It proposes that at national level: labor-market discrimination is prevented; social partners are involved in the elaboration and implementation of integration measures; the recruitment of migrants is encouraged and migrant

entrepreneurship is supported. At European level, the Commission proposes: monitoring the impact of national reform programs aimed at the integration of immigrants into the labor-market; encouraging EU countries to develop labor-market integration policies; monitoring the application of the directives on discrimination in employment and on non-EU nationals who are long-term residents.

3. *“Basic knowledge of the host society’s language, history and institutions is indispensable to integration”*. It proposes strengthening the integration component through introduction programs that offer courses at several levels. At EU level, transnational actions and innovative integration models should be supported.

4. *“Efforts in education are critical to integration”*. It proposes the reflection of diversity in the school curriculum and addresses the specific problems of young immigrants, such as participation in higher education, and being taken into account at national level. Actions at EU level should include the incorporation of integration objectives into educational programs (European Commission - Education and Training: 2017) and the facilitation of transparent recognition of qualifications - the European Qualifications Framework (European Commission - Learning Opportunities and Qualifications in Europe: 2017).

5. *“Access for immigrants to institutions as well as to public and*

private goods and services in a non-discriminatory way is a critical foundation for better integration”. It proposes the following national actions: strengthening the capacity of public and private service providers to interact with non-EU nationals; introducing sustainable organizational structures for integration and schemes to gather and analyze information; engaging companies in debates on integration; integrating intercultural competence into recruitment and training policies. At EU level, the application of the directives on non-EU nationals who are long-term residents and on equal treatment should be monitored and studies and exchanges of best practices should be supported.

6. *“Frequent interaction between immigrants and EU citizens is a fundamental mechanism for integration”*. At national level, it proposes that activities in which immigrants interact with the host society are promoted and that their living environment is improved. Simultaneously, at EU level: the integration dimension in social inclusion and social protection policies should be strengthened; the exchange of information and good practice should be encouraged; transnational cooperation at regional, local and municipal level between public authorities, private enterprises and civil society, including migrants’ associations, should be supported.

7. *“The practice of diverse cultures and religions must be*

safeguarded". It proposes developing constructive intercultural dialogue and public discourse and promoting inter- and intra-faith dialogue platforms at national level. At EU level, it proposes facilitating intercultural and inter-religious dialogue and further developing dialogue with religious, social and cultural organizations.

8. *"The participation of immigrants in the democratic process and in the formulation of integration policies supports their integration"*. At national level, the Commission proposes that: civic, cultural and political participation of non-EU nationals in the host society is increased; dialogue and consultation with non-EU nationals is encouraged; active citizenship is promoted; national preparatory citizenship and naturalization programs are drawn up. At EU level, it proposes that a study/mapping exercise of the rights and obligations of non-EU nationals in EU countries is initiated, the creation of a platform of migrants' organizations is fostered and the value of developing a concept of civic citizenship is explored.

3. REFERENCE ENVIRONMENTS FOR INTEGRATION FIGURES IN THE EU

The EU has targeted the promotion of immigrant integration and for this reason it has established actors, institutions and instruments to promote it: the Committee of the

Regions and the European Economic and Social Committee, Ministerial Conferences, National Contact Points (NCPs) on Integration, the European Fund for the Integration of Third-Country Nationals (TCNs), the European Integration Forum, the European website on integration, handbooks on integration (such as the *Handbook on Integration for policy-makers and practitioners*) (Niessen and Huddleston: 2010), or European integration modules, all of them providing monitoring capabilities, tutorials, statistical tools and common indicators, etc.

A more coherent European approach towards integration is planned in the EU by mainstreaming integration in all relevant national policies and reinforcing the capacity to coordinate national integration strategies across different levels of government.

In this respect, an excellent example for the EU supportive integration framework is the creation of the European Migration Network (EMN), which aims to provide up-to-date, objective, reliable and comparable information on migration and asylum to support policymaking in the EU. It also provides the general public with such information through its website (http://ec.europa.eu/dgs/home-affairs/what-we-do/networks/european_migration_network/index_en.htm); the products made available – like Policy Reports, statistics, or Country Factsheets – are useful for the purpose of comparative analysis.

Other references of interest are represented by the proceedings of the European Integration Forum, launched in April 2009 by the European Commission and the European Economic and Social Committee (EESC) for consultation, exchange of expertise and drawing up recommendations on integration issues, or the EU website on Integration (<https://ec.europa.eu/migrant-integration/home>).

For measuring the parameters of migrants' integration, the Stockholm Programme (2010–2014), which replaces the Tampere and Hague Programmes (Hellenic Republic – Ministry of Foreign Affairs:2017), embraced the development of core indicators in a limited number of relevant policy areas (e.g. employment, education and social inclusion) for monitoring the results of the integration policies. Quantifying the integration process is an important step ahead

in increasing the ability to perform comparative analysis of national experiences in this matter and reinforce the European learning process.

The 2010 European Ministerial Conference on Integration, which took place in Zaragoza, resulted in the Zaragoza Declaration (Council of the European Union: 2010) that called upon the European Commission to undertake a pilot study examining proposals for common integration indicators and reporting on the availability and quality of the data from agreed harmonized sources necessary for the calculation of these indicators. The Zaragoza indicators, along with other indicators proposed to determine the level of immigrants' integration, are available in the Final Report for Directorate-General for Home Affairs, European Commission, *Using EU Indicators of Immigrant Integration* (Table 1) (Huddleston, Niessen, and Tjaden:2013, p.9).

Table 1. EU Indicators of Immigrant Integration Source: Huddleston, Niessen, Tjaden:2013, p.9

| | Employment | Education | Social Inclusion | Active Citizenship | Welcoming Society |
|----------------------------|--------------------|---|---|--|---|
| Zaragoza Indicators | Employment rate | Highest educational attainment | At-risk-of-poverty (and social exclusion) | Naturalisation rate | Perceived experience of discrimination (survey) |
| | Unemployment rate | Tertiary attainment | Income | Share of long term residence | Trust in public institutions (survey)* |
| | Activity rate | Early school leaving | Self-reported health status (controlling for age) | Share of elected representatives (research)* | Sense of belonging (survey)* |
| | Self-employment | Low-achievers (PISA) | Property ownership | Voter turnout (research)* | |
| | Over-qualification | Language skills of non-native speakers (LFS module)** | | | |

Table 2. Proposed New Indicators

| | Employment | Education | Social Inclusion | Active Citizenship | Welcoming Society |
|--------------------------------|---|---|--|--|--|
| Proposed New Indicators | Public sector employment | Participation in early childhood education (SILC/PISA) ** | Child poverty (SILC) | Participation in voluntary organisations (survey)* | Public perception of racial/ethnic discrimination (Eurobarometer) |
| | Temporary employment | Participation in life-long learning (LFS,AES) | Self-reported unmet need for medical care (SILC) | Membership in trade unions (survey)* | Public attitudes to political leader with ethnic minority background (Eurobarometer) |
| | Part-time employment | Not in education, employment or training (LFS) | Life expectancy (SILC) | Membership in political parties (survey)* | |
| | Long-term unemployment | Resilient students (PISA)** | Healthy life years (SILC) | Political activity (survey)* | |
| | Share of foreign diplomas recognized (survey)** | Concentration in low-performing schools (PISA)** | Housing cost overburden (SILC)** | | |
| | Retention of international students (research)* | | Overcrowding (SILC)** | | |
| | | | In-work property-risk (SILC) | | |
| | | | Persistent poverty-risk (SILC) | | |

A more sophisticated tool for assessing and comparing the integration marks, and ultimately supporting the improvement of the integration policy, is the Migrant Integration Policy Index - MIPEX. This is a unique tool which measures policies to integrate migrants in all EU Member States, and Australia, Canada, Iceland, Japan, South Korea, New Zealand, Norway, Switzerland, Turkey and the USA,

based on 167 policy indicators developed to create a comprehensive picture of migrants' opportunities to participate in society.

The proven credibility of the MIPEX indicators and methodology made it the main data source for comparative analysis between the integration facts and figures defining Romania's performances vs. Sweden in this sector, as we will show later in this paper.

4. BACKGROUND ON NATIONAL IMMIGRATION POLICIES. THE SWEDISH AND ROMANIAN CASES

Part of the national responsibility on migration policies (apart of the extraordinary measures taken by countries in the wake of the European migration crisis), was that each EU country alone decided:

- the total number of migrants that can be admitted to the country to look for work;
- all final decisions on migrant applications;
- rules on long-term visas – stays for periods longer than three months; and
- conditions to obtain residence and work permits when no EU-wide rules have been adopted. (European Commission - EU Immigration Portal:2017)

Once the residency is granted, a critical step – both for the receiving community and the immigrants – is represented by *integration*, in its multiple dimensions. As shown in the previous chapters, integration can be quantified and measured making use of a series of indicators encompassed by different areas of reference: employment, education, social inclusion, active citizenship, and welcoming society.

The MIPEX score positions Sweden in the top of the analyzed countries, while Romania hits the 23rd position amongst the 83 analyzed countries and is characterized as "*halfway favorable*".

Sweden's foreign-born population has been growing for many decades. In 2013, close to 16% of the Swedish population had been born abroad, placing Sweden among the OECD countries with the largest foreign-born population, while 5% of native-born Swedes had two foreign-born parents (OECD:2014). Integration of immigrants and their children is therefore of key importance for the Swedish economy and society as a whole.

Romania, though not a popular destination for immigrants, has recently experienced a growing wave of immigration, mostly from the Republic of Moldova, Turkey and China, but also from Africa, the Middle East, and the former Soviet Union. In 2013, there were 198,839 immigrants living in Romania, of which 13,000 were refugees (NationMaster: 2016). Over half of the country's foreign-born residents originate from the Republic of Moldova. However, immigration is expected to increase in future, as large numbers of Romanian workers leave the country and are being replaced by foreigners. The predictions for 2008-2060 show for Romania a minimal rate of 18.4/1000 inhabitants net immigration (Alexe and Păunescu – coord: 2011).

The immigration policy is a direct answer to the emigration facts and a potential solution for the population decrease. The emerging requirements in economy (labor market), or an increased attractiveness of Romania's status within the EU,

can also contribute to positioning our country as a more interesting destination for immigrants.

In any case, the integration process is of paramount importance for a successful story, conditioned by an open society and a bivalent comprehensive approach, addressing in the same measure the receiving communities and the immigrants.

For an inclusive picture on these aspects, the European Migration Network country factsheets on immigration policy provide a factual overview of the main policy developments in migration and international protection in the analyzed countries during 2014, including the latest available statistics.

5. A COMPARATIVE ANALYSIS OF INTEGRATION INDICATORS. ROMANIA VS. SWEDEN

Similarities and differences across political boundaries are at the heart of comparative politics. The study of comparative politics embraces cross-national and cross-regional research, as well as “within country” studies that evaluate differences and similarities among administrative territorial systems, or across policy spheres.

The comparative analysis makes use of many research methods, such as qualitative and quantitative analysis. The result of this approach is very important for accurate

description and for theory building and testing.

Comparison helps seeing causal relationships that an exclusive engagement in our own societies and cultures might lead us to ignore. It is the case of putting side by side the integration policies in Sweden and Romania, determining what stands behind their concrete results and looking forward to learning lessons or acquiring best practice in this matter.

For this purpose, we are going to use the Most Different Systems Design (Mill's Method of Similarity), in the exercise of comparing the opposite experience of Romania and Sweden for immigrants' political participation in the social life of these nations. It would be of interest to determine what is behind these two different experiences – political will, faulty approach or inadequate instruments?

The most accurate comparison will be supported by the means offered by the above mentioned analysis tool for assessing integration policies. MIPEX 2015 uses as points of reference eight policy areas, with a series of factual indicators (Huddleston et al.:2015):

1. *labour market mobility* (quantifying the access to the labour market, access to general support, the targeted support, workers' rights);

2. *family reunion for foreigners* (investigating eligibility, conditions for acquisition of status, security of status, and rights associated with status);

3. *education* (focusing on access, targeting needs, new opportunities, intercultural education for all);

4. *political participation* (analyzing electoral rights, political liberties, consultative bodies, and implementation policies);

5. *permanent residence* (addressing eligibility, conditions for acquisition of status, security of status, and rights associated with status);

6. *access to nationality* (eligibility, conditions for acquisition of status, security of status, and dual nationality);

7. *anti-discrimination* (based on definitions and concepts, fields of application, enforcement mechanisms, equality policies);

8. *health* (entitlement to health services, policies to facilitate access, responsive health services, measures to achieve change).

The key common statistics for the analyzed countries take into account UN and Eurostat data for the balance between emigration and immigration, the percentage of non-EU citizens in the total population, the proportion of foreign-born (EU and non-EU), the amount of non-EU university educated immigrants or the share of immigrants from low or medium-developed countries (based on Human Development Index – HDI – ratings) (**Table 2** and **Table 3**).

Table 3. Key common statistics for Sweden Source: MIPEX 2015

| Country of net migration since: | % Non-EU citizens | % Foreign-born | % Non-EU foreign-born | % Non-EU university-educated | % From low or medium developed (HDI) country |
|---------------------------------|-------------------|----------------|-----------------------|--|--|
| <1950s | 3.9% | 15.4% | 66% | 32% | 68% |
| UN 2010 data in 2013 | Eurostat 2013 | Eurostat 2013 | Eurostat 2013 | Note: Adults aged 18-64, Eurostat 2013 | Eurostat 2013 |

Table 4. Key common statistics for Romania Source: MIPEX 2015

| Country of net migration since: | % Non-EU citizens | % Foreign-born | % Non-EU foreign-born | % Non-EU university-educated | % From low or medium developed (HDI) country |
|---------------------------------|-------------------|----------------|-----------------------|--|--|
| x | 0.3% | 0.9% | 60% | | 75% |
| UN 2010 data in 2013 | Eurostat 2013 | Eurostat 2013 | Eurostat 2013 | Note: Adults aged 18-64, Eurostat 2013 | Eurostat 2013 |

The charts in **Figures 1** and **2** depict the evolution in time (2010-2014) of the analyzed indicators at country level. Comparing the levels of performance

between the integration policies in different areas, there is a clear picture of similarities and differences between Sweden and Romania (**Figure 3**).

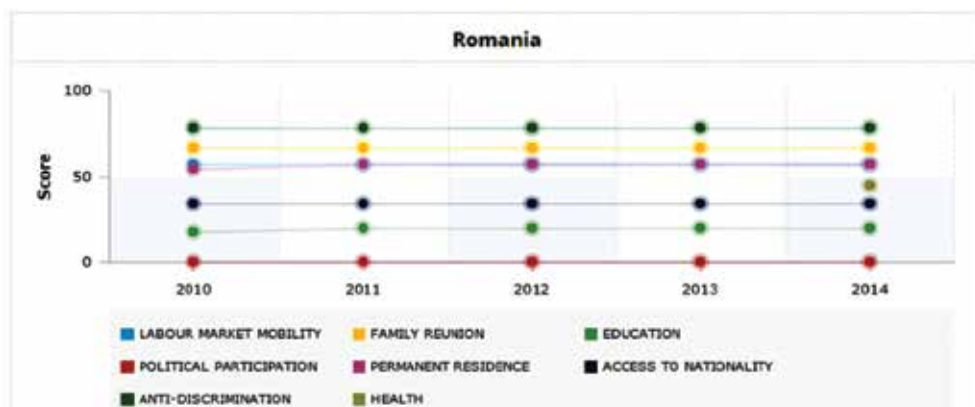


Fig. no. 1. Integration indicators evolution – Romania Source: MIPEX 2015



Fig. no. 2. Integration indicators evolution – Sweden Source: MIPEX 2015

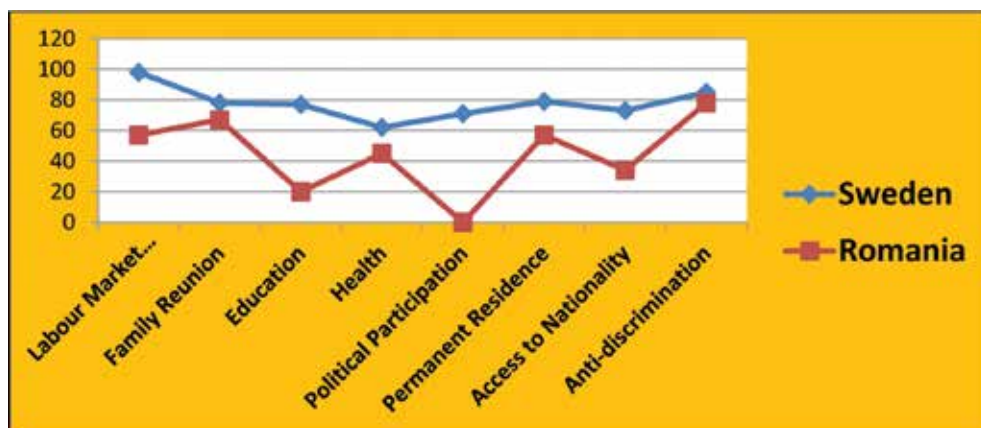


Fig. no. 3. Comparative charts on Sweden and Romania MIPEX 2015 scores for integration policies

If policies in integration areas such as Family Reunion, Health, or Anti-discrimination produce comparative effects, there are fields where differences in the outcomes are considerable (Education and Political Participation, notably).

MIPEX characterizes Sweden's integration policies as more responsive and evidence-based, more ambitious, better supported and more effective in many areas of life, relevant for immigrants. Newcomers and all residents of disadvantaged areas are enabled to use their rights and invest in their skills in order to take up equal opportunities in all areas of life. Policymakers are constantly looking for quicker and more cost effective solutions and include more hard-to-reach groups.

These high expectations are also shared by the public and a general political consensus in Sweden (as in the other top-scoring countries), where overwhelming majorities think that immigrants should benefit from the same rights as citizens. However, larger gaps may be expected between immigrants and the native-born in Sweden than in less developed or equitable societies, as the Swedish come to expect high standards of living, equality, education and active citizenship.

In spite of the backing policies, reality still proves that certain inequalities persist over time and

require greater attention, especially for women, early school leavers and disadvantaged areas with many newcomers.

In Sweden, nearly all non-EU immigrants are guaranteed the same economic, social, family and democratic life rights as Swedish citizens by law and in practice. Residents in Sweden are most likely to reunite together and become permanent residents, voters and citizens. More people in Sweden are informed on their rights as potential victims of discrimination, and how to use these rights to access justice.

As the immigration records dramatically increase in numbers, a real challenge for Sweden will be to expand access to the most effective programs for all newcomers and disadvantaged residents.

On the other hand, in Romania, newcomers benefit from intermediate favorable policies that even slightly create more obstacles than opportunities for non-EU immigrants to quickly and fully participate in host country's social life. However, MIPEX underlines that the balance between opportunities and obstacles is more favorable in Romania, Czech Republic, or Hungary than in the rest of Central Europe.

Romania's integration strategies provide basic opportunities for integration. As a result of the EU law, most non-EU newcomers can access

the labour market and training, reunite with family and secure EU long-term residence, though some gaps persist in these areas.

Going above-average for the region in terms of immigrant integration, Romanian authorities and civil society are taking steps to provide free language training and basic information on jobs, training, schooling for children, and healthcare. With the right resources and support, Romania's strong anti-discrimination laws can also be used to guarantee equal treatment for non-EU citizens when practice goes against the law.

According to MIPEX analysis, the major obstacles to integration in Romania are the common problems of the region, linked to a wide administrative discretion in solving different applications. Support for Romania's few immigrant pupils is weak, and largely limited to learning the Romanian language.

Romania's integration strategies lack political participation and a clear path to citizenship for ordinary immigrants and their Romanian-born or educated children.

Romania is seen as the most restrictive in denying all political rights to its small number of non-EU citizens. Even though MIPEX mentions an above-average majority of Romanian citizens in favor of

immigrants' rights and contributions, we rather rally the opinion that the Romanian society is still not prepared to face the intercultural issues that go along with increasing diversity, and that benevolent reactions on the part of the general public toward immigrants cannot be taken for granted (Horváth:2007).

6. THE POLITICAL INTEGRATION OF IMMIGRANTS IN SWEDEN AND ROMANIA. A COMPARATIVE APPROACH

This chapter goes into detail with the comparative analysis between the Swedish and Romanian policies on immigrants' integration process, in terms of their political participation, which is recorded by MIPEX as a sign of confidence regarding the newcomers. However, restrictive policies disenfranchise 10 million non-EU citizens from voting and engage few others through weak consultative bodies and funding for immigrant organizations.

In the MIPEX customized index for this indicator (**Figure 4**), Sweden ranks as one of the most inclusive developed democracies at both local and national level and long-settled non-EU immigrants are more likely to participate politically there than in most other European countries.

| Ranking 2014 | | Score | Ranking 2014 | | Score | Ranking 2014 | | Score |
|--------------|-------------|-------|--------------|----------------|-------|--------------|----------------|-------|
| 1 | Norway | 82 | 14 | Belgium | 57 | 27 | Slovenia | 23 |
| 2 | Luxembourg | 81 | 15 | Spain | 54 | 27 | Hungary | 23 |
| 3 | Finland | 79 | 15 | South Korea | 54 | 29 | Estonia | 21 |
| 4 | Portugal | 74 | 17 | France | 53 | 29 | Czech Republic | 21 |
| 4 | New Zealand | 74 | 18 | Netherlands | 52 | 31 | Lithuania | 16 |
| 6 | Ireland | 73 | 19 | United Kingdom | 51 | 31 | Slovakia | 16 |
| 7 | Sweden | 71 | 20 | Canada | 48 | 33 | Bulgaria | 13 |
| 8 | Iceland | 67 | 21 | Austria | 38 | 33 | Latvia | 13 |
| 9 | Australia | 64 | 22 | USA | 36 | 33 | Croatia | 13 |
| 9 | Denmark | 64 | 23 | Japan | 31 | 36 | Turkey | 11 |
| 11 | Germany | 63 | 24 | Greece | 30 | 37 | Poland | 6 |
| 12 | Italy | 58 | 25 | Cyprus | 25 | 38 | Romania | 0 |
| 12 | Switzerland | 58 | 25 | Malta | 25 | | | |

Fig. no. 4. MIPEX ranking for Political participation as integration indicator
Source: MIPEX, 2015

Disenfranchised to this opportunity, similarly to other inclusive Nordic democracies, are the relatively few non-EU adults who do not meet the basic residence requirement for **local voting rights** (<20% according to 2011/2 estimates) (**Figure 5**).

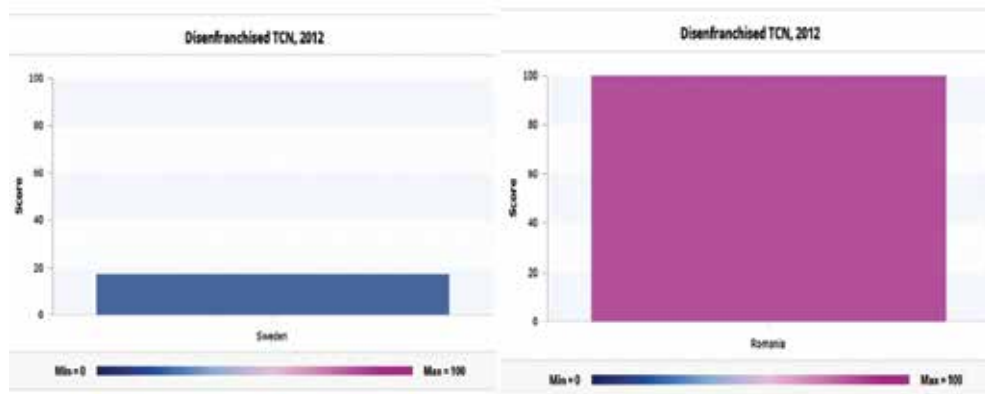


Fig. no. 5. Comparison on the ratio of immigrants disenfranchised from voting – Sweden vs. Romania. Source: MIPEX 2015

Opposite to Sweden, the small number of non-EU citizen adults is completely excluded from public life in Romania, while political participation is completely absent from the integration strategy (**Figure 6**). According to the 2014 Eurostat data, an estimated 48,453 number of non-EU adults (aged 15+) are disenfranchised without the local right to vote in our country. However, they represent a very small share of

the adult population (0.3%) (given the small size of Romania's immigrant population), which is one of the lowest in the EU and similar to Poland.

While political participation is a standing issue for the integration principles in Romania, voting rights have been adopted in countries with similarly small numbers (e.g. Slovakia in 2003) and raised as a priority for a new integration strategy in Poland. However, the challenges posed by the massive immigration and possible side effects may determine changes in this approach.

Regarding the **immigrants' rights and opportunities to participate in political life**, Sweden, by supporting formal immigrant consultative bodies, opens slightly favorable political opportunities for participations of residents in general politics. Immigrants can benefit from information, support and rights to participate in local/regional elections and civil society. All can vote in local/regional elections and can form or join associations, media and political parties. Newcomers are better able to use their rights because policies are implemented to inform them and include their associations in civic life, as in several Western European countries.

By contrast, Romania is the only country scoring 0 for political participation (just below Poland and Turkey). Non-EU citizens are excluded from democratic life, as political participation is still missing from Romania's integration strategy, with no action taken in these areas for the past years.

Several dimensions are analyzed by MIPEX within this indicator (**Figures 6 and 7**):

- *Electoral rights*: non-EU citizens in Sweden, after 3 years of legal stay, can stand as local candidates; in Romania, the Law 67/2004 (regarding the election of the local public administration) opened the local right to vote and stand in elections to EU citizens, but not to non-EU citizens or long-term residents;

- *Political liberties*: non-EU citizens in Sweden are guaranteed the same basic political liberties as citizens; in Romania, the Emergency Ordinance 194/2002 for the regime of foreigners in Romania confirms that non-EU citizens cannot set up their own political association or join political parties;

- *Consultative bodies*: Sweden does not provide immigrant associations any official structure for dialogue with state authorities or politicians. Instead, the government funds Cooperation Group for Ethnic Associations in Sweden (SIOS) and other immigrant organizations, NGOs, while municipalities and authorities have signed partnership agreements at local level in major cities, allowing national authorities to conduct a better dialogue with NGOs and municipalities about their work in disadvantaged urban areas.

Similarly, in Romania, the immigrants are not consulted in a formal manner so as to inform and improve the policies that affect them daily. There is no further action on

this aspect, to note the most recent National Immigration Strategy for the period 2015-2018, and the Action Plan for 2015, approved by the Romanian Government (Government of Romania:2015).

- *Implementation policies:*
Immigrants can get funding for their civic activities in Sweden. They are also regularly informed of opportunities to participate in political life. In Romania, new communities cannot obtain State funds to organize themselves politically, except through occasional European Integration Fund projects (European Commission – Migration and Home Affairs:2017).

In matters of non-EU immigrants – real beneficiaries of the rights and

opportunities to participate in political life – Sweden ranks as one of the most inclusive Nordic democracy at both local and national level. The inclusive Nordic model of local democracy means that most non-naturalized citizens are eligible to vote in local elections in Sweden. According to national data cited by MIPEX, around 1/3 of non-EU citizens (108,000) were registered to vote in 2009. More importantly, non-EU citizens most interested and active in politics are likely to quickly naturalize as Swedish citizens. Nearly 3/4 of non-EU immigrant adults have been naturalized as Swedish citizens (Figure 8).

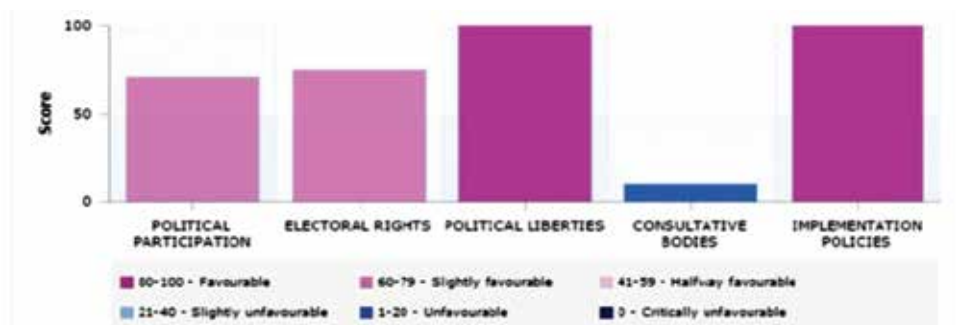


Fig. no. 6 Strand and four dimensions on political participation of immigrants in Sweden, 2014
Source: MIPEX 2015

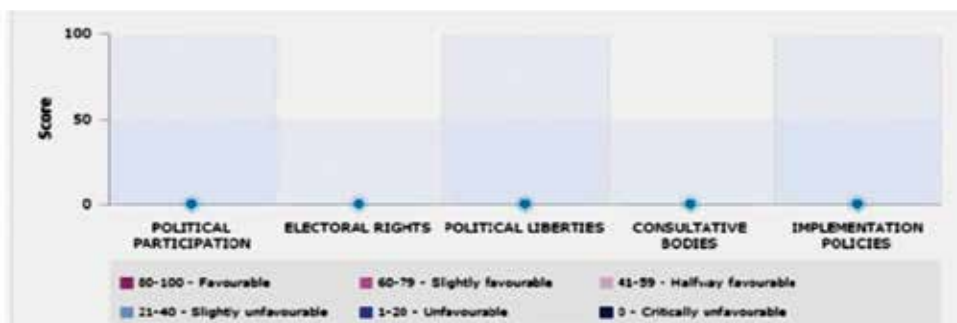


Fig. no. 7. Strand and four dimensions on political participation of immigrants in Romania, 2014. Source: MIPEX 2015

In Romania, political participation can be promoted through extension of political rights to third-country nationals and/or facilitation of access to nationality. Acquiring citizenship enables third country nationals to

gain not only political rights but also access to a set of privileges reserved to nationals. As in most of Eastern and Central Europe countries, Romanian citizenship law relies heavily on *jus sanguinis*.

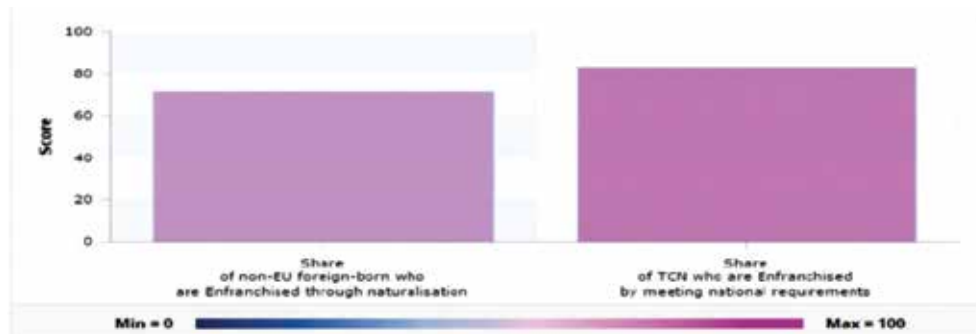


Fig. no. 8 Share of non-EU born who are enfranchised through naturalization and share of non-EU citizens who are enfranchised by meeting national requirements – Sweden, 2012
Source: MIPEX 2015



Fig. no. 9. Share of non-EU born who are enfranchised through naturalization and share of non-EU citizens who are enfranchised by meeting national requirements – Romania, 2012
Source: MIPEX 2015

Citizenship is acquired at birth if at least one of the parents is a Romanian citizen, regardless of whether the birth takes place on Romanian territory or abroad. Romania also accepts double citizenship. Naturalization is regulated in Romania through Law no 21/1991 for Romanian citizenship, amended and completed (**Figure 9**).

7. CONCLUSIONS

For a long period of time, migration management in Europe was an exclusive national responsibility, with effects on admission of foreigners on the national territory, the visa, asylum and residency regime, or citizenship granting.

The EU context has changed the rules, as the open borders, freedom of movement and labor mobility created the premises of a migration phenomenon perceived both as necessity and threat.

Even though a common EU legal corpus on immigration integration has increasingly developed in time, there is still a strong national autonomy in developing integration policies for third country nationals. It leaves room to acquiring disparities between different regions or countries within the EU, based on several factors considered as preserving the national security.

Since Romania has never experienced major inflows of foreign citizens, the authorities and society in general might have to face a genuine challenge in dealing with increased diversity and integrating a large number of newcomers. Even though other EU countries have different means of managing immigration and integration, none of which can be considered unequivocally as best practice, there are aspects of interest that can be further referenced in any national endeavor meant to support a better integration of immigrants.

In matters of political integration of the immigrants, the comparative analysis between the Swedish and Romanian policies on political participation as part of the immigrants' integration process is pertinent by revealing a mature way to deal with this issue in the Nordic state.

The Swedish policies regarding immigrants' rights and opportunities to participate in political life, expressed in: electoral rights, political

liberties, consultative bodies, or implementation policies, even if not perfect, can offer a model for a future Romanian Immigration Strategy, especially under the anticipated integration of an unusually large number of newcomers, as a result of the EU distribution policy.

In Romania, where citizenship is viewed as the prerequisite for full political participation, a population of permanent residents who are subject to the rule of law - but lacking access to legislative representation - may create a deficit in the democratic legitimacy of the country (Ghenea:2014).

As none of the sixteen EU member states that granted local voting rights to third country nationals have abolished this right because of its negative effects, presumed or real, this may be the right time for a serious debate on this topic - and comparison based efforts are the first step in this approach.

Note

(1) The leaders of the EU set out at the October 1999 European Council in Tampere (Finland) the elements required for a EU immigration policy that: will be based on a comprehensive approach to the management of migratory flows so as to find a balance between humanitarian and economic admission; will promote a Common European Asylum System; will devote fair treatment for third-country nationals aiming as far as possible to give them rights and obligations comparable to those of the nationals of the Member State in which they live; and will enhance the development of partnerships with countries of origin, including policies of co-development.

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MILITARY MISSION COMBAT EFFICIENCY ESTIMATION SYSTEM

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Military infantry recruits, although trained, lacks experience in real-time combat operations, despite the combat simulations training. Therefore, the choice of including them in military operations is a thorough and careful process. This has left top military commanders with the tough task of deciding, the best blend of inexperienced and experienced infantry soldiers, for any military operation, based on available information on enemy strength and capability. This research project delves into the design of a mission combat efficiency estimator (MCEE). It is a decision support system that aids top military commanders in estimating the best combination of soldiers suitable for different military operations, based on available information on enemy's combat experience. Hence, its advantages consist of reducing casualties and other risks that compromises the entire operation overall success, and also boosting the morals of soldiers in an operation, with such information as an estimation of combat efficiency of their enemies. The system was developed using Microsoft Asp.Net and Sql server backend. A case study test conducted with the MECEE system, reveals clearly that the MECEE system is an efficient tool for military mission planning in terms of team selection. Hence, when the MECEE system is fully deployed it will aid military commanders in the task of decision making on team members' combination for any given operation based on enemy personnel information that is well known beforehand. Further work on the MECEE will be undertaken to explore fire power types and impact in mission combat efficiency estimation.

Key words: *military mission, combat efficiency estimation, military team, enemy team, decision support system.*

1. INTRODUCTION

Annually governments expend millions of dollars on work force pooling in the military to ensure national security, through well-staffed military. New recruits, although trained, lack experience in real-time combat operations, leaving top military commanders with the tough task of deciding, the best blend of inexperienced and experienced personnel for military operations, based on available information on enemy strength and capability. Conventional decision methodology either adopts the strategy of only choosing personnel that is most combat experienced and holds known record of success, or a combination of highly combat experienced and non-experienced personnel.

The risk of losing a soldier is not just considered an ordinary loss of human life, but a collateral damage to the entire nation, due to the cost incurred by recruitment, training, death compensations, and all other types of settlement for the deceased's family and which does not provide adequate output to the nation.

Hence, an automated decision support system has become a stringent requirement. Decision Support Systems are otherwise referred to as technologies which support delivering the appropriate knowledge to the appropriate decision makers at the appropriate time, format and cost (Burstein et. al., 2008). This research paper aims at developing a military mission combat

efficiency estimation system known as MCEE. The MCEE is a decision support system that aids military top commanders in estimating the best combination of soldiers suitable for different military operations, based on available information on enemy's combat experience. This will reduce casualties and other risks that compromise the entire operation overall success, while also boosting soldiers' morals in such operations given handy estimated information on their combat efficiency against their enemies. This research paper is divided into five sections. The first section comprises a brief introduction, statement of problem advantages of the proposed system. The second section presents the mathematical model developed for simulating and estimating combat efficiency of both military and enemy personnel involved in an operation. The third section is the design and implementation of the MECEE system. The fourth section is a case study test of MECEE system. Finally, the last section is the conclusion of findings.

1.1. Statement of problem

Wrong combination of infantry soldiers for any military operation goes a long way in deciding the fate of the entire team, and success of the operation at large. Also, effective manpower utilization is top priority to military asset utilization, deployment, and management. Hence for effective decision on the best blend of infantry

soldiers for a military operation team, a computerized decision support system is imminent.

1.2. Literature overview

Decision support systems application in human resource management has attracted researchers and industries' interest over the years, with the sole objective of automating and managing human resources in organization effectively (Tripathy, 2012). Tripathy (2012) highlighted the use of decision support systems as a better tool for effective organizational management, using Birla Corporation India as a case study. The designed employee management system was used to plan and execute leaves, promotion, and appraisal. Also, Maria (2012) emphasized the importance of decision support systems as a tool helping managers in effective decision making, citing a simulation of employee gross current value using Microsoft excel spread, as a fast and effective decision support tool for easy computation of overwhelming calculation task. In addition, Yaseminet.al.(2012) examined the effectiveness of Management information systems and human resource information systems using structured questionnaires that result in the overwhelming importance role-played by information systems in human resource management, although they did not deal with the subject of human resource deployment. Also Bongani (2013)

examined the impact of decision supports systems use in human resource management in some Zimbabwe tertiary institutions. The result of their study reveals more positive response from tertiary intuitions management staff, which is a positive indication that decision support systems have significantly improved human resource management since it was first introduced in Zimbabwe tertiary institutions. However, the aforementioned study did not consider the subject of human resource deployment.

Similarly, Nana et.al. (2013) developed an automated smart human resource management decision support system that automates the entire employees' management of an organization from the date of appointment to expected retirement day, promotions, pay history, etc. The system focuses on human resource management and not deployment.

In addition, Gmeenakshi (2012) designed a performance evaluation decision support system using fuzzy logic. The system is quiet novel but does not deal with the subject of human resource deployment, which is an integral part of human resource management. Furthermore, Deepika (2013) developed a mono-agents three-layer hierarchical decision support system for human resource management. The proposed architecture seemed novel and effective once implemented, but it did not deal with effective human resource deployment.

Most of the reviewed decision support systems applications in human resource management are yet to take into consideration the risk associated with poor human resource deployment, an important aspect of human resource management that requires a critical approach in decision making. There is a risk prevention decision support system already developed (Raul et.al.,2011) but it concerns real estate investment risk analysis forecast and aims at enabling well informed decision on real-estate investment and not on human resource management. Furthermore, Jing et. al. (2007) delved into the design of a military human resource management using a fuzzy model for military personnel appraisal. This attempt was quiet novel and the results seem promising in automating military personnel's appraisals and effective human resource management. In addition, Elena (2012) elaborated on the possibilities and challenges involved in the development of decision support systems that are intelligent enough to support top military commanders in making real-time scientific decision at the appropriate time under reasonable cost. Also, Andreas et. al.(2000) conducted a study within the German army on the impact of decision support systems. The results of this study indicated that decision support systems are fast becoming an integral part of the military to aid speedy commanders 'decision and the implementation of decision support systems that are already feasible in

practice. Furthermore, Jens (1999) designed a multi-agent command and control system in collaboration with the Marine Corps warfighting laboratory to test new concepts in military command and control. The system is a distributed system primarily designed to provide general tactical images.

1.3. Motivation

Existing literature reviewed so far supports the claim that decision support system are necessary for effective decision making in various scenarios (investment, education, civil organizations etc). Although none of the reviewed literature dealt with the subject of military human resource deployment management and the associated risk of poor human resource deployment in military mission motivates this research project that delves into the design and implementation of an automated military mission combat efficiency estimation system that computes and represents the military combat efficiency of all possible team members selected for any mission and that of their enemy mathematically. To determine the best optimum and efficient blend of military team members for an operation, while keeping in mind efficiency is to focus on human resource deployment and mission success. This system serves as decision support system for top military commanders saddled with the responsibility of deciding who is to be part of mission team or not.

1.4. Advantages of MEECS

The advantages of estimating military team and enemy team combat efficiency in a mission are:

- Enhancing the decision making process related to team selection for an operation, giving endless possibilities of combination of soldiers with varying years of combat experience;
- Optimizing team selection in the military, as many possibilities of team combinations are available with higher combat efficiency;
- Enhancing military manpower resource deployment for operations;
- Directly reducing the possibility of team casualty, as team members with optimum performance are to be selected;
- Ultimately, boosting the morale of soldiers, and their confidence in out rightly crushing their enemies, without envisaging any casualty.

2. METHODOLOGY

In conducting the research, we employed a two-stage approach. First, a mathematical model was constructed to compute the combat efficiency of all possible military and enemy team. Next, we devised a simple optimal solution selection algorithm for selecting the most optimal military team. The implementation of this model was done with Microsoft ASP.Net using visual basic and Microsoft SQL server as the backend for the application. Finally a test case was simulated with the application to ascertain the working of the system

2.1. Combat efficiency estimation methodology

In this research, a mathematical model is first developed and latter transformed into a software logic for computing the military and enemy team combat efficiency using Visual Basic development tool and microsfot SQL server database. Data for system validation where case study simulation. While the analysis of the Case study data was done with descriptive statistical methods.

2.2. Recruitment training combat efficiency of friendly forces (military)/enemy

A. Military: The estimation of the military recruitment training combat efficiency is key to determining the combat efficiency of military recruits and ascertaining the overall training efficiency of combat experienced soldiers. We consider formal education, military drill with weapon training, and simulated war practice as constant indicators in the military. Each indicator scoring one point, totaling constant three (3) points for military training. Thus, the mathematical formulae for estimating the combat efficiency for military training is given below:

$$MTCE = \sum TD[NOR] * 3 * NOR \text{ eq (1)}$$

WHERE

MTCE= military training combat efficiency

Training Duration= TD

Number Of Recruits=NOR

3 = the constant point representing all military training components (formal education, weapon education and combat education)

B. Enemy: The enemy recruitment training combat efficiency estimation is obtained by primarily considering the components of the enemy training, which are commonly weapon skill, and fighting skill, for example al-Qaida terrorist will not consider formal education in recruiting fighters). Hence accumulating 2 points. The mathematical formulae is shown in eq(2) below, compared to the three points in military training combat efficiency.

$$ETCE = \sum TD[NOR] * 2 * NOR \quad \text{eq (2)}$$

WHERE

ETCE = Enemy training combat efficiency

Training Duration = TD

Number of Recruits = NOR

2 = the constant point representing all enemy training components/indicators (weapon education and combat education)

2.3. Combat efficiency of experienced soldiers/enemy per group

A. Military: Simulating and expressing combat efficiency of experienced military personnel in figures using a mathematical formula was achieved by finding the combat efficiency for all training per person with accumulated training duration, using eq(1). We further group the soldiers into four groups

by dividing the maximum number of years in military service into four equal sets. The combat efficiency of accumulated training for a group is obtained by multiplying the number of experience soldiers in a group with the accumulated training duration of personnel's in the group. This result is added to the result of multiplication of Corresponding Point on Years of Experience, number of experienced soldiers and years of combat experience. The corresponding point on years of experience is on a five-point scale for the military encompassing no vulnerability to kill trauma, death trauma, maneuvering, skills accumulation for different weapons and promotions. These points are in increment of 5 point for each year an experienced soldier has accumulated. The number of experienced soldiers is the total number of experienced soldiers per group, while the years of combat experience are expressed in months rather than years. Since, the total years of active service in military are usually fixed for a maximum 35 years globally, to obtain better results, during the system simulation and design experienced soldiers were grouped into four categories by years of combat experience from 1 to 9, 10 to 18, 19 to 27 and 28 to 36 as maximum. Therefore, to obtain the estimated combat efficiency of experienced soldiers, computation is performed in four different groups. We exclude other possibility that are highly probabilistic, such number and nature of personnel arms and

ammunition, which vary from mission to mission. The simulation only assumes that all parties are well armed. The combat efficiency for experienced soldiers is obtained by the mathematical formulae below

$$\text{CEOESPG} = \sum ((\text{TD} [\text{NOCES}] * 3) * \text{NOCES}) + (\text{YOCE} * \text{CPOYOE}) * \text{NOCES}$$

WHERE

Combat Efficiency of Experienced Soldier Per Group = CEOESPG

Years of Combat Experience = YOCE

Numbers Of Combat Experienced Soldiers = NOCES

Corresponding Point on Years of Experience = CPOYOE (ranges from +5 for each year)

B. Enemy: The combat efficiency of enemies are obtained, in a similar grouping faction, as with the military, using the same equation, but slightly different, with the constant 2, which is the value for training, due to the lack of formal education in enemy

$$\text{CEOEEPG} = \sum (((\text{TD} [\text{NOCEE}] * 2) * \text{NOCEE}) + (\text{YOCE} * \text{CPOYOE}) * \text{NOCEE})$$

WHERE

Combat Efficiency Of Experienced Enemy Per Group = CEOEEPG

Years Of Combat Experience = YOCE

Numbers Of Combat Experienced Enemy = NOCEE

Corresponding Point on Years of Experience = CPOYOE (ranges from +5 for each year)

2.4. Total cumulative combat experience for whole team (enemy/military) selection (TCCEFWTS)

This is the numerical equivalent of the combat efficiency of the selected team, which is expected to be greater than that of the enemies, based on known information about the enemy. Although the enemy TCCEFWTS computed by the system will not change, because all information about the enemy are known and input into the system, hence will not change. While the TCCEFWTS for the military team will continue to change for each possible team selection information entered into the system. The TCCEFWTS formulae is given below.

Military team:

$$\text{TCCEFWTS} = \left(\sum_{I=1}^4 ((\text{CEOESPG}[I]) + \text{MTCE}) \right)^4$$

WHERE

Total Cumulative Combat Experience Whole Military Team Selection = TCCEWMTS

Combat Efficiency Of Experienced Soldier Per Group = CEOESPG

I = 1 TO 4, corresponding to the years of combat experience divided into four groups

MTCE = military training combat efficiency obtained with equation (1).

Enemy team:

$$\text{TCCEFWET} = \left(\sum_{I=1}^4 ((\text{CEOEEPG}[I]) + \text{ETCE}) \right)^4$$

WHERE

Total Cumulative Combat Experience Whole Enemy Team = TCCEWET

Combat Efficiency Of Eperienced
Enemy Per Group = CEOEEPG

I= 1 TO 4, corresponding to the
years of combat experience divided
into four groups

ETCE=enemy training combat
efficiency obtained with equation(2)

2.5. Optimum team selection algorithm

The pseudo-code for selecting
the best team from a list of feasible
best teams, which optimally utilizes
human resources and projects higher
mission success, is given below:

- Select the enemy combat effi-
ciency;
- Compare all military team
combination combat efficiency;
- Select all military team combi-
nation with higher combat efficiency;
- Select the military team with
lesser number of personnel but which
balances inclusion of recruits and ex-
perienced people;
- Un-select any military team
with higher number of personnel,
higher number of experienced per-
sonnel and lower number of recruits;
- Output the best team.

3. SYSTEM DETAILS

3.1. System design

The MCEES was designed with
visual basic asp.net tool. It consists of
several modules, from introductory
module through authentication, to the
combat efficiency estimation module,
which translates the physical combat
efficiency through mathematical

operation, into numerical values,
for both enemies' and military
teams selected. These are further
compared, continuously, until all
possible military team scenarios are
exhausted. As illustrated by the chart
below, it begins with first computing
enemy combat efficiency, then it
move on continuous computation
of military team combat efficiency,
for every possible combination,
with repetitive comparison of their
result. If any military team combat
efficiency is less than enemy combat
efficiency, then a re-entry of another
possible team combination is done.
Else, if the military team combat
efficiency is higher, and there is no
more possible team combination
with higher or equal combat
efficiency, then the military team
with the highest estimated combat
efficiency is selected as the best team
combination suitable for the mission.

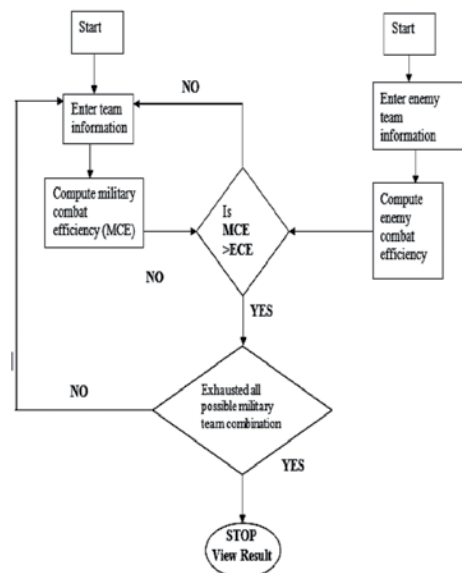


Fig.no.1. MCEES flowchart

3.2. System implementation

The MCEES was designed using Microsoft asp.net technology tools and Microsoft sql server as backend technology for storing each team combinational test data. The system consists of three small modules as shown by the screen shots below: first, there is an introductory module, the next is the authentication module that ensures only duly registered legitimate users have access to the system, and Finally, the main module that performs the logical computation of selected team and enemy team combat efficiency.

The system begins by first computing the enemy combat efficiency, since that is considered constant. Next, there is the computation of the every selected trial team combat efficiency. Also the comparison between the enemy combat efficiency and the military team combat efficiency to outline all feasible optimum military teams for the operation is performed as the next step before the final execution stage. Finally, the most optimum solution with respect to efficient utilization of human resource deployment and mission success is selected using the pseudo code mentioned in **Subchapter 2.5**.

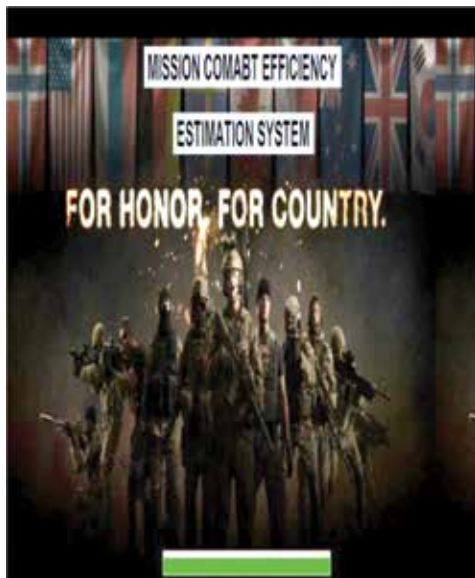


Fig. no. 2. Home screen shot of the MCEES



Fig. no. 3. Authentication screen shot of the MCEES

Fig. no. 4: Combat efficiency estimation module screen shot of the MCEES

4. CASE STUDY

The case study builds up on a mission to combat the ISIL group in Syria with intelligence information estimating its total fighting manpower at five thousand (5,000) with details as follows:

- 2,000 experience fighters existing for the past three years;
- 2,000 new recruits;
- 1,000 experiences fighter

having combat experience of 10years as veterans.

To determine the best military team combination that will be optimal in operation performance, human resource utilization, and assures success of the mission the MCEES performs an n-number of possible team combinations, computes their combat efficiency, and compares it with that of the enemy as follows in the table below.

Table 1: Case study data

| TEAM | MILITARY TEAM | | | | | | E N E M Y TEAM |
|------|-------------------------------|---|--|--|---|----------------------|----------------------------|
| | TEAM COMBIANTION | | | | | COMBAT EFFICIENCY | Enemy COMBAT EFFICIENCY |
| | RECRUITS | 1-9YRS | 10-18YRS | 19-27YRS | 28-36YRS | | |
| 1 | 2000 (3months training) | 2000 (32months exp, 3months training) | 1000 (120 months exp, 3months training) | - | - | - | 7124000 |
| 2 | 150 (6months training) | - | 200 (180months exp, 6months training) | - | 50 (348months exp, 24months training) | 5225808 | - |
| 3 | 400 (6months training) | - | 100 (180months exp, 6months training) | 50 (228 months exp, 16motnhs training) | 50 (348months exp, 24months training) | 7486356 | - |
| 4 | 600 (6months training) | - | 50 (180months exp, 12months training) | 250 (228 months exp, 16motnhs training) | 50 (348months exp, 24months training) | 8119356 | - |
| 5 | 450 (6months) | 150 (96motnhs exp, 9months training) | 85 (216months exp, 18months training) | 50 (300months exp, 24motnhs training) | 50 (396 months exp, 36motnhs) | 7378761 | - |
| 6 | 450 (6months) | 150 (96motnhs exp, 9months training) | 100 (216months exp, 18months training) | 75 (300months exp, 24motnhs training) | 40 (396 months exp, 36motnhs) | 7954461 | - |
| 7 | 350 (6months) | 150 (96motnhs exp, 9months training) | 100 (216months exp, 18months training) | 75 (300months exp, 24motnhs training) | 50 (396 months exp, 36motnhs) | 8606061 | - |
| 8 | 200 (6months) | 50 (96motnhs exp, 9months training) | 20 (216months exp, 18months training) | 15 (300months exp, 24motnhs training) | 100 (396 months exp, 36motnhs) | 7681161 | - |

Further analysis of the results in **Table1** is presented in **Figure 5**. Clearly team1 is excluded from the possibility of feasible teams due to its lesser combat efficiency in comparison to enemy combat efficiency. Hence leaving just teams 2-7 as the only possible feasible team solution for the operation, since they all have higher combat efficiency in comparison with enemy combat efficiency.

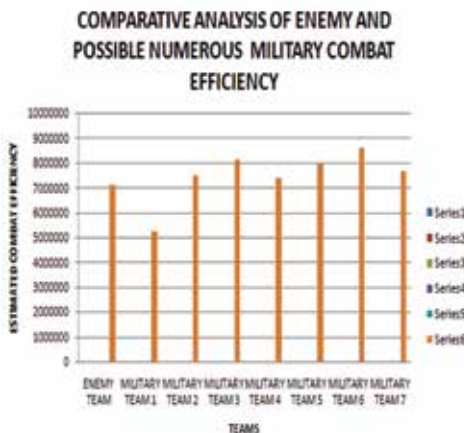


Fig. no. 5. Comparative analysis of enemy and feasible military team combat efficiency

Furthermore, **Figure 6** below shows an analysis of teams' personnel number in different categories and the total number of personnel per group, as well as for both enemy and various military teams. Clearly military team2 and team4 have more personnel drafted for the operation than military team7. Although military team2 and team4 have almost same level of combat efficiency estimated, but military team4 has more personnel

drafted for the operation than team2. While both team2 and team4 have almost the same combat efficiency as estimated for team7, team7 requires little personnel for the same operation with slightly higher combat efficiency in comparison with team2 and team4. Military team3 and team5 have almost equal combat efficiency, but by comparison with the enemy their estimated combat efficiency is greater than the enemy's. Nonetheless, military team3 has more personnel drafted for the operation than military team5. Hence, the optimal feasible military teams for this operation are military team5, team7 and team6, which are selected due to its significant lower number of personnel drafted for the operation with higher combat efficiency estimated. Between teams 5,6, and 7, the optimum team will be the one that requires fewer soldiers, effective combination of experienced and inexperienced soldiers and still maintains a combat efficiency estimated above the enemy combat efficiency. Team7 has more experienced personnel and few recruits in comparison with teams5 and 6. Hence, team7 is eliminated. Between team5 and 6, team6 obviously stands out to be the most feasible for this operation since it has the best blend of experienced and inexperienced solders, with a total number of personnel drafted for this operation kept at a minimum and with the highest combat efficiency estimated above all other possible military teams and the enemy team.

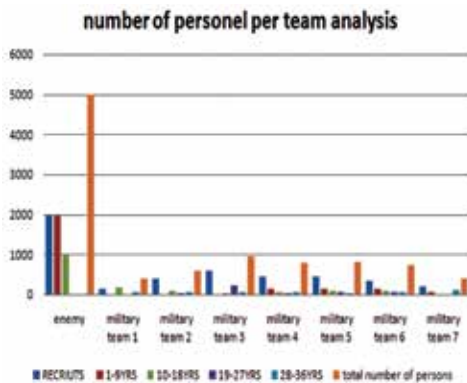


Fig. no. 6. Evaluation of number of personnel per team

The MCEES can be further enhanced by adding other probabilistic combat efficiency and performance estimation components, such as the number of rounds of ammunition, types of weapons, type of mission, skill needed in the military team and skill possessed by the enemy, etc. to further ascertain the highest probability of mission success and failure as a factor of the combat efficiency of the team selected. However the combat efficiency considered in this paper, is highly needed for manpower selection and deployment.

5. CONCLUSION

In conclusion, a first attempt towards quantifying the combat efficiency of military personnel and enemies' manpower was achieved through the design and implementation of the MCEES. The system was developed using Microsoft asp.net technology and Microsoft sql server for backend. MCEES is a decision support

system for top military commanders and military mission planners, saddled with the responsibility of deciding "who" and "how many" will be in a military mission team. MCEES will aid the efficiency and optimality of decision making on the topic of military team selection and combination. This is important for military asset deployment and utilization, especially human resource utilization in addition to the overall mission success with minimal or zero casualty on a military team. The analysis of the case study considered, clearly indicates the optimal character and reliability of the MCEES when utilized for mission team selection planning by top military commanders. Therefore, MCEES promises to ease the military team selection decision-making process by automating it and providing an n-number of possibilities that allow vast team combinations for optimal decision-making.

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DISTRIBUTED SIMULATION – A CONNECTION VECTOR AMONG ROMANIAN JOINT NATIONAL TRAINING CENTER AND SIMULATION TRAINING CENTERS DURING LARGE-SCALE TRAINING EXERCISES

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To face the modern battlefield challenges, Armed Forces need to be effectively trained and military leaders have to visualize the area of operation and understand its complexity, the purpose of missions, and the operational end state. In other words, for achieving the commander’s intent and operation’s end state, units must understand the contemporary complex operational environment. Using simulators and simulation systems, during large-scale simulation training exercises, military simulation can provide the best training opportunities for all armed forces in order to accomplish training objectives thru live-virtual-constructive integrating architecture (LVC-IA) and synthetic environment. The advance of science and technology related to military simulation and simulation systems supports the planners for tailoring appropriate training scenarios and sometimes it could be a significant challenge and also an opportunity for the staff to establish the technical simulation framework and integrated training environment. Nowadays, in order to support and provide the best training opportunities for setting up the appropriate simulated operational environment to all military forces which are located in different areas, the distributed simulation is the key of military training success and it also could be considered as a connection vector throughout all training simulation centers.

Key words: *distributed simulation, Military training, Simulation systems, integrated training environment.*

1. AN OVERVIEW OF ARMED FORCES TRAINING PROCESS

In an increasingly complex geopolitical situation opened to the unpredictable global evolutions of

the nowadays security environment, increasing the level of training quality, as part of the modernization process of the Romanian Armed Forces, became mandatory.

As part of the modernization process of the Romanian Armed Forces, in an increasingly complex geopolitical context opened to unpredictable global evolutions of nowadays' security environment, enhancing training quality level becomes mandatory.

A number of reasons favor large-scale training exercises by using distributed simulation, as following: they provide the best approximations to the actual realism of military operations, they efficiently use all the resources, and they reflect national capability and commitment. For training purposes, the Romanian Armed Forces strives to replicate the actual operational environment as closely as possible and, as a consequence, the training exercises accomplished at the "Getica" Joint National Training Center (JNTC), Cincu, Romania are the most successful in this regard by involving all unit types, no matter the size, and unit branches. The large-scale multi-echelon training exercises offer the best approximation of military operations for a sizable force, such as a division or greater.

Based on the unpredictable international security environment, along with maintaining the international agreements and commitments, the Romanian Armed Forces has been starting the transition from the training related to counterinsurgency operations towards a training focused on decisive actions, which implies adaptable Armed Forces, capable of fulfilling

tasks across the full spectrum of operations and achieving the national defense goals. The Romanian Armed Forces must be aligned with the Alliance's training efforts and, furthermore, they must start the training process transition towards Joint Operations in order to have adaptable, operational, and capable military forces facing all kinds of missions, anytime and anywhere.

Along with other military activities, the Armed Forces training represents a fundamental activity which requires an important amount of time and lots of resources, in order to achieve stated training objectives.

The modernization process of the military training through large-scale exercises requires also the existence and development of the simulation training component. The increasing role of Modeling and Simulation (M&S) in the training process represents a viable solution in support of the military training exercises implying cost reduction and reaching the training goals by using military modern equipment, simulators and other kind of simulation systems used in an integrated environment.

2. TRAINING CAPABILITIES THROUGH THE INTERCONNECTION OF SIMULATION SYSTEMS

The possibility to conduct training activities for each branch/specialty, in a joint, combined and multi-echelon manner by Headquarters

and maneuvering forces displaced in different locations, as well as the use of simulation capabilities in all-type training exercises brings up the interconnection issue in an integrated training infrastructure, concluding to what we are used to name – distributed simulation for training purposes.

The “*Change Engine*” in the military training field and exercises for all Headquarters and armed forces at the Romanian Army level, JNTC (located in Cincu, Braşov) makes use of the integrated real-constructive-virtual simulation for training environment’s replication and, in addition, the existent infrastructure, training capabilities, and all type facilities, as well as the well-trained teams (SMEs – Subject Matter Experts) belonging to JNTC lead to a real increase in training quality and evaluation of the training for all the units involved in a training event or in a large-scale exercise.

Table 1. Military simulation systems used during headquarters and forces training [1]

| MILITARY SIMULATION SYSTEMS | | |
|------------------------------------|------------------|------------------|
| Simulation | People | Systems |
| REAL | Real | Real |
| VIRTUAL | Real | Simulated |
| CONSTRUCTIVE | Simulated | Simulated |

The simulation systems offer the possibility of interconnection in order to have at the same time, in the same exercise, military structures (units) using different types of systems and simulations: LVC - Live, Virtual,

Constructive. With this capability, the training audience has the common operating picture (COP), no matter the systems and the type of simulation used by the subunits, often deployed in different locations, but using the same scenario. Moreover, by integrating multiple simulations we can create a common operational environment (ITE – Integrated Training Environment) – the base for the integrated architecture (LVC-IA Live, Virtual, Constructive – Integrating Architecture).

At the Munich Security Conference plenary session on “Building Euro-Atlantic Security”, February 4, 2012, NATO Secretary General, Anders Fogh Rasmussen, issued the “*Connected Forces Initiative*” (CFI) concept. The main idea was that the forces trained, exercised and operated alongside each other around the world, e.g. Libya, Kosovo, and Afghanistan, have to maintain their interoperable capacity, ability to work together – and, when necessary, to fight together. The main areas where this Initiative could enhance the unique capacity to work together are: expanded education and training increased exercises, and better use of technology [2].

An important role in achieving the objectives of the CFI concept is set by the simulation systems, their integration in a common training environment and their capacity/capability to be used in a distributed

simulation exercise: trained forces – different locations (different cities, countries or even continents).

To emphasize the previous statements, the series of the Command Post Multinational Exercises *Saber Guardian* which comprises more than three thousands military from different countries is an example in this respect. Some of the forces attending the exercises are deployed in one of the Combat Training Centers (e.g. Novo Selo – Bulgaria, L'viv – Ukraine) and the rest of them are stationed at Cincu JNTC. The participating forces are part of the distributed simulation exercise, having Response Cells at different levels according to the integrated exercise architecture and using a common scenario.

The situation is assessed as flexible due to the training audience's locations and based on the planned exercise design. The distance between the JNTC and CTCs does not represent an obstacle in conducting such exercises: the distribution capability is improved by integrating other countries' forces owning constructive simulation equipments. Moreover, it is important to mention the connection of live simulation with constructive one. In the same exercise, staff is working in constructive, troops – boots-on-the-ground instrumented with the Real Simulation equipments and all

together can be deployed in different locations and countries.

Concerning the *Saber Guardian 16* Multinational Exercise as an example, it is worth noting that the troops deployed at Cincu JNTC are using constructive and live simulations, and other subordinated forces are stationed in Bulgaria and Ukraine, achieving their training objectives in the same realistic and challenging scenario.

In this context, the statement of COL John G. Norris, U.S. Army Europe Joint Multinational Readiness Center, Hohenfels, Germany, delivered during the *Saber Guardian 14* exercise is important. He restated the “*Connected Training Initiative*” (CTI) approach during an interview for IHS Jane's Defense Weekly: “*This exercise, due to the last decade sustainment, is connected digitally with Romania, one of our sister Combat Training Centers, Cincu CTC located in Romania, which we have helped build and establish over the years. They have a battalion training there in CPX, and the rest of the higher headquarter training in Bulgaria, in a contingency Command Post. That is powerful, that is tremendous. The future is to connect the Live/Virtual to the CPX in a digital world, and we can do that. We are capable of doing that right now*”[3].

The JMTC “*Connected Training Initiative* (CTI) is illustrated below:



Fig.no. 1. Joint Multinational Training Command Connected Training Initiative (CTI [3])

The Romanian Armed Forces ROU NAT SIMNET (Romanian National Simulation Network) is an ongoing project and involves constructive simulation for staff training, live and virtual for troops training. The ROU NAT SIMNET functionality is established by Cincu JNTC guidance and coordination, since the beginning of the last year, based on the knowledge, experience and lessons learned gathered by the JNTC specialists during the distributed simulation multinational exercises. The ROU NAT SIMNET utility was proven during a distributed constructive exercise when the *Land Forces Combat Training Center - Cincu*, *Evaluation and Simulation Training Center – Constanța* and *Simulation Training Center - Bucharest* were fully connected.

Step by step, ROU NAT SIMNET will expand towards Romanian Armed Forces Units and other training structures, like Air Forces Simulation

Center, Secondary Training Centers, Military Academies and so on.

3. FINAL REMARKS

From the simulation training perspective, 2016 represented a milestone in Cincu CTC's experience: DACIA 16, the first major joint distributed exercise validated the ROU NAT SIMNET (Romanian NATional SIMulation NETwork). Starting with the distributed constructive simulation as a first step for this project, there are also clear goals to integrate live and virtual simulations, developing Cincu JNTC Live, Virtual, Constructive – Integrating Architecture expertise at the national level.

In order to have a more efficient simulation training, where all the combat and combat support branches are represented, we need interoperable simulations [4].

Nowadays, using more and more the simulation equipments, simulators and other systems in support of the Romanian Armed Forces training in a modern Joint operational environment, national and multinational depends on the projected training objectives, the planners, scenarios experts, specialists knowledge, background and expertise. The Land Forces simulation training using Cincu JNTC capabilities reached the perfect framework heading to the right direction. The M&S development perspectives in order to support staff and troops training are very promising at this point.

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KEY DUTIES OF A COUNTRY'S ECONOMY RELATED TO NATIONAL DEFENSE IN CRITICAL TIMES

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A country's economy has a special role in a country's defense. The organization of the national defense is carried out not only through the development of national armed forces, but also by increasing the sustainability of the economic activity for provision of the State and population demands during war. For this reason, development of the economic potential, taking necessary measures for preparation and sustainability of labor, material and financial resources are one of the significant issues and studying the conceptual, legal and economic issues related to the duties of the economy in the organization of state defense in Azerbaijan is very crucial.

Key words: *special period, sustainability, economic potential, resources, mobilization, preparation, mobilization planning*

1. INTRODUCTION

Under the Law of the Republic of Azerbaijan on "Defense", the defense of the country is based on the fact that armed forces, economy, population, and the territory always shall be ready for protection and this is organized in compliance with a Military Doctrine of the State [9]. During mobilization and wartime, as well as during emergencies (*hereinafter* – in a special period/critical times) provision of sustainability of activity of the country economy, its

spheres, possible economic-social facilities (*hereinafter* – country economy) stipulates the ability to maintain its operating capacity, mobilization within a short period of time and restoration of its activities considering the threats of a special period.

Main external factors violating the activity of the country in a special period are the following:

- Damaging the productive forces of the country and worsening their circumstances;

- Application of destructive means to the facilities of economic and social importance by the enemy;

- Deterioration of external economic relations and trade as a result of military and political factors [23].

Development of information technologies and its application in various spheres of the economy, creating new areas of economic activity and relations, development of finance and banking system make imminent internal threats occurred in a contemporary and a special period, along with traditional destructive factors.

According to the military doctrine of Azerbaijan preparation of public institutions, country economy, population and territories for protection is one of the significant actions taken in time of peace in the frame of the defense policy and covers the following directions:

- Ensuring mobilization preparation of the state authorities, self-governing bodies and organizations, economy and population for defense preparation in time of war;

- Preparation of the country economy to mobilization and conditions of wartime and preparing mobilization plans accordingly;

- Building, development and maintenance of productive capacities to meet demands and needs of the State, armed forces and other armed groups and of population in wartime;

- Creating reserve points of public institutions, self-governing bodies and organizations and preparing for conditions of war [13].

The relevant state policy based on forecasting of a special period and its planning, as well as measures for ensuring economic sustainability of the economy in that period and for increasing capacity. Taking into consideration the abovementioned, it is necessary to prepare economy to conditions of war in advance in peacetime, protect productive forces of the country from enemy's destructive means, prepare and implement special norms, rules and preconditions, complex institutional and engineering and technical measures addressed to restoration of the damaged economic activity in a short time through comprehensive analysis and evaluation of the existed military-political situation, the possible (predictable) economic situation during military operations for increasing economic sustainability of the country in a special period.

2. CONCEPTUAL APPROACH TO THE PREPARATION OF THE COUNTRY ECONOMY FOR A SPECIAL PERIOD

Studying economic processes of the defense of the country encapsulates various levels and degrees. The defense of economy at macro, mezzo and micro levels explore defense and security, military and economic capacity of the State, mobilization preparation of the country economy, execution of military duties and services, building

military cooperation, economic basis of wartime and armed conflicts, as well as security, wars and relationships between economic interests [6].

Mobilization preparation of the national economy as one of the defense economy includes evaluation, preparation and mobilization of economic resources (labor, material and financial resources) for a special period, also studying measures undertaken for increasing sustainability of the country activity during that period.

Main purpose of ensuring sustainability of the country economy for a special period is continuous and complete provision of the country, society, and people in accordance with specifically determined goals (goals, interests and ambitions), real labor, finance and material resources (economic resources). Key principles, duties of different institutes and preparation as well as mobilization mechanisms for mobilization of defense resources and ensuring preparation for this purpose, generally are regulated by the Law of the Republic of Azerbaijan on "Mobilization Preparation and Mobilization in Azerbaijan". Under this Law Preparedness activity – means a complex of activities carried out at peace time for preparation of the economy, executive authorities, local governments and organizations of Azerbaijan Republic, Azerbaijan Republic Armed Forces and

other armed units provided in the legislation, as well as, special state bodies established by the relevant executive authority and special units established for wartime, for the purpose of defense of the state against any armed attack and provision of demands of the state and needs of the population at wartime.

The main directions of the concept of preparedness of the economy: effective usage, maintenance and development of economic potential of provision of demands of the state and needs of the population at wartime; preparation, mobilization and creating special reservations of labor, material and financial resources, as well as, ensuring directions of sustainability of the activity of country economy. In accordance with this Law, legal regulation and organizing in the field of mobilization preparation and mobilization carried out by the Cabinet of Ministers [10]. Thus, obligations of the government in this field are the followings:

- Developing national supply system of readiness of the economy, stable operation of these systems and provision of continuous control over the organization, developing legal and normative framework, as well as preparing regulator and normative documents for mobilization of the country economy, public institutions, self-governing bodies and organizations;

- Regulation of the economy, including stable and efficient

operation of the financial, tax and currency systems in special period;

- Development and execution of mobilization plan for the economy, relevant plans for state and self-governing bodies, organizations;

- Provision of demands of the Armed Forces, other armed units, and needs of the population at wartime, as well as the creation of mobilization forces in the areas of manufacturing to ensure creating important product and services for sustainable economic activity;

- Establishment, accumulation, maintenance and re-supply of mobilization and state reserves of material resources, as well as, untouchable reserve of foodstuffs and oil products;

- Establishment and maintenance of a reserve fund of documents regarding to arms and military equipment, important civil products, highly dangerous objects, systems of vital importance for population and objects deemed to be national wealth;

- Development of technical equipment for the purposes of including in or using in the interest of armed forces, other armed units, as well as formation and training of special units;

- Establishment and preparation for functioning at wartime conditions of reserve control points of governmental authorities, local governments and organization, in accordance with the established conditions;

- Reservation of military officials for a special period.

3. EFFECTIVE USE, PRESERVATION AND DEVELOPMENT OF ECONOMIC POTENTIAL

Effective use, maintenance and development of economy in time of peace and wartime are important elements for sustainability of the special period. Consequently, this issue is reflected not only in economic development concepts of the country, but also in other strategic documents of military importance. According to the Law on economic capacity building, ensuring economic stability and efficient use of financial resources are included to the national interests of the country in the field of economy [11]. Furthermore, under the National Security Concept of Azerbaijan, economic dependence and economic destabilization are considered threats to the national security [14]. The significance of this for a special period is that economic capacity, economic structure of the country, geographical location of important economic and social facilities, and their sustainability in the respective period, effective allocation and using of resources, and other issues require advance assessment, planning and preparation from the perspective of provision of demands and needs of the State and population. Thus, failure to develop necessary production facilities and import opportunities considering the demands of a special period, not placing productive forces and field considering compatible threats, and failure to provide

sustainability of important economic and social facilities in comply with scenarios finally give rise to serious challenges in provision of defense needs. In a special period, in order to ensure economic sustainability it is necessary to take the following measures:

- Evaluation and development of economic and production capacity in accordance with the demands of needs of a special period;
- Development of sectoral and territorial structure of economy;
- Ensuring and maintenance of important economic and social facilities;
- Development of capabilities to restore the activity and rapid mobilization of important economic and social facilities [21].

3.1. Assessment and development of economic potential

The economic potential refers to economic-productive activity of the economy, as well as the activity carried out by its areas objects and persons, production, rendering services, provision of the public and population demands, and ensuring the development of production and consumption [26]. While assessing the economy it is necessary to evaluate the following key aspects affecting the economic power:

- Material resources: natural resources potential, manufacturing, service facilities and infrastructure;
- Human resources: population, demography, military and economic personnel (or forces), additional

Sources for involvement of labor Resources, and employment procedures and etc.;

- Developing and applying the high technologies: productive scientific innovations are very significant resources. The application of scientific innovations to economy is one of those aspects that increase effectiveness. Therefore, applying fundamental and practical researches in different areas of economy and testing the innovations and their application to the production pave the for increasing the economic potential;

- Climate and geographical position: the air temperature, humidity and other similar factors affect the production potential. In addition, the existence of internal and external transport corridors increases the transit capacity of the country. Simultaneously, the availability of high transport capacity is very important not only for increasing the importance of the country for the region, but also for rapid mobilization of resources during war and economic crisis;

- International relations affecting the increasing the economic potential: the export capacity and the existence of production areas ensuring the money flow to the country are one of the significant factors seriously affecting the economic potential. Also, import of the products that do not exist in the country, attracting foreign grants and investments are valuable also from the perspective of the participation in the, international division of labor;

- Manufacturing capabilities and its efficiency: Natural and value, additional value and its structures are important indicators that characterize the economic potential. From one hand, added value in resource efficiency and indicators such as energy capacity demonstrates the quality of the country's economy [4].

On the other hand, the indicators mentioned above are not sufficient for the assessment of the country's economic activity during the war. When assessing the economic potential in war the following factors are of utmost importance for taking into consideration:

- Public support to the activity of the ensuring the defense. This mainly covers the issues in relation to more ideological propaganda and society's enthusiasm;

- Economic conversion. The opportunities of peacetime economy to be operational in wartime conditions are factors affecting the economic potential. So, the economy failed to rapidly adapt to the conditions of wartime cannot use it efficiently. This type of economic model was more characteristic for the USSR;

- Macro-economic stability. Investing in the frame of the programs applied in wartime (conversion of the industry, creation of industrial enterprises of defense importance and etc.), and modifications in the structure of consuming and production can be accompanied with sharp dynamics in monetary indicators;

- Civil demands. One of other crucial issues during war is creating

a balance by minimizing the large-scale civil demands with regard to manufacturing and consuming of products of defense importance. Such minimizing is done either at the expense of conversion of production of such needs, or by reducing the populations' income [5].

3.2. Improvement of the sectoral and territorial structure of the country economy

Taking into consideration special demands, norms and rules during the military operations addressing to reduce damages to sectoral and territorial structures, while ensuring their improvement, along with economic and social factors are issues of utmost importance. In addition, while preparing comprehensive and detailed plans for social and economic development, schemes on placement of productive forces, and programs about development of major regions and areas of economic importance, also a placement of important territorial production complexes the following aspects should be taken into consideration:

- Prioritizing the areas of significant civil production;

- Clustering of significant industries aimed at the local resources and the latest data product;

- The rational allocation of production resources, taking into account the volume and potential economic regions across the country;

- Application of effective technology;

- Improving and increasing internal and external economic and trade relations;

- Confining the concentration expansion of large cities, industry, material resources, and high-risk facilities in cities such;

- Use of underground space of cities and mountainous areas to accommodate the specific manufacturers of products and objects of importance of defense;

- Duplication of objects of particular importance, and specific production areas sensitive to external threats [28].

The development of sectoral and territorial economy based on the factors considered above, allows to achievement of sustainability for a special period. Relevant criteria in time of peace are important from the point of effective and efficient development of economy.

Strengthening the state activities in emergency situations and maintain the functionality of infrastructures of vital importance to the extent necessary in emergency situations are one of the priorities in Azerbaijan [1].

4. PREPARING, MOBILIZING AND CREATING SPECIAL RESERVATIONS OF LABOR, MATERIAL AND FINANCIAL RESOURCES

Every defense system fails to achieve concrete results without being able to mobilize economic resources [3]. Resources are the

combination of set of tools or resources that the country possesses and uses for achieving the execution of particular duties. But in the literature on fundamental economics, the economic resources mean as resources being necessary means for ensuring the production are divided into natural (raw materials), labor (human resources), investment (private equity), turnover means (materials), information resources, and finance (capital in the form of money) [27].

Theoretically in order to obtain any resources it is necessary to have a strategy on possession and mobilization. The mobilization of resources itself includes the organization of effective use of all type of resources and management methods and technologies to achieve the goals [22].

While assessing the wartime conditions, it is possible to observe the absence of significant differences in the amount of the existing resources available in the country, and that there are changes in their flow directions and centers of interest. So, in peacetime if the main factors forming the structure of demands and proposals related to provision of high quality of life, in wartime the priorities more or less interlinked whether the current production is sufficient for support the war process and provision of necessary consumption of the population [17]. It is not surprisingly that preparation and mobilization

of labor, material and financial resources for the wartime are ensured on the basis of this concept. Under the military doctrine of the Republic of Azerbaijan, the needed capacities for effective solution of the problems encountered and existed in Azerbaijan shall be developed in accordance with the human, financial and other resources available for the country [13].

4.1. Preparation of labor resources of the country economy for special period

Preparation and mobilization of labor resources for wartime are only one part of the complex of measures for the mobilization preparation of the economy. This should be taken into account that during wartime complex of measures in relation to human resources undertaken by the State is very diverse and multi-staged process; there assessment of the potential, forecasting of possible losses in various scenarios, a compilation of balance of labor resources, provision of the economy with human resources, and preparing plans are significant issues. In addition, the other obligation of the State here is to take measures with regard the following field in a peacetime:

- Evaluation of labor market of the country for a wartime and mobilization preparation of able bodied forces;

- Training of personnel in necessary fields important for wartime;

- Reservation in wartime the high-level and necessary staff of the important fields of the economy;

- Determining the set of rules of labor and salaries for a wartime;

- Defense of labor resources in war [21].

According to the national laws, with regard to military and emergency situations, an employee shall be permitted to perform overtime in order to prevent a natural disaster, industrial accident, or other emergency events, or to eliminate their consequences, as well as to prevent the loss of perishable goods, and the work place of that employee is preserved [7]. Furthermore, for ensuring sustainable activity of the country economy in wartime the special list of necessary duties and professions are prepared, military officials, executives, scientists and cultural workers, skilled workers and employees working in organization and institutions that are assigned to mobilize, are respite in advance in accordance with the pre-arranged events [20]. Also, provision of human resources is carried out in the frame of the state programs through learning the demands of the country economy in relation to wartime.

Defense of the country population and labor forces from the enemy's destructive attacks are one of the priority duties of the State. The key principles, methods and means of defense of all categories of the population are regulated by the legal and normative acts of Azerbaijan on civil defense. The

main duties ensuring the preparation and implementation of life insurance of the population in wartime are as follows:

- Preparing size, nomenclature and normative about provision of the people with necessary goods and means of first necessity in wartime and preparing and realizing those stuff considering the categories of the population (according to the ability to work and age), type of the work, its importance and other factors;

- Determining (forecasting) the needs and services for population (goods, needs of first necessity, electricity, natural gas, heating, water and other public utilities and other services) in accordance with the volume (size), nomenclature and normative for the wartime);

- Assessment (forecasting) of the system of life insurance in accordance with the volume, nomenclature and normative for wartime and taking measures for provision of demands;

- Temporarily placement of the staff of the facilities of economic and social importance evacuated during emergencies and provision of first level life insurance.

4.2. Mobilization of material resources and reservation of special resources

The change in the balance of the production capacity of the country in wartime leads to obstacles in meeting the needs in raw and component materials. So, taking

into consideration the limitation of some resources and import of the most of them, for meeting the demands in wartime determining the relevant measures (improvement of the reserves, creating the reserves, and preparing import scenarios and etc.) are main duties of the State. For determining the noted issues in advance it is necessary to make planning of balance of materials and supplies for wartime [4].

During the period of deficiency occurred in the wartime due to the competition among producers and wartime conditions the access to raw materials may be accompanied by a price rise and the execution of production plans prepared on the basis of mutual obligations can face with difficulties. Therefore, most economists consider it is necessary to take the obligation by the State to regulate the distribution and usage of raw and component materials during the war times [17].

One of the measures addressed to the increasing the sustainability of the activity of the county economy in war is the creation of material assets in the state reserve. The mobilization and State reserves in Azerbaijan are special fund for ensuring the stable activity of the country economy, meeting the defense and mobilization needs and for wealth intended to be used during emergencies. Main duties of the State in the field of concern are the activity in relation to determining the size, nomenclature

and places of material resources, creating, refreshing and removal from reserve, considering the threats on various scenarios, important needs of the State and the population, economic, security and time factors of the measures are to be taken in war [19]. Main goal of material resources reservation is to meet the urgent needs of the armed forces and population in wartime conditions; to ensure the work of important economic and social facilities and restore the destructed work; to take rescue, procurement and other measures; to eliminate the results of emergencies for peacetime; to invest the material market to ensure the stable activity of the country economy; and to ensure humanitarian aid.

4.3. Allocation of financial resources in special periods

Financing the needs of the country economy, armed forces of Azerbaijan and the population is an issue of utmost importance. It is not accidental that while analyzing the legislative acts of other countries, including Kazakhstan, Moldova and others, we can see that there are legal acts about not only special mobilization plans for ensuring the sustainability of the economy in wartime, but also special provisions about preparing the draft of the State budget for the first year of the war, adoption by the respective Parliaments, and specification if it is necessary to do so [12]. Financial

and material provisions of increasing the sustainability of the country economy in wartime are determined by the legislative acts and norms of that particular country. Then it is necessary to develop common (or single) accountability principle for preparation, implementation and financing the action plans for the executive bodies.

In accordance with the national legislation, the source of the established funds for measures for mobilization preparation and their implementation in Azerbaijan is a State budget [18].

Main duties of the State with respect to preparing and mobilizing the financial resources are as follows:

- Budget planning to continuously meet the military needs in special period;
- Directing the country's financial and credit funds to finance military production;
- The mobilization of all financial resources available to meet the budgetary costs;
- Research and attracting new sources of funding;
- Settlement and sustainable system of money transfers;
- Implementation of measures in wartime in relation to financing of the areas of special defense;
- Execution of control over the rapid flow of money and over circulation of financial resources out of the country;
- Creating financial resources of the country in advance during a peace time.

5. ENSURING DIRECTIONS OF SUSTAINABILITY FOR COUNTRY ECONOMY

Under the military doctrine of Azerbaijan mobilization and preparation of the country economy for wartime is an integral part of the defense policy of the country [13]. The mobilization and preparation of the country economy to war cover the principles on creating the capacity of the economy to operate and ensuring its development and sustainability in order to meet the needs of the State and population.

Ensuring the sustainability of the economic system of the country for wartime stipulates preparation and implementation of the state policy meeting all expected challenges of the war conditions. In accordance with the national laws and strategic political documents, ensuring the sustainability of the economic system of the country necessitates the preparation of national systems about mobilization preparation of the economy, as well as public bodies, self-governing organizations, and institutions, and economic regulatory systems for wartime to sustainable and effective operation. Additionally, drafting and execution of preparatory measures in important economic and social objects at the institutional level.

5.1. Developing state administration system

The structure and duties of all branches of the Government with

regard to the management of the economy in war are regulated by the legislation and regulations governing their activities. Mobilization preparation and mobilization in the country are carried out on the basis of the principles of centralized administration, advance preparation, planned work and control, complex approach and mutual agreement. Under the national laws, the organization and rules about mobilization preparation and mobilization of public bodies, local self-governing institutions, armed forces and other armed units are carried out by the President of Azerbaijan [10].

In wartime, the relevant management by the state and self-governing institutions in relation to the country economy are carried out in accordance with the mobilization plans. During the wartime, state and self-governing bodies within their competences shall supervise the territorial and sectoral areas of the country economy, adapt and transfer to the wartime work conditions according to the instructions given. In wartime, the sustainability of the management of the country economy is carried out through the following ways:

- Developing the management system of the rationally placed across the country and technically equipped protected reserve facilities located in suburban areas and in the city;

- Creating the collection and processing of carrying out the communication, warning and

necessary information and training systems;

- Implementation of complex measures for the development of organizational and staff structure to adaptation to work under the war condition and to operation under the specific work schedule;

- Collecting, processing and transferring the information important for the management in wartime, as well as preparation and implementation of complex of measures for their security;

- Training of administrative personnel and necessary staff for war conditions;

- Creating an archive of documents on important civil products, objects of high risk, systems of life importance and objects of public wealth;

- Advance preparing of the complex normative and methodological documents determining the activity in war conditions [23].

5.2. Economic policy tools: the necessary means for special times preparation

Stopping inflation, balancing the budget, taxes and customs, mobilization for a war, conscription, foreign aids, and current problems like bankruptcy protection are inalienable part of the economic management in a special period. War economy defines tasks for the national economy, including agriculture, forestry and water management, production and processing industry, transportation,

communications, power engineering, public utilities, wholesale trade and retail, finance and bank accounting, international trade [4]. Therefore, it is necessary to use economic regulation instruments in price (tariff), antimonopoly, foreign trade relations, domestic trade, minimum salary, and maximum work hours, production control, fiscal and monetary policy, and other areas of the economy. This regulation instruments are indirectly (fiscal and monetary) and directly (salary, price and etc.) regulation instruments.

Main priority of financial policy in a special period is the allocation of necessary financial resources for ensuring goods and services for armed forces and a State. In addition, there are other significant tasks of the financial policy in a special period. They are as follows:

- Protection of production incentives;

- Facilitating the shift of output from civilian to military uses;

- Equitable distribution of both the real and money costs of the war among various groups in the nation;

- Preventing inflation, or at least limiting its extent, both during and following the military effort [17].

On one hand, the preparation of indirect management tools itself includes ensuring the stable budget revenues and the use of debt instruments in wartime; meeting the military needs by reducing the budget expenses taking into account the minimum consuming demands of the population; involvement of credits

for meeting the needs; ensuring the stability of money flow; reliable performance of foreign payments; and restrictions of crediting to protect the population's incomes.

On the other hand, in order to implement a more complete and continuous security of material resources and to prevent the price increase in wartime, it is necessary to use direct regulation like defining limits on goods and service prices and wages as defined by the nomenclature [4].

5.3. The preparation at micro-economic level

In wartime, the specific duty of enterprises and organizations is to fulfill the mobilization assignments (orders) in accordance with the relevant agreements to ensure mobilization preparation and mobilization. The relevant legislation determines binding duties for the organizations regardless of their structure of ownership. So, the organizations, able to fulfill mobilization assignments (orders) according to their production capacity in cases when it would be necessary to extend the production due to the mobilization are not entitled to withdraw from the contracts about fulfillment of those assignments (orders). Furthermore, by the laws the State is responsible for compensation for the damages caused to the organizations as a result of the fulfillment of such assignments (orders) [15].

The organizations that are obliged to fulfill the mobilization assignments, have undertaken duties not only before the State but also before those organizations while preparing for wartime. In wartime, public bodies and organizations assigned to get mobilized take measures for preparation of defense industry facilities and those producing important civil products, technologies in those facilities to be used in wartime, ties of production cooperation, special technological lines and production processes; documents important for wartime, personnel and employees; strategic raw materials supporting the production process, as well as material and financial resources [24]. Alike, it is necessary to conduct measures for implementation of scientific-research and project works on increasing effectiveness of the public bodies activities, creating reserve objects on supply with transportation, energy, natural gas and water, preparing and improving the normative about supplement of consuming energy, natural gas and water in wartime, preparing and improving the relevant legislation about mitigating and stimulating the activity of the organizations to be mobilized.

6. CONCLUSIONS

Developing economic potential, preparation of labor, material and financial resources, mobilization of administration, regulation tools and

skills are important tasks before the state in the direction of increasing the economical sustainability for the special period.

With the aim of efficient fulfillment of related duties the economic potential should be evaluated and development priorities should be properly determined in compliance with the needs and possible challenges of the special period. Alongside with this, the sector and area structure of the country economy should be improved basing on the effects of resource, transport, concentration and safety criteria.

The material and financial resources that are important elements of the economic system should be mobilized and allotted basing on the conception of continuous support of the war process at the special period situation and meeting the necessary need of the population.

Conduct of state regulation over working out the material balance, procurement planning, allocation and use of strategic materials, as well as creation of the state material reserves assume significant importance for provision of sustainable material turnover in the economy at the special period.

Alongside with this, ensuring the sustainability of the financial system of the state at the special period makes it important planning of the budget means, prioritizing the expenses, mobilization of all possible means, control over financial currency and monetary circulation, as well as creation of the strategic reserves.

For preparation of the labor resources there is a need in staff training in necessary economical spheres, booking of the highly – skilled and necessary personnel through evaluating the labor market of the state at the special period, also establishment of norms and mechanisms regulating labor relations at the relevant period, undertaking the labor resources protection measures.

For provision of the sustainability of the state economic system at the special period, there is a need in forming the state policy that meets the expectable possible challenges at that period, improving the readiness of the state systems of economical mobilization, determination of economic and administrative regulation tools according to the specificities of the relevant period, ensuring the readiness of important economic and social objects to sustainable and efficient activity at the special period.

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THE 2020 SLOVAK REPUBLIC CONCEPT ON THE SCOPE OF RESEARCH AND DEVELOPMENT SUPPORTING STATE DEFENSE AND GOVERNMENT PROGRAM STATEMENT

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This article focuses on the research and development concept and its support to the Slovak state defense. It compares the latter with the Manifest of the Government Slovak Republic, dated 2016. It shows on mistakes and wrong steps in military policy oriented to support military science and research. In conclusion shows on some solutions to development military science and research to next years.

Key words: *armed forces, defense sources, conception, transformation, development, research, program, cooperation.*

1. INTRODUCTION

The fundamental problem of the research and development program aimed at securing the support for state defense in the Slovak Republic is the absence of adequate departmental R&D establishments and, at the same time, a great fragmentation in the coordination of such entities that are willing to implement research and development aimed at this particular area. Currently, it is not possible to achieve top results in this field without the existence of a so-called “critical mass of human and material resources”.

The absence, or non-elaboration of “*The Concept on the scope of and support for research and development in the field of Defense for the years 2011 to 2015*”, as a direct continuity of the previous “*Concept on the scope of and support for research and development in the field of Defense by 2010*”, has had a negative impact on a number of areas since 2011, in particular:

- the implementation of the domestic commitments of the Ministry of Defense of the Slovak Republic;
- the implementation of international commitments of the Ministry of Defense towards NATO and the EU;

- the allocation of funds for research and development to support the state defense;

- credibility of the Ministry, not only in the eyes of professional scientific research available to the citizens of the Slovak Republic, but also at international level.

The task B 8. of the Resolution of the Government of the Slovak Republic No. 766/2007 revealed the development of "*The Concept on the scope of and support for research and development in the field of Defense for the years 2011 to 2015*" (hereinafter referred to as "concept") as a document, which elaborates on "*The long-term intention of the State Science and technical policy up to 2015*". However, the Resolution of the Government of the Slovak Republic No. 876 of 15 December 2010 cancelled the task.

In 2013, the work on the preparation of a new concept to address the negative state of affairs in this field emerging from 2011 onwards, was initiated. But the preparation of a new concept was stopped the same year due to developing a new national strategy "*Research and Innovation Strategy for the Smart Specialization of the Slovak Republic*", and its subsequent "*Action Plan for the 2014-2016 Implementation*". Preparation of new priority areas in the R&D field by NATO Science and Technology Organization (STO), as well as by

the EU European Defense Agency (EDA) was another cause leading to the suspension of the elaboration of a new concept in 2014.

An even bigger tragedy was the disbanding of top defense entities with a mission in the R&D field. For example, the Slovak Aviation Institute, Inc., Košice, a successor of the *Military Aviation Technical and Experimental Institute Košice*, which was founded in 1994, merged with the *Aircraft Repair Company Trenčín, Inc. Trenčín*, in 2009 and thus, the cutting edge Research and Development Department for aviation and air defense of the Armed Forces of the SR disappeared. Also, merging the Military Technical Institute in Liptovský Mikuláš with the *Aircraft Repair Company Trenčín* in 2009 imposed the liquidation of the Research and Development Department of Land Forces of the Armed Forces of the SR. The Ministry of Defense of the SR, as a Government Organization, "voluntarily" gave up on their own independent bodies for carrying out the verification tests of upgraded and purchased technology applied into the use within its Armed Forces, lost the independent investigation of air incidents, accidents and disasters, lost the top experts in aviation, air defense, ground technique and systems. Consequently, to meet NATO standards-STANAG for

modernized or newly introduced technology means “buying services”, which currently the SR is not able to provide on its own. The Military Technical and Testing Institute Záhorie is the only development and testing facility of the Ministry of Defense of the SR, which provides for the development and tests of weapons, ammunition and military technique. The Institute has an accredited testing laboratory for arms, ammunition and military technique. The time dedicated to the research is limited, though.

The above reorganization associated with the repeated cancellation of the research and technology department between 2005 and 2011 at the Ministry of Defense of the Slovak Republic proves non-systematic, and means a huge step back in the field of research and development in the defense.

The only research institution of this kind, which carries out fundamental and applied research in a broad spectrum of activities, is the Armed Forces Academy of General Milan Rastislav Štefánik in Liptovský Mikuláš. The latter’s main mission is the training of human resources for the Armed Forces of the Slovak Republic, conducting fundamental research, as well as training human resources in the field of research and development, which is implemented to a limited extent.

2. THE MAIN OBJECTIVES AND PRIORITY GOALS OF THE SCIENCE AND TECHNOLOGICAL POLICY FOR 2020

The objectives and priority areas in the research and technological field are based on the directions set by NATO and EU.

The conclusions and priorities of the meetings of the Science Technology Board-STB & NATO of March 2015 in Brussels, that were approved at NATO Wales Summit in 2014 and ratified by CNAD in December 2014 in Brussels, set top 10 priority areas and a direction of NATO in the area of research and development. The priority areas include [1]:

- maritime defense,
- cyber defense, new network architecture, communications and information systems with new protocols of the information transfer,
- non-lethal weapons and weapon systems on the basis of directed energy, lasers, infra-red spectrum, acoustic effects, microwaves, electromagnetic pulses,
- modelling, simulation technology, and information analysis to support decision-making processes,
- hybrid warfare and defense against them,
- monitoring and recovery of the biometric data of individuals by using the neuro-scientific knowledge

of the science, monitoring, and modification of psychic simulations in order to increase the resilience of an individual, trauma regeneration,

- sensors and sensor systems based on the spectrum between the extra low frequency and optical frequencies, for technologies of the CBRN detection,

- unattended autonomous systems (UAV, UGV, UWS) with the use of new materials and technologies (polymers, nanotechnologies, composites, ceramics, etc.) to increase their protection and resistance to CBRN, armed with light weapons, communication systems and sensors, etc.

Similarly, as in STO NATO, after a complex reorganization of EDA EU in 2014, existing activities and priorities in the area of research and development were reviewed for the purpose of defense capabilities development research, acquisition and armaments. The new organizational structure brought about a change in the main areas of solutions in terms of research and development. The objectives and priorities for the years 2015-2020 are included in the main thematic areas:

- Counter IED,
- Air-To-Air Refuelling,
- European Air Transport Fleet,
- Effective Procurement Methods,
- Medical Support,
- Helicopter Initiatives.

The basic principles for a new orientation of research and

development of technologies applied in the process of developing defense capabilities include [2]:

- acceptance of the research and development of technologies as a driving force for the development of defense capabilities and a tool for increasing their effect and effectiveness,

- orientation of research and development of technologies to support the required capabilities in the medium or long term, in accordance with the activities of STO NATO and EDA EU, and, at the same time, to provoke their identification by systematic analysis of deficiencies,

- deeper involvement of a potential future user to the processes of defense research and the technology development in the form of demos and experiments,

- building and developing new workplaces at the Armed Forces Academy Liptovský Mikuláš and The Military Technical and Testing Institute Záhorie with the support of the Ministry, or considering the renewal of the research and development departments for aviation, air defense, and land forces,

- analyzing the current capacity of the Slovak Republic and the identification of scientific and technological areas corresponding to the priorities of the EU and NATO and their engagement in the processes of international cooperation within STO NATO and EDA EU [3,4],

- the use and application of existing knowledge base and outputs of the new scientific research projects into the Armed Forces of the SR.

Future focus, interests and the financing of research and development programme aimed at securing the state defense up to the year 2020, should be also oriented to:

- support the most talented and creative individuals and their teams in the implementation of the domestic and foreign research of the highest quality through the use of the achievements of the European Research Council,

- finance joint research with the aim of stimulating new research and innovation by supporting future and emerging technologies,

- develop research infrastructure (including e-infrastructures) in order to achieve world levels, which are available for all researchers in Europe and beyond,

- support research and development tasks in the field of supportive and industrial technologies accompanied by targeted subsidiary for investment in key technologies, nanotechnology, innovative materials, biotechnology, advanced manufacturing and processing with parallel support for cross-cutting activities to capture the benefits of combining several key enabling technologies used in favour of the defense,

- safe, clean and efficient use of new kinds of energy,

- intelligent and integrated environmentally friendly transport.

The priority areas of the research meant to support the defense of the state until 2020 will include:

1. building **communication and information systems and networks** based on new knowledge of science and technology,

2. building and innovating the **cyber defense** field as a situational alert network system in the network cyberspace with regard to the competences required for effective command, control and communication in the Armed Forces of SR,

3. analysis of “**hybrid wars**” and defense against them, which are shown as an effective tool of destabilisation of the system in a variety of interest areas of the defense,

4. support **modelling and simulation technologies**, as a direct support element of the decision-making processes and streamlining its financial costs on the processes of development of the Armed Forces of the Slovak Republic, preparation of commanders and staff, variations, upgrades, and acquisition of equipment, weapons, technology and material,

5. the implementation of **the land and air non-controlled systems** into the structures of the Armed Forces of the SR as the future tool to increase security and the protection of troops

and soldiers in the territories of interest,

6. **protection against CBRN weapon systems and non-lethal weapons**, which are likely to be used in future peacekeeping and/or regional war conflicts,

7. the use of **dual technologies** in the field of science and technology in a way that by their implementation, the acquisition of new capabilities and the abilities of the Armed Forces of SR is secured, while the financial costs of their implementation are effectively reduced.

3. THE INTERNATIONAL SCIENTIFIC TECHNOLOGICAL COOPERATION

One of the objectives of **international cooperation of the EU** is the integration of the defense research and development of the Slovak Republic into the international defense research and development of the EU, particularly through EDA. The basis of European cooperation in the field of the defense research and development is a close tie to the defense industries of the Member States under the “umbrella” of EDA.

In the framework of NATO, The Organization for Defense Research and Technology is established (STO). Its mission is to conduct and support cooperative research and information

exchange to support the development and effective use of national defense research and technology capabilities for military needs of NATO. STO develops and maintains a coordinated long-term strategy for the defense research and Technologies of NATO, and acts as the integrating body within NATO.

As a part of the national structures guaranteeing the activity of the Slovak Republic in NATO STO, **the national Distribution and Information centre of NATO STO** at AFA Liptovský Mikuláš has been created, which concentrates, keeps and distributes information gained from NATO STO for the specialized community in the Slovak Republic.

The development of **bilateral cooperation** in the field of the defense research and development to support the State defense focuses primarily on cooperation within the V4 countries. Finding common priority areas is difficult since possible joint projects have to encounter the diversity of ideas and the timing of their implementation and the financial capacity of the countries V4.

4. FUNDING FOR RESEARCH AND DEVELOPMENT TO SUPPORT STATE DEFENSE BY 2020

As a member of NATO and the EU, the Slovak Republic has the **total defense spending below the level**

of 2% of GDP on a long - term basis; in recent years it has been settled at the level of approximately 1%. The “Long-term plan of the State Science and Technical policy up to 2020” explains that in order to ensure the fulfilment of the goals and objectives for the development of science and technology starting with 2015, **the total expenditure on Science and Technology in the Slovak Republic shall be 1.8% of GDP.**

Recommended intensity of support for the defense research in EU Member States, on the basis of a resolution of the Management Committee of EDA No. 2007/13, is **2% of the total expenditure on defense.** Expenditure of the Ministry of Defense on **research and development to support the state defense** totals in average 0.142%, and since 2011 it has had a decreasing trend.

An important priority in the direct support of science and technology (research and development) will be increasing the proportion of business resources to support research and development, so that since 2016

the share of these resources for the overall promotion of science and technology has reached 2/3.

Direct support of science and technology (research and development) to support the state defense between 2016 and 2020 will be carried out in accordance with section 16 (4). 11 of Act No. 172/2005

Coll., through the budgetary heading of the Ministry.

The funding for the research and development to support state defense **is allocated each year from the budget of the SR Ministry of Defense.** Earmarked funds, which are purpose-bound by Resolution of the SR Government each year, **do not provide** for the real needs of financial support in the field of research and development (**Table 1**).

Currently, the funds are used exclusively for institutional support; specialized support in the form of grants is currently not being implemented [5].

Institutional support in favor of the Armed Force Academy of Gen. M. R. Štefánik, Liptovský Mikuláš as a state academy, is provided in accordance with Act No. 172/2005 Coll. on a yearly basis in the form of a “Contract” in order to ensure the following (6):

- to solve the task of research and development to support state defense through individual projects,

- to ensure international cooperation within a range of international conventions and membership of the Slovak Republic in NATO and EDA EU,

- to ensure the operation of the Distribution and information centre of documents, NATO STO (*in accordance with the legislation AC/323-D/22 Operating procedures*).

In the long term, taking into account the experience of the previous period (2004-2012) and the active participation of the Slovak Republic in NATO STO and EDA EU projects, it is possible to forecast **the amount of the minimum need of funds (Table 2)** for the comprehensive provision of all

required activities and areas of research and development in the Defense field (in 2016, preparation for a public call for special support to research and development, and the selection of projects for the gradual involvement in projects of STO NATO and EDA EU starting from 2017 will be made).

Table 1. The funding for the research and development of MoD SR (in Eur)

| Year | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|------------------|---------|---------|---------|---------|---------|---------|
| Total Eur | 000 150 | 000 150 | 000 150 | 000 100 | 000 100 | 000 100 |

Table 2. The forecast of the minimum of funds for the research and development in MoD SR (in thousands EUR)

| Subroutine/Project | YEAR | | | | | Notes |
|---|------------|------------|------------|--------------|--------------|---|
| | 2016 | 2017 | 2018 | 2019 | 2020 | |
| Subroutine 06E-0I Research and development in support of state defense | 150 | 650 | 870 | 050 1 | 170 1 | |
| Of this: | | | | | | |
| Targeted support for research and development in support of the defense | 0 | 150 | 150 | 200 | 220 | to tackle new projects according to the Act No.435 / 2010 Coll., The assumption 1-5 projects per year |
| Institutional support research AOS LM | 150 | 150 | 200 | 200 | 200 | according to the Act .No.172 / 2005 Coll |
| Support participation in NATO projects STO | 0 | 180 | 220 | 300 | 350 | projects per year 1-3 |
| Support participation in EU projects EDA | 0 | 170 | 300 | 350 | 400 | projects per year 1-2 |

5. RESEARCH AND DEVELOPMENT MONITORING AND EVALUATION

The concept of focus and support for research and development, aimed at securing state defense, responds to the growing importance of research

and development evaluation at all levels, both in the Slovak Republic, as well as in all developed countries. The evaluation system respects the current global trends with the use of new knowledge and best practices from the evaluation research in the individual EU Member States.

The basic principles of evaluation will be a multi-criteria based approach, a demonstrable project will serve as a feedback for the future decision making on financing new projects of research and development. The results will be evaluated in relation to the embedded resources. The evaluation will be covered by the Department of the Management of Research, Development and Coordination with the defense industry, SEMPO MO SR, which is responsible for defense research and development. Results of the “ex post” assessment and evaluation of the research and development results’ use for a period of three years from the completion of the project will serve as a feedback for the future decision making on financing new research and development projects.

These ambitious plans, however, are necessary to be confronted with the options and plans of the entities in the field and the government as they are mentioned in **the program statement of the new government in 2016**. Among other things, the following are mentioned [7]: For the security of the SR, the system of collective defense policy of NATO and Common Security and Defense Policy of the EU are crucial. The Government will formulate the basic objectives of the security and defense policy and the parameters for preservation of the security of citizens and the State in the current

and future security environment in the updated security and defense strategy of the SR, taking into account the strategic adaptation of NATO and the EU which will be presented to the National Council of the SR no later than in 2017. While updating, the participatory way of processing will be used with an aim to ensure their approval and the long-term support of implementation across the political spectrum.

In the field of academic science, the Government will:

- ensure the further development of the system for the comprehensive review of research in universities, by applying good policy practices employed at international level,
- ensure the strengthening of motivational financial instruments to support research activities of universities yielding results at international level,
- create transparent instruments to support the research activities of universities in areas relevant for the development of the SR and its regions,
- intentionally support improvement of doctoral studies as the highest quality tool to develop human resources, and create a grant scheme for the acquisition of post doctoral candidates for excellent workplaces in particular.

The Government considers state defense its priority, and for its implementation it will, within

the scope of the preservation of the security of citizens and the State, create conditions corresponding to the fundamental changes in the security environment. The Government, in accordance with its constitutional responsibility for state defense, shall adopt measures to enhance the striking power of the Slovak Republic by developing individual and collective abilities to withstand armed attack, and at the same time, to strengthen the defensive potential of NATO, as well as the military capabilities of the EU.

The Government will prepare an update to the security and defense strategy of the SR, and will implement targeted and long-term sustainable modernization and replacement of the main types of equipment and techniques together with the formation of the stock material for the development of the capabilities of the armed forces in accordance with the commitments of the SR. Emphasis shall be laid on the development of the capabilities of the mechanized brigade and forces, also available for the fight against terrorism.

The Government will support an increase in the intensity of the training of the armed forces, as well as their participation in the exercises focusing on the defense of the State. It will continue to improve the readiness of the reserve forces, mainly through the preparation of

active reserve forces. On the basis of an evaluation of the contribution of voluntary military training to create reserve forces, it will consider its development.

The Government will support the development of defense infrastructure; improve the system of supplies, services, and activities to support the armed forces in the defense of the Slovak Republic and of the Allied forces in the performance of the collective-defense tasks in the territory of the SR as the host country. It will also encourage the involvement of the defense industry of the SR in the provision of equipment, technology and material for the armed forces and the use of its products abroad.

In accordance with the Alliance commitments of the SR, the Government shall ensure a gradual increase in the defense spending of the SR. It will continue to support major strategic projects of modernization of the armed forces by approval and funding them on a case by case basis.

6. CONCLUSION

The documents **“The concept of the scope of Research and Development** to support the defense of the State with a perspective to 2020” and **“The Government Programme Statement”** from 2016 **do not contradict each other, and in principle do not support each other either.** The knowledge transfer

of research and development for the benefit of new weapon systems, the acquisition of new “know-how”, as well as the use of the latest findings and the conclusions of the analysis of the projects and the work, will significantly allow the Armed Forces of the SR to use more efficiently related funds to modernize the equipment, techniques and materials.

New priorities are conditioned by **adequate financial resources**. By re-evaluating the financial budget allocation for the Ministry of Defense of the SR in accordance with the forecast amount, we shall fulfil national and international commitments towards NATO and EDA EU. This will ensure a proactive approach and the development of research and development, the transfer of new technologies in the processes for the development of defense capabilities. However, and this is **the first problem**, the program statement does not speak at all about the amount allocated for the defense, and the amount of funds to be spent on research and development. Looking at the priority areas for research, there are huge discrepancies between the level of ambition and the lack of funding.

The second problem is human resources capacity that should carry out research. The capacity of 65 teachers at AOS will not be sufficient. What is more, some subjects are not taught at AOS (CBRN Defense).

The establishment of new offices at AOS, or in Záhorie, or restoring the Office of research and development for the air force and air defense takes at least 3-4 years if business support for research and development amounts up to 2/3 of the total resources for research and development.

The elaboration of the document “The concept of the scope of Research and Development to support the defense of the State with a perspective to 2020”, however, enters a real direction for implementation in alignment with NATO and EU trends in the field, and we definitely need to work with it.

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DATA MODELING OF INTEREST FOR THE MANAGEMENT OF EMERGENCY SITUATIONS IN CENTRAL ROMANIA

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The management of emergency situations is based, in principle, on the integration of all technical, systemic and last but not the least, operational aspects. Based on this, a proactive approach must consider a huge volume of data, which should be ready for use as information. In this framework, dedicated software is required to be used in correlation with possible working scenarios. This article demonstrates the viability of such analysis with an example regarding the central region of Romania.

Key words: *data, modeling, emergency situation.*

1. GENERAL CONSIDERATIONS

As addressed by Romanian national legislation, as a consistent definition, emergency management means all activities and procedures used by policy makers, public institutions and services responsible to identify and monitor risk sources, evaluate information and situation analysis, develop forecasts, establish alternatives for action and implement them in order to restore the situation to normality. The object of this kind of activity is the emergency situation considered an exceptional event, of nonmilitary character, which, by its scale and intensity, is threatening the

life and health of the population, the environment, important material and cultural values, and for the restoration of normality it is necessary to take urgent measures and actions, assign additional resources and a unified management of forces and means.

Emergency management in the current context of society's development, especially urban areas, requires more than the existence of competent institutions equipped with the latest technology. Science is also needed to understand how the world works and how to succeed in developing effective procedures for taking the best decisions [3]. Basically, the specific decision-making mechanisms must use

the most appropriate instruments, given at least a minimal set of universal constraints, among which outstanding are the time, quality and resources at their disposal. Among these instruments, dedicated software are highlighted, with increasingly diversified ways of operation, the most famous being the GIS (Geographic Information Systems). In such an environment, in terms of methodology, the representation of the real world in a conceptual data model involves four levels of generalization or simulation [3]. Initially, the reality is modelled based on the real issues (buildings, roads, lakes, people, etc.) and includes all perspectives which may or may not be relevant to a particular application. Then, the conceptual model is focused on the human factor, often partly structured, and involves selecting the objects and processes that may be considered relevant to a particular scenario. Representing reality as a chart or list is the third level of simulation and the physical model - the last stage of simulation - in GIS environments is the fact that data exists physically in computing systems and are represented by files or databases.

The data model provides both for developers and users or beneficiaries a common understanding. From the point of view of developers, a data model is a means of representation

of a problem in a particular area, from description to implementation, while for the user a full description of the system's structure is provided, independent of the type of data used in the implementation. GIS offers a wide range of operations aimed at generating the various models used in specific applications in a particular area.

2. CASE STUDY

Identifying actions to return to normality in the shortest time, state analysis, monitoring the achievement of specific operations are restricted by the time variable. For an acceptable rate of reaction it would be better if the various situations occurred rely on a minimum set of data that can be collected long before the incidents and that can be restricted depending on the nature or specifics of the emergency situation. The minimum set of data can be generated on different thematic layers and the generally accepted information refers to [4]:

- administrative limitations
- transport infrastructure: land, sea and air, if required;
- hydrological network determined by the lakes and streams of surface, which, on the one hand, should allow identification of high-risk flood areas or analyses to identify the sources of water use in agriculture;

- location of critical infrastructure - government buildings or constructions, museums and recreation areas that can accommodate at one time large groups of people;

- elevation of terrains - raster image allowing terrain analysis for example, identifying optimal or alternative routes, location of sensors so that an area can be monitored;

- the use of land.

Based on data from the minimum set, mathematical models [1-2] can be constructed, and then a map-based approach can help in the decision making process in emergency management.

The minimum set that should be as comprehensive as possible can be used in building maps by embedding relevant data in different thematic layers. The operations that allow analysis can be applied to each layer independently or operations that unify information on two different layers can be defined. At one point, a class of information can be deleted or deselected. Removing irrelevant data for a particular situation is preferred, instead of collecting new data under time pressure, because the process of collecting and processing can be longer and more difficult.

Generating a comprehensive geospatial database for the Central region is envisaged, especially Brasov county, which can be used to risk management for the various threats that may arise in the region. Within the centre region of the country, including Alba, Braşov, Covasna, Harghita, Mureş and Sibiu counties, Braşov County is best developed in terms of economy and population.

The administrative limits of the cities of Brasov County, and the towns of the bordering counties were obtained from shapefile [5]. Initially, based on the need to develop possible contingency procedures anywhere in the county of Brasov, it was agreed to generate a “buffer” region containing all urban or rural areas at a maximum distance of 10 km to the county limit. In the event of an incident, it is likely that forces located in surrounding counties have a lower response time due to a shorter distance to the point of interest. After generating the buffer zone of the administrative limit of Braşov County, a Selection by location enquiry was generated - this allowed only the selection of administrative regions which are located inside the buffer zone (**Figure 1**).



Fig. no. 1. Segment of the map – administrative limits of the cities of Brașov county and surrounding areas, at a distance of up to 10km

Transport infrastructure, an element of major importance for the considered area consists of the road and rail network. Brașov is among counties in the central area with the highest population density, with a GDP per capita higher than the national income average obtained from well-developed tourism industry, but also with major transport infrastructure. It is, followed closely on these indicators by Sibiu. On the opposite side there is Covasna, due to its less developed transport infrastructure. Therefore, if the state of our transportation infrastructure is proportional to the economic development of a geographical area, the vulnerability is also great. A possible incident can cause huge damage. In other

words, a clear picture of rail and road networks can reduce the risk of undesirable incidents and supports the decision-maker. Transport infrastructure is used both for transporting passengers, and cargo. Goods/commodities may have some degree of toxicity or flammability, and a possible incident may affect the inhabitants of the localities crossed by transport networks. On the other hand, an evacuation scenario is built on certain safe, unaffected routes.

A selection based on the location of the data set corresponding to the road network in Romania [6] and the buffer zone considered allowed the selection of routes in the region of interest. For a clear picture, the entire road network must be classified based on the type of road (national, county,

inside county) as each segment, depending on its type, makes driving at a certain speed possible. Similarly, applying a selection by location between the Romanian railway network and the buffer zone considered, a representation of the railway network was obtained. The classified road network and the rail network will be separate thematic layers of the map of Brasov county and surrounding region within a range of 10 km from the administrative borders of the county. An undesired incident that would disrupt traffic

on a section of road could allow the determination of alternative routes or where required evacuation of people from an area, the optimal route between two points on the map could be determined. In addition, the section of the road with the highest degree of vulnerability could be determined, based on the rate of incidence of the history and characteristics of the road, but, in order to do this, other thematic layers would be needed, such as bridges over the railway or roads crossing a watercourse or areas with high degree of landslide.

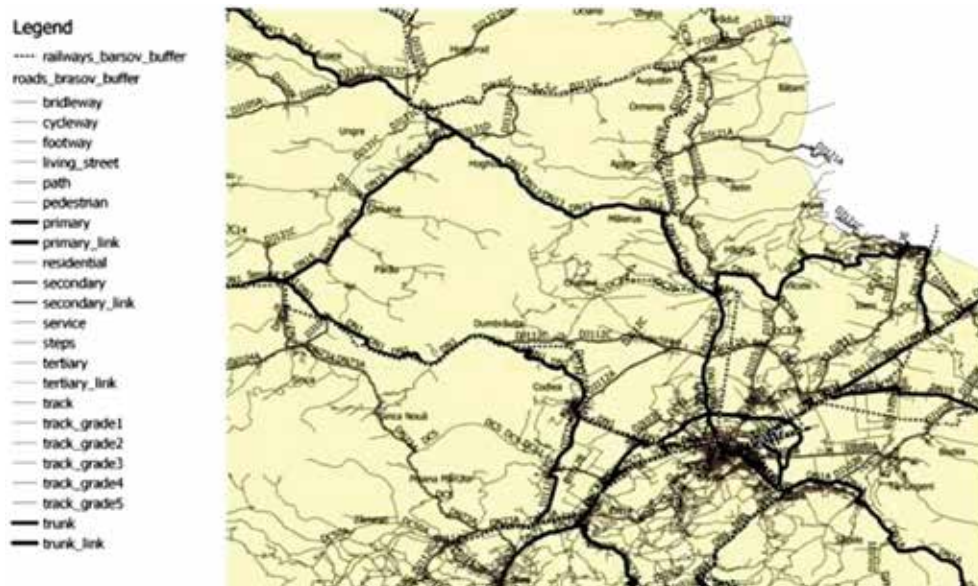


Fig. no. 2. Classified transport network, depending on the type of the road

The hydrological network (Figure 3) is determined by surface watercourses and natural or artificial lakes. Although high flood risk areas can be determined based on raster data, a complex image in vector format of

the hydrological network allows the identification of populated localities or areas that could be affected by flooding. The entire state is located on the middle of the Olt River, with main confluent the Black River

(Râul Negru), Timiș and Bârsa; the streams have a low flow due mostly to the mountainous relief. However, floods are possible especially in times of year when heavy rain falls or snow melts quickly. When floods occur, road segments that make access to various localities may also be affected or damaged. Viewed from

another perspective, an image of the surface lakes and barrier lakes in particular, which supply the region's localities with drinking water, can provide a clear image in case of an unwanted event. A critical situation occurred in drinking water basins can have very serious repercussions on the population of the area.



Fig. no. 3. The hydrological network determined by waterways and lakes

Brașov County falls into the category of regions with large numbers of tourists, especially during the times when winter sports are practicable or when national or regional large scale events are organized. Therefore, a thematic layer is required for emergency management containing the location of governmental institutions, buildings of utmost importance - malls, museums, theatres, churches, hospitals, recreation centers, or recreational areas - parks, stadiums,

which at certain times of the year or during certain hours, may be regarded with high vulnerability due to the number of people participating in various activities. The location, in terms of geography, maximum capacity, and access routes allows a clear assessment of the impact dimension and responsible security forces can act having all the necessary information. On the other hand, in case of an incident, safe buildings could be used for short-term shelter of the population. The

most comprehensive and current location of buildings of utmost importance can be downloaded from the OpenStreetMap (OSM) - thanks to the plug-in with the same name in QGIS environment. As buildings

are represented on the map by multi-polylines vector-type structures, from the downloaded data set, only the layer represented by multi-polygons is added to the map of appropriate buffer zone considered (Figure 4).

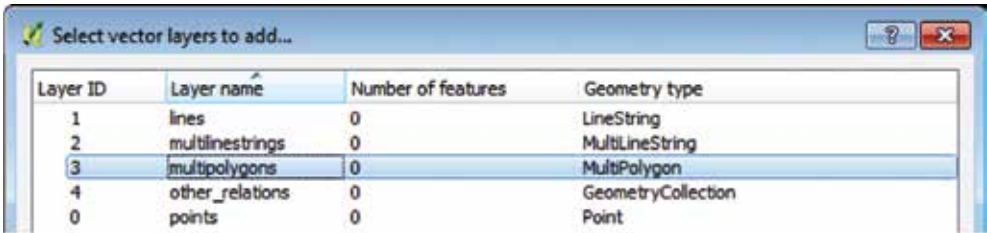


Fig. no. 4. Adding a polygon-type thematic layer

The very important institutions, from the dataset downloaded from Geofabrik [7], there are obtained, based on a query of location selection and of a query by *building* value feature, a feature that contains the use of the building.

“building” = ‘cathedral’ OR “building”= ‘chapel’OR “building”= ‘church’OR “building”= ‘college’OR

“building” = ‘commercial’ OR “building”= ‘hospital’OR “building”= ‘kindergarten’ OR “building” = ‘postal_office’ OR “building” = ‘public’ OR “building” = ‘school’ OR “building” = ‘supermarket’ OR “building” = ‘synagogue’ OR “building” = ‘train_station’ OR “building” = ‘university’



Fig. no. 5. Major buildings obtained based on a selection enquiry depending on the characteristic

In addition, there are emergency situations in which it may be necessary to approximate populations in a given area to determine the extent to which it should be acted if necessary. From the residential areas, the population

can be estimated using specific GIS functions that allow determination of the inhabited areas. Combining this value calculated with the height of the buildings allows estimating the number of people in a certain area.



Fig. no. 6. Estimating the inhabited area

If until now, the minimum data set was built only on the basis of vector data, an overview image and a feasible rigorous analysis cannot be done without raster data containing the elevation of terrain (Digital Elevation Model) and the use of the land.

The raster image [8] corresponding to the elevation was downloaded from the UGS agency's website (United States Geological Survey) and is very useful in obtaining detailed information for evacuation operations or damage assessment after an event or for the planning or identification of vulnerabilities in

order to reduce or minimize impacts to high-risk areas. Reduction of the risk of an event is similar to a prior identification of areas with high floods, or determining the risk of avalanches based on rainfall and the degree of inclination of hills. Initially, the raster image was reduced to the studied area by a clip-type operation, and then the layer associated to the hydrographic network was added. In the raster image, high altitude areas are represented by bright pixels. The lower altitude is represented by the darker pixels.

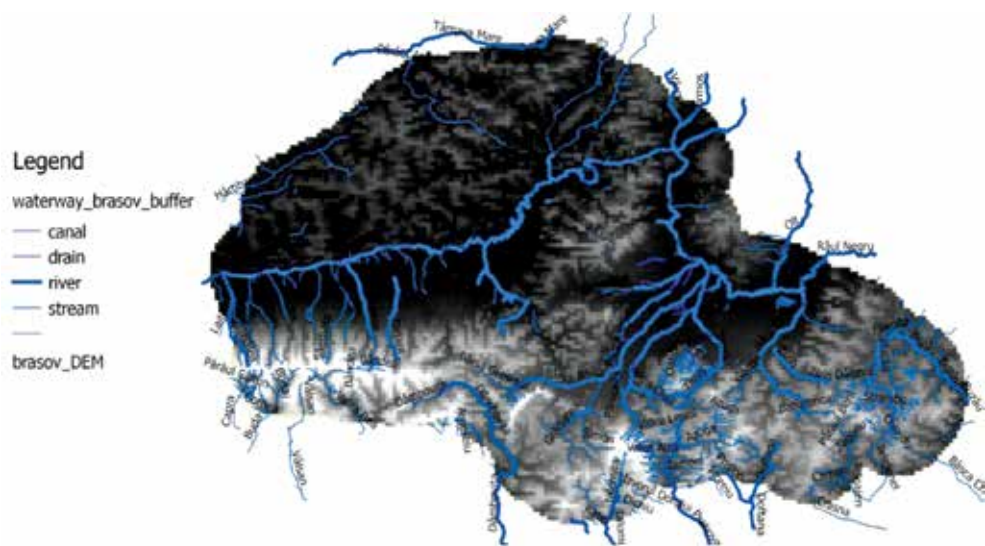


Fig. no. 7. Elevation of terrain and the waterway network

An important element from the minimum data set category relates to the use of the land. Corine Landcover [9] raster data can be useful in rescue operations, specifically in identifying landing areas, depending on the type

of land and its size, if necessary. In a marshy area, for example, the landing of aircrafts is impossible. Another approach is to identify woodland and analyze neighborhoods in order to limit fires that may occur in dry seasons.

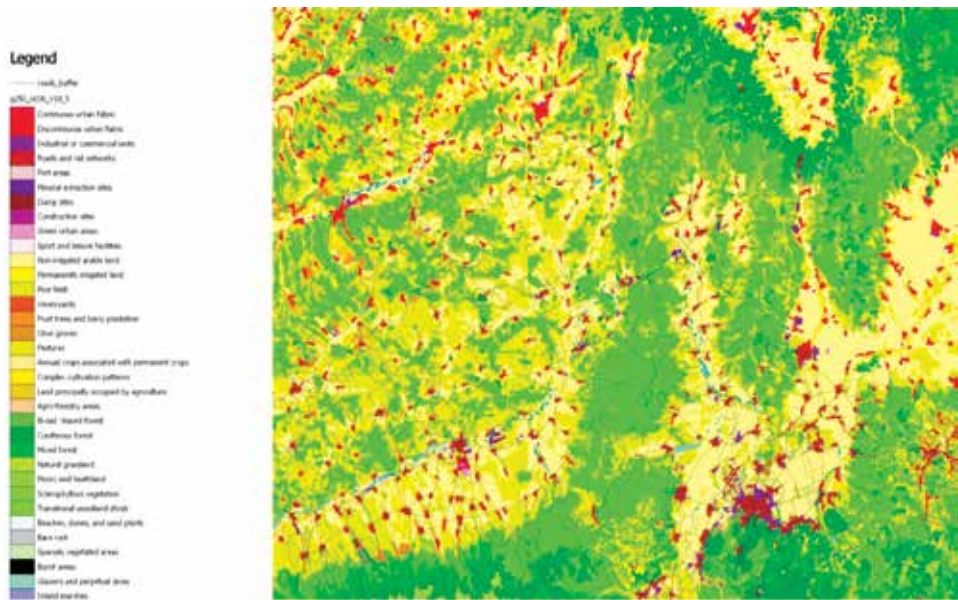


Fig. no. 8. The use of land in the selected area

3. CONCLUSIONS

The first step in emergency management is to identify vulnerabilities and reduce the risk of unwanted events. These operations can be carried out successfully if for a specific area there is a minimum set of data in combination with GIS applications to enable the collection, analysis and visualization of spatial data. Vector and raster data, downloaded from various sources, can initially undergo operations in order to narrow the scope to a particular area of interest. The analysis by combining various thematic layers allows the identification of vulnerable areas and can be used in specific emergency management operations pre or post event. The purpose is to minimize the risk of a possible event, or if the event occurred, to reduce the size of the damage, to protect the population in the affected area and to return to normality as soon as possible.

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ASPECTS OF LOGISTIC PLANNING IN A MILITARY UNIT AT PEACETIME

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The inter-conditioning of the management processes within the economic domain with those belonging to military logistics generates a modern approach of logistics management, in the context of creating the necessary circumstances for fulfilling the objectives of interoperability with the western military structures. Logistic planning proves useful in identifying risks and accurately determining the costs and benefits implied by providing logistic support at the appropriate time and place. Without clear and consistent focus on efficient logistic planning, the military organization might be caught in the whirlwind of unpredictable events, not being able to influence them properly, in order to fulfill in an adequate manner its operational goals. Thus, through the aspects revealed below, we set out to deal only with the relevant issues outlining the concept and process of logistics management and present the details of the planning activity in the military unit at peacetime.

Key words: *logistics management; logistics foresight; logistics planning; rationality; optimum; balance; logistics planning documents.*

1. INTRODUCTION

The logistics management of a military organization is the complex and continuous process aimed at accomplishing logistic goals through the most efficient manner of using human potential. At the same time, as a concept, logistics management is the science and the art of employing material and financial resources and of *leading the people whose positions*

and roles are varied and specialized, but who cooperate continuously in order to reach the established logistic objectives.

Actually, the logistics management of a military structure presupposes the compulsory accomplishment of the specific management process integrated within the military organizational one.

Thus, the logistics management process is explained by the action

of the managing sub-system upon the managed sub-system, following the performance of all activities (foresight, decision, organization, command, coordination and control-assessment) conducted by logistics managers, in order to establish and accomplish the specific goals (of procurement, transport, maintenance, assistance, insurance etc.) of units and major units at

peacetime (Figure 1). All these actions actually reflect the functions or attributes of management applied to the logistics domain which – if fulfilled efficiently – determine the accomplishment of logistics missions at peacetime. If we explain each function separately and if we analyze them all, as a whole, we will have the complete image of the logistics management process.

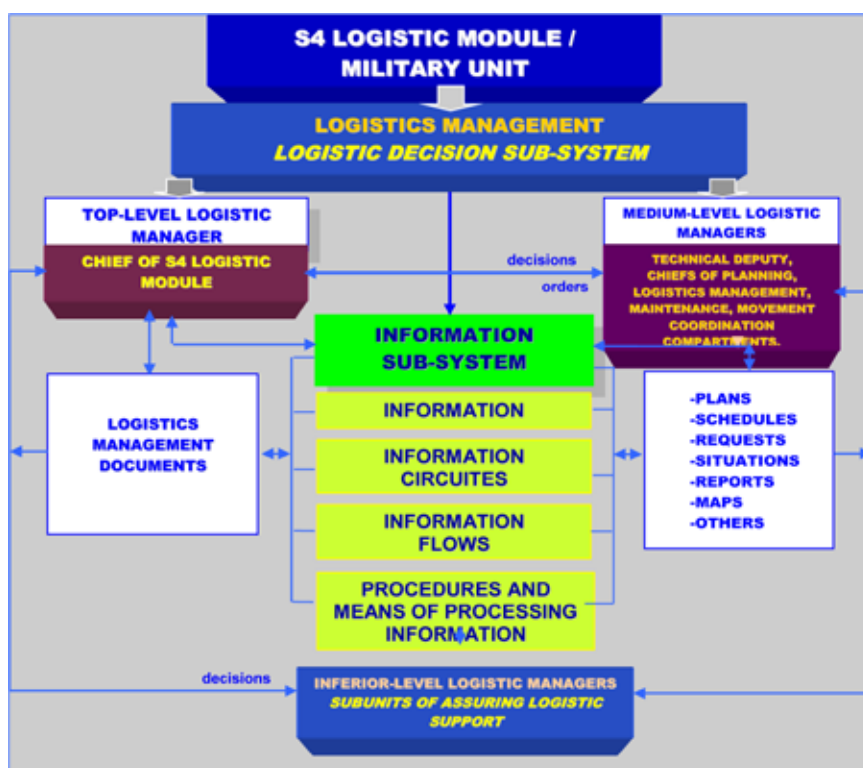


Fig. no. 1. Mechanism of logistics management

The foresight function consists of the entire range of actions leading to foreseeing the main goals (on long, medium, or short term) of units' (major units') logistics and of its domains, as well as the main necessary resources and means. Depending on

the time frame in which they occur, we can outline three components of logistics foresight: *prognosis*, *planning*, *scheduling*.

In logistics, *prognosis* means anticipating the evolution of a military structure on the long term, envisaging

a period that goes over ten years, and relying on specific investigation methods and procedures of certain economic and technical processes. Usually, prognoses are conducted by the logistics compartments of higher echelons, especially by those to be found at strategic level.

The prognosis-making process is mainly based on the following requests: conceiving logistic variants applicable in the future; making a retrospective analysis of processes subject to prognosis and their trends under the impact of the general restructuring of the military organization and especially of the logistic system; the complex analysis of the logistic domain investigated from economic, scientific, technological, professional, managerial perspectives etc. [1].

2. ASPECTS OF LOGISTIC PLANNING IN THE MILITARY ORGANIZATION AT PEACETIME

Logistic planning refers to a provisional activity on long, medium, and short term, which formally takes from one month to one year. This planning process results in the logistic plans conceived within any military structure. In military units, the planning process usually covers a short term (one month), a medium term (from one month to a trimester), or a long term (from one trimester to one year). The detail degree of

these plans are in inverse ratio to the time frame they cover, therefore short-term plans are explicit, while the plans made for one year only comprise the fundamental goals (activities) and the main resources. Plans are made according to the specific features of each domain of military unit logistics, according to the missions it has to accomplish at peacetime.

2.1. Aspects regarding the content and accomplishment of logistic planning

The shifts produced in the settlement and organization of each echelon prove the adjustment of logistic functions and missions to change. Within the new functional background, planning becomes a complex and essential activity of logistics management, integrated within the foresight function. It reveals the coordinated process of S4 logistic module for detailing and managing all the specific activities, according to the attributes it gets.

Regardless of the echelon at which it is performed, logistic planning at peacetime is defined as the exploitation of every opportunity (obvious possibility) in order to assure the effective and efficient completion of the activities mentioned in the *annual plan with the main activities of the military unit*, by allocating time, resources and responsibilities needed to reach the goals subordinated to the accomplishment of continuous and timely provision of logistic support.

Logistic planning is a complex, continuous process, integrated within the whole planning process of the military unit's peacetime missions that rely on the detailed acknowledgement of the number and condition of troops, products, technique, armament and materiel at a certain moment, as well as on the capacity of foreseeing the likely evolution of the specific activities undertaken by the military organization in the future. Consequently, in order to have a proper orientation, logistic planning has as starting points the data and information resulting from diagnosing the state of the logistic

system at a certain moment and foreseeing the complex activities specific to the logistic domain of the respective military unit at peacetime.

The constant correlation between the level of complexity of the military structures' peacetime missions with the material and financial resources available require abiding by certain principles of elaboration and efficient undertaking of logistic planning. Thus, the efficient performance of logistic activities is given by the *rationality, optimum and balance* of procurement and use of financial and material resources in the existing economic circumstances (Figure 2).

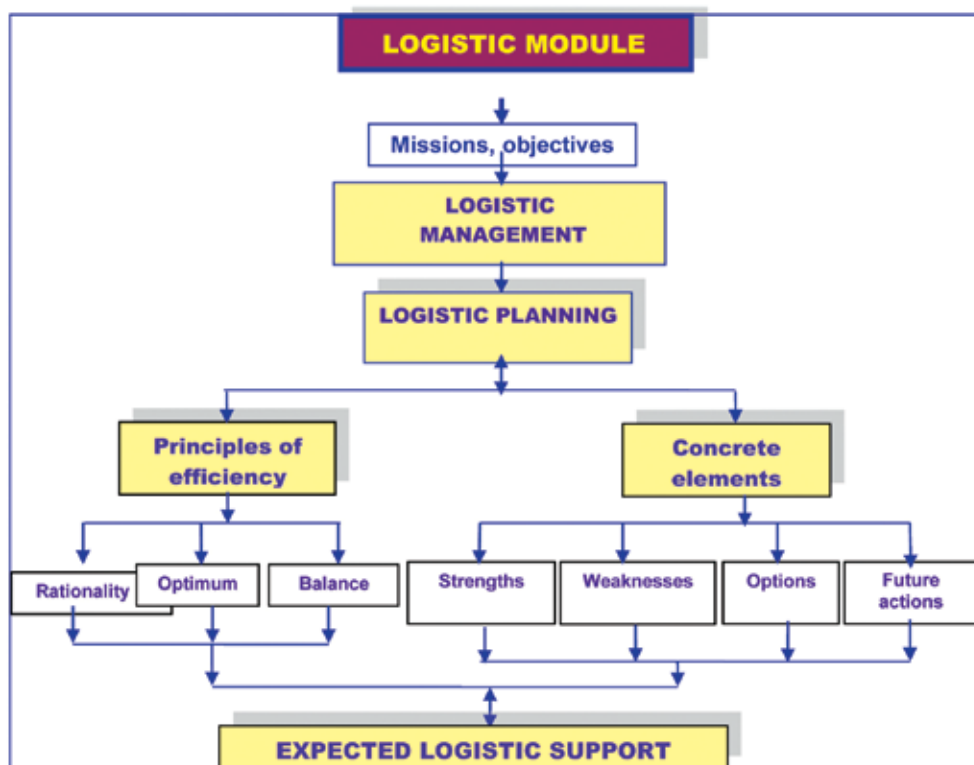


Fig.no. 2. Principles of efficiency and determined elements of logistic planning

At present, when the trend of inflation rate is not at all optimistic, the application of *rationality* in logistic planning is the result of a consistent attitude of the specific bodies so as to avoid risk and uncertainty, in order to assure the normal functioning of military structures [2].

In order to provide the logistic support necessary for troops' peacetime preparation for armed conflict situations, we consider that an adequate *economic optimum* should be assured. Optimizing the supply activities have to do more with the competence, ability and correctness of the specialists involved in the efficient spending of financial resources, in the appropriate administration, use and consumption of material means (resources). Under these circumstances, due to uncertain or unsettled local economic environments, logistic managers have to design and concretize flexible logistic plans able to permanently place the procurement / consumption relationship in an efficiency-determined framework [3].

The *balance* created, as a result of logistic planning, embodies the principle according to which there should be interdependence among consumption, available financial means, used purchase prices and allocated budget. Balance is given by the level of the consumer's capacity (military unit), as a legal entity, to spend rationally and in accordance to the planned missions in order to accomplish them. Attaining logistic goals imply planning and spending

function of the allotted budget. Certainly, the effects of an economic crisis may determine restructurings and giving up on some activities (military actions) in favor of others, so as to establish a permanent balance between goals, currently available means and future possibilities of logistic support [4].

Starting from these principles, we consider that in order to avoid the situations hard to overcome, at operational level, within the logistic domain it is important for decision-makers to foresee and identify *strengths, weaknesses, future options and actions* that will have to be taken into account in designing and conducting logistic planning, as depicted in **Figure 1**.

- **Strengths (decisive points)** mainly encompass the following: dynamics of troops related to food and equipment rights; the equipment and armament in the organization list and their operational state; the stock level (daily, weekly, monthly, quarterly, annually); the financial resources necessary for procurement; satisfying under normal conditions the internal consumption, regardless of budgetary constraints; initiating, preserving and developing favorable selling-buying relationships with competitive providers; correct and timely gathering of information with respect to providers and products on offer or that are about to be delivered etc [5].

- **Weaknesses** mainly reveal the following aspects of interest in the military unit: the lack of correlation between the foreseen supply of food

products with a distant expiration date and fuels and lubricants; not taking into consideration the changes in terms of troops and technique, having direct consequences upon demanding and assuring financial and material resources in a de-centralized system; the military unit having to pay larger amounts, as compared to those paid by other buyers for the purchased products; unfavorable time limit for payment set by providers (for instance too many incomplete deliveries; negotiations that are insufficiently detailed and uncertain regarding price growth) and so on [6].

Only an objective re-evaluation of the strengths and weaknesses made by the habilitated logistic bodies could make it possible to correctly identify the options specific to each logistic compartment (office) individually, in order to perform specific planning so as to reach the designed standards of interoperability [7].

- **Options** represent, from our point of view, various measures that could be taken in order to accomplish future logistic objectives. They aim, for instance, at improving the standing plans and making new plans [8].

In order to accomplish the management-marketing goals, options refer to: selecting the most appropriate providers; assuring the standard price-quality ratio; adequately cutting down the price while the contract unfolds, through intermediate negotiations; identifying and choosing new providers and so on [9].

- **Future actions** usually refer to performing under new circumstances

the planned actions and identifying new actions and resources. In order to assure the appropriate accomplishment of procurement logistic missions, future actions are especially aimed at the following: developing, starting from the good standing relationships, the cooperation with current providers, to the purpose of ensuring *timely delivery*; negotiating within the legal framework (when competition allows it) smaller prices for products, based on long-term contracts, keeping the time limits for already established payments; improving the payment conditions with occasional providers; enforcing penalties for incomplete deliveries and so on [10].

The careful examination of the supply issue and of the other components within logistics structures lead us to the belief that, in order to be efficient, *logistic planning* will mainly respect the requirements referring to the following: reflecting the consumption peculiarities of military units; conceiving it so as to use for procurement suppliers legally accepted as convenient and valuable; its purpose to respect consumption principles (rationality, optimum, balance), to develop the strong points and eliminate the weak ones; to outline in a realistic manner the objectives, limits and necessary resources; the best options, checked against risks or the periodic revision of these options [11; 12].

Unlike in the case of logistic planning performed during an armed conflict, logistic planning at

peacetime can be applied due to the influence of the other functions of logistics management (organization, command, coordination, control and evaluation), which are taken into account separately [13].

2.2. Main logistic planning documents

Generally speaking, the logistic planning of military units and major units at peacetime relies on a predictive activity on medium term (from one year to a trimester; from one trimester to a month).

Plans are built on the components of the unit's / major unit's logistics, according to the specific features and missions they have to accomplish at peacetime. In this respect, the main documents of management, for the decisional and operational levels, within the military structures mentioned above are the following:

- *The chapter entitled "Logistics" and the corresponding annexes from the Annual plan with the main activities of the military unit;*

- *The chapter entitled "Logistics" and the corresponding annexes from the Order of drills of the military unit no... for year...;*

- *The plan with the main activities of S4 logistic module for month... – made by the Chief of logistic planning compartment;*

- *Annual supply plan with class 1 – 5 materials;*

- *Annual movement plan;*

- *Annual transport plan;*

- *Annual engine-resources plan;*

- *Annual maintenance plan;*
- *Annual medical support plan;*
- *Annual sanitary-veterinary assistance plan;*

- *Annual infrastructure plan;*

- *Annual income and spending budget.*

We will detail below the purpose of each document of management taken separately.

- *The chapter entitled "Logistics" and the corresponding annexes from the Annual plan with the main activities of the military unit* is made, at the level of S4 logistic module, yearly, by the chief of logistics of the respective military structure. The document is based on the project of the plan with the main activities, made by the military unit's staff.

The format of *the chapter entitled "Logistics" and the corresponding annexes from the Annual plan with the main activities of the military unit* comprises the following elements: number; task; calendar with time limits (yearly); allocated resources (human, material, financial); responsibilities; manner of verification (control) of task completion.

In order to allow the timely completion of the planned tasks according to the allocated resources, it is useful to include two rubrics in the "Logistics" chapter from the *Annual plan with the main activities of the military unit*: *order of the activities planned, function of their urgency; number of the next activity (task).*

- *The chapter entitled "Logistics" and the corresponding annexes from*

the Order of drills of the military unit no... for year... is made yearly, at the level of S4 logistic module, by the chief of logistics of the respective military structure. This document is based on *“Logistics” and the corresponding annexes from the Annual plan with the main activities of the military unit.*

The format of *the chapter entitled “Logistics” and the corresponding annexes from the Order of drills of the military unit no... for year...* comprises: number; task name; calendar with time limits (yearly); allocated resources (human, material, financial); responsibilities; manner of verification (control) of task completion.

- ***The plan with the main activities of S4 logistic module for month...*** is made by the Chief of logistic planning compartment, according to the specificities and missions of every unit at peacetime.

The document is based on *the chapter entitled „Logistics” and the corresponding annexes from the Order of drills of the military unit no... for year...* that has as a purpose determining the main activities necessary to the proper functioning of the respective S4 logistic module, in the respective year.

The chapters from *the plan with the main activities of S4 logistic module for month...* refer to: planning specific activities and planning controls according to the missions and objectives each compartment in the S4 logistic module has to fulfill within the military organization at peacetime.

The activities planned (yearly, monthly) specific to logistic components will be grouped according to three categories: common to all compartments, specific to the compartment and other activities. The respective plans will be approved, after filling, by the commander (head) of military structure.

The document comprises the two rubrics mentioned above, that is, *the order of the planned actions, function of their urgency; the number of the next activity (task).*

- ***The annual movement plan.***

At peacetime, the movement of a military unit implies dislocation and re-deployment for conducting tactical exercises on national territory or outside it. In order to plan for the movement of the military unit (at peacetime) the *annual movement plan* is made so as to mainly comprise the activities, capabilities, resources, time limits and responsibilities necessary to force re-deployment, equipment, military technique and materiel. Each movement activity requires specific planning (scheduling).

- ***The annual transport plan*** is made in order to move all the types of technique and materiel (according to the respective classes) from the supply sources to the beneficiary (subunit, unit), using own transportation means.

This plan usually comprises all the actions, resources, terms and responsibilities necessary for the movement of material

goods (equipment) from providers (economic operators, maintenance sections, military warehouses etc) to the beneficiary units (subunits). The act of completing this document requires the involvement of all the structures in the respective military organization, that will use transport means in the respective year, taking into consideration the types of goods (equipment) that need to be transported and the types of necessary transportation means. The tasks specified in this plan are correlated with those in the *movement plan*, as well as those in the *annual engine-sources plan*. Each transport task requires specific planning (scheduling).

● ***The annual supply plan with class 1 – 5 materials*** is actually the most specific document of military unit supply management at peacetime. The document gathers all the profile data in the military unit and comprises all material goods that have to be supplied by the structures of the military unit during a whole year, divided into trimesters and months, which are at the same time evaluated financially.

For the decentralized supply of different types of products, the instructions in effect nominate the logistic products and materials that will be ordered, contracted, supplied and reimbursed by units and major units. In this respect, it is necessary for each military organization to make a *supply plan* and an *annual plan of public procurement*, correlated with the data from the “Notes comprising

indicators and justification calculus” that will comprise, on budgetary articles, all the products and services evaluated that are to be purchased organizationally in the planned year.

Moreover, the document allows the following: *the re-evaluation of future costs and possibilities of procurement locally; the estimation and planning of procurement procedures that are to be used; the demand for funds necessary to constant supply; the human and material resources that will be employed; the comparison of results obtained in the supplying process with the foresight made to this purpose* [14].

● ***The annual engine-resources plan*** is the management document resulting in the planning of transport means in separate drives, periodically, function of the needs, during a certain year.

At the level of military unit, the document is elaborated by the officer (non-commissioned officer/NCO) responsible for coordinating S4 logistic movement/module, following the setting of a calculus database, which depicts: the type of activity (combat training, transport to/from the unit, running-in new technique and so on), cars, vehicles and aggregates used for these activities, the number of engine-run kilometers resulting for each unit (hours of running – for aggregates).

Function of the activities included in *Annual plan with the main activities of the military unit* (also comprised in the “Logistics” Chapter from the

same plan) and in the *Monthly plan with the main activities of S4 logistic module*, the number of engine-run kilometers will be divided quarterly and then monthly.

The *annual engine-resource plan* is useful to the officer (or NCO) responsible for fuel and lubricants supply within the logistics management/S4 logistic module, that balances the number of engine-run kilometers established on categories of activities and types of consumers with the daily consumption rates and with an average quotient of road trips, generating the whole necessary amount of gas and diesel fuel, as well as the funds that have to be demanded for the following year [14].

After the approvals are obtained from the higher echelon for engine-resources and fuels-lubricants, the logistic compartment (office) will establish a certain correlation between the annual engine-resource plan and the annual plan of fuels-lubricants supply.

Periodically, the chief of S4 logistic module will report to the commander of the military unit within the working group, to justify consumption set out as engine-run kilometers and oil resources (gas, diesel engine, oils etc). Starting from this plan, the specialized bodies make quarterly and yearly analyses regarding planning and performing engine-resource consumptions.

• **The annual maintenance plan** is the document stipulating all the measures and activities necessary to maintaining or re-establishing

the normal characteristics of functioning specific to the equipment and armament in the endowment of the military unit. In this respect, the maintenance plan allows the employment, maintenance and repairs of equipment and armament during one year.

In order to fulfill the plan, the chief of S4 logistic module together with the technical deputy and the maintenance compartment put together the necessary resources (spare pieces, maintenance materials, funds and so on) with the existing ones, fact for which they perform the following activities: *they establish the number of technical maintenance and periodical repairs, on types of equipment and armament, as well as their setting in time; the way the equipment and armament are used according to the destination of the planned activities and allocated resources; they establish the types of equipment and armament that are to be preserved; they adequately foresee the future resource consumption, as well as the technical and maintenance state of technique and armament* [14].

In order to fill out the annual maintenance plan, the chief of staff of the military unit together with the deputy of the commander establish the necessities of technique, armament and resources separated on training activities, on months, on sub-units, on types of equipment and armament, on parks and destination groups.

The technical deputy of S4 logistic module together with the

respective compartment make the annual maintenance plan starting from the data received from the general staff and the actual military technique and resources, for assuring an appropriate functioning and maintenance.

For the next year, the maintenance plan is made after receiving the necessary material resources (spare parts, maintenance materials) and the financial resources (for procuring materials from the economic agents), so as the document might be approved by the commander in the first half of December of the financial year. The plan stipulates, divided on periods, the necessary amounts for technical maintenance, technical inspections, needed repairs (of current, medium, capital complexity), as well as general revisions.

In order to prevent losing the right to allocated resources, the manner in which the annual maintenance plan is put into practice will be analyzed periodically, thus:

- *monthly* – working groups meetings will evaluate the following: the allocated material and financial resource consumption; the consumption and spending made; the causes for not fulfilling the plan and the measures that need to be taken for fulfilling it, also taking into consideration the alterations made;

- *quarterly* – the units will gather all the data in an analysis that clearly shows the manner of fulfillment of the plan [14].

- ***The annual plan of medical support*** is the management document

starting from which the medical personnel from military units plan and perform all the activities necessary for keeping the health of personnel, preventing the occurrence and spreading of diseases, providing timely first aid, qualified or specialized medical aid.

The one responsible for the correct fulfillment of the plan, with all the activities involved, according to unit specificities, is the chief medical officer of the unit. The document has to be made every December for the next year, in order to be endorsed by the chief of S4 logistic module and approved by the commander of the respective military structure.

To have a basis for the annual plan of medical support, the chief medical officer has to coordinate the specific activities according to the following areas: the hygienic-sanitary assistance and living conditions of the troops; the medical assistance of the personnel (curative, prophylactic activity, anti-epidemic activity); the analysis of morbidity in the unit or major unit (dominant ailments; consultations, treatments, hospitalization; analyzing absences from work because of illnesses); the medical assistance of conscripts, of reduced term conscripts and course-takers (if the case be); the medical assistance of personnel participating in exercises and firing-range practice; medicine and sanitary materials procurement; military and medical training of medical personnel; efficiency of direction and control work made by the higher echelons in the domain of medical assistance.

We consider that periodically, during the working group meeting, heed must be paid to the manner of accomplishing the planned tasks, taking the necessary measures, according to the respective situation, both regarding medical support and the way of assuring material and financial support for fulfilling all the planned actions.

Starting from the plan, quarterly and annual reports are made regarding the objectives and actions specific to medical support, that are submitted at the stipulated deadlines through orders given by the medical compartments of higher echelons.

- ***The annual sanitary-veterinary assistance plan*** is the management document based on which the military units that have animals benefit from specialized actions aimed at: protecting the health of the animals in their service; treating ailing animals; ensuring sanitary inspection of animal origin food products.

The responsibility of making the annual sanitary-veterinary plan belongs to the veterinarian working full time within the respective military unit. When this position in the payroll is not filled or there is no function in the unit's organization, the document will be filled out by the veterinarian of the territorial sanitary-veterinarian practice to which the military unit is circumscribed.

In order to produce this document, the military vet (or the circumscription vet) will work together with the chief of S4 logistic module and with the

chief of procurement compartment in the respective military structure.

Regarding its structure, the annual sanitary-veterinary action plan include the following tasks grouped under the following headings: sampling during the year for screening in order to detect the possible diseases that may affect animals and other pathogen germs; preventing infectious – contagious and parasitic diseases at animals through periodical immunizations, according to sanitary-veterinary norms; preventive and curative anti-parasitic treatments; current preventive and curative treatments; food and fodder control [14].

The annual sanitary-veterinary plan is filled out either at the end of December of current year or the beginning of January (of the year planned for). Starting from this document, veterinary compartments make quarterly and yearly reports regarding the way the sanitary-veterinary actions that were planned were also performed. At the same time, this plan also represents the basis for putting together the needs of sanitary materials and medicines for treatments and prophylactic measures. Moreover, the periodical analysis of plan fulfillment by the responsible bodies show the medicine and material consumption, the spending and the efficiency of each sanitary-veterinary action taken separately.

- ***The annual income and spending budget*** made at the level of the military unit is the document

meant to ensure the undertaking of financial-accounting tasks, to strengthen the orderly and exact following of financial and accounting plans in managing financial means, the maximal mobilization of the existing resources and increasing spending efficiency.

The budget project is made by each financial-accounting structure in the respective military unit, it is signed by its commander (chief) who, according to the law, has the quality of tertiary credit release authority, and by the chief accountant, after an initial analysis made together with the chiefs of the modules (S1, S2, S3, S4, S6). After it is filled out, the budget project signed by the authorized people and accompanied by documents and detailed explanations both for extra-budgetary income and for spending are submitted for centralization to the hierarchically superior credit releasing authority, at the respective time limits [14].

3. CONCLUSIONS

The complexity of activities related to logistic support requires flexible planning for the timely and optimal accomplishment of the specific missions by the structures of management and execution of force logistic support.

Through planning, the activity of operational logistics management shows, regardless of the operational structures within which it is conducted, the effort of logistic forces

involved made in order to reach the purpose and goals of military actions and obtain optimal effects resulting from the maximal efficiency of all available resources.

In the domain of military logistics, just as in any economic domain, logistic planning is worked out through scheduling, based on a reduced interval of time – decade, week, day, shift, hour – including a lot of details regarding the actions performed, the means and resources used for accomplishing the plans logistics-wise. For conducting current logistic activities, the people in charge with logistics issues make schedules with own activities they perform daily, within the timetable made by the commander and, sometimes, beyond it.

In order to be able to reach the objectives and specific activities of the military unit at peacetime, *planning and scheduling* are especially relevant for logisticians, as they need to have management and specialized knowledge; professional experience; adequate communication capacity both within the logistic system and outside it with representatives of different companies, organizations and public institutions; functional authorities in the field and so on.

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THE EFFECTS OF GLOBALIZATION ON THE TRANSFORMATION OF ORGANIZATIONAL MANAGEMENT

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Under the present economic conditions, the accelerated process of globalization poses many problems for the adaptation of the company to the external environment, characterized by fierce competition. In this sense, management is facing numerous challenges related to globalisation, especially in times of organizational change.

Key words: organizational management, globalization, transformation.

1. THE GLOBALIZED ORGANIZATION

Today, the enterprise focusing only on the national market cannot become successful if it does not take into account the international market environment. Thus, we are witnessing the gradual transition from the logic of focusing mainly on the domestic market to the international market-based, and that both the level of production and that of labor, capital and consumer markets. The phenomenon of globalization is giving the world a new shape and opens new perspectives in the arena of international relations, having a major impact on social, cultural and political levels. Globalization represents a breakthrough, an exchange of information, an economy without borders and without political implications. Globalization, a process that has been lasting for centuries, has numerous consequences

for both national societies and international economic actors. The development of the globalization process determines the fears and some reaction from economic actors, who feel the full realities generated by the process of globalization. This is because globalization does not only offer opportunities to economic organizations, but also concerns and side effects. In order to be successful on the international markets, companies need to focus on:

- to move from the idea of competition to the idea of cooperation, serving the world;

- seek to identify the needs of consumers as they define themselves and it should be the main goal of organizations;

- to recognize and invest in an organization's overall advantage;

- to recognize the positions of individuals involved within and around its organizational structure;

- managers should have a global vision over the organization actions.

Business success will depend on management's reaction towards globalization, i.e. the way in which economic organizations will know how to respond to the demands of the world community. [2]



Fig. no. 1. The process of globalization

In the context of globalization, organizational change involves altering the mission and vision of the organization, the introduction of new technologies with new activities, the introduction of a rating system and performance system, redefined payroll, changes in organizational structure, a new orientation of the target customer groups with other necessities and a totally different behavior than its previous customers, and in particular, the introduction of the system of management guided by objectives. [1]

Organizational change aimed at the modification of procedures and systems, organizational structures and responsibilities, but equally changing skills. In the new construction, the people need new knowledge and empowered to act. In addition, new managers are necessary to support employees to cross the

change. At every level, managers of the organization must have the knowledge needed to achieve constant change to support staff through periods that may prove to be stressful for most of their employees. They are asking a different mindset, a different value system.

In general, the main characteristics of globalization include increased global interdependencies between all economic actors, internationalization of production and trade, a new international division of labour, new movements of migration, a new competitive environment, and liberalization of financial markets, free movement of capital, goods, people and information. In the ordinary acceptance, globalization is considering defining processes on the integration of capital markets and the privatization of commercial production and the means of production. Globalization is all about high mobility of labor, about the distribution of income across countries, about removing the existing fragmentation in the world economy.

Globalization of the economy can be defined as the process of growth, a particularly dynamic interdependencies between national states, due to the expansion and deepening of transnational connections throughout the wider and more varied economic, political, social and cultural spheres. Globalization is the stage reached by the secular process in the internationalization of economies and economic activities, as a result of mutations occurring in the domestic and international economic structures. [4]

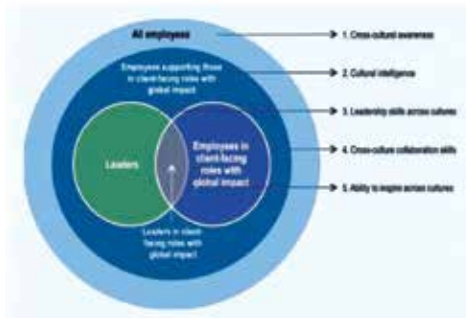


Fig. no. 2. The globally integrated organization

2. ORGANIZATIONAL CULTURE IN THE CONTEXT OF GLOBALIZATION

Organizational culture is considered to be “the invisible force” behind the conspicuous and tangible elements from a company, the energy that causes people to act. Management analysts can compare the organizational culture of a company with an individual personality, which meets a number of issues visible and less visible, but providing vision, direction and meaning, the energy required for evolution. In Hofstede’s vision, organizational cultures have penetrated into every corner of our society. Similar to computer software, works like a man’s mental software, and at the same time plays an important role in our way of thinking and loyalty, to act. Organizational culture represents the personality of the organization and defines the way it works. In terms of non-academic language, organizational culture can be understood through “how we do things here”. [3]

Globalization understood as the theory suggests that global culture is promoted by social and cultural development, emergence behavior patterns of consumption and consumerism; the cultivation of certain lifestyles and” globalism implies a new consciousness of the world as a unified space. Globalization may appear as a phenomenon that takes place at the macro level. In fact, the phenomenon manifests itself as a micro-level issue that has an impact on everyday life. The expression of cultural identity and experience are conditional on the vast process of globalization. The term “globalization” has been developed to highlight the realities of our world, namely: the internationalization of markets for goods and services, as well as the emergence and proliferation of multinational companies involved in the development of comprehensive financial, production, marketing and management productions. Globalization processes are a vital component of the contemporary world economy, determining the modality of approaching social and human resource. [9]

In the present economic context, contemporary organizations alongside the contemporary economy are tackled as a whole. Organizations cannot exist in isolation, cannot survive outside of a more extensive network established at all levels and their purpose is “to serve people’s needs (and not vice versa)”. The world economy and hence the organizations are viewed as a unified system, as a whole composed of smaller or bigger parts, more or less developed. Thus, a part of local decisions have to be

taken in the light of the general trend of globalization processes. Organizational culture supports the massive influences that the economic interaction created between states, organizations (corporations), people with a mobility service and various cultural traits. Our society is witnessing a concentrated on establishing cultural synergies, elements that have a character of universality and uniformity without taking into account the specifics of a certain geographical area or a specific group. The world is seen as a source of unlimited potential with new suppliers and new products in a setting designed to enhance organizational competitiveness. Globalization is beneficial for multinational corporations that integrate into their own networks the international production systems. [6]

Given a particular organization, its own culture is identifiable with the human personality. Its transmission channels are varied, depending on the type of the system, such as: a specific attire, unwritten rules, languages or specific jargons that facilitates communication between members of the organization, standards of ethical, moral and social behavior. Research on the elements of cultures or organizational cultures indicate that organizations are perceived as having unique characteristics and having stability in time. It is precisely these elements in terms of stabilizing the internal environment that are changed under the influence of globalization.

Globalization is forcing change and adaptation. From this point of view, globalization requires rethinking the concepts of organizational culture

and cultural identity. Phenomena related to adapting to the process of globalization, internationalization and the so-called “wave” of globalization can be identified as the phenomena of trans-cultural. Organizations are considered a living organism that reacts to changes in the environment and at the same time trying to take advantage of these changes. The modern theory of globalization argue that it comprises two completely contradictory processes of homogenization and differentiation, that there is a complete interaction between localism and globalism, and that manifests the strong resistance movements against globalization processes.



Fig. no. 3. Culture creation and Culture Maintenance in the context of globalization

Globalization understood in the sense of organizational culture, influences organizational behavior. Current studies on the impact of organizational culture on competitiveness have highlighted the need to raise awareness of the administrative apparatus of the value and importance of the components of the organizational culture which may lead to achieving superior performance. Adapting

the organization to the demands of globalization generally means the crossing of several intermediate states between two relatively balanced states (one of the states being national culture). Research on organizational culture represents a way of evaluating the staff without recourse to the use of advanced psycho-social models which may turn out expensive. Organizational cultural manifestation, allows observation of human behavior and attitudes, their motivations, symbols, values, visions and concepts within existing organizational. The results of researches of the organizational culture are becoming more widely accepted by their managers, using them as a tool for improving the structure of the organization. [8]

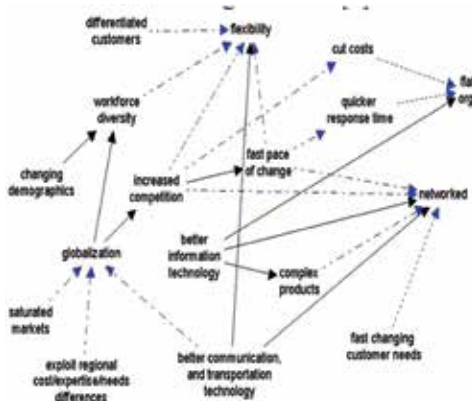


Fig. no. 4. Globalization on the transformation of organizational management

If we look at an organizational process as a normal process, which consists of three stages (input, processing and product) stated the following: the input consists of what a company receives from the external environment (customer

requirements, the legislative framework, the company claims); the input is then processed by the company; finally we obtain a product (products, services, technology), having a single footprint left by the personality of the company. This process is based on the culture and assumptions about how the company should be made. At some point in this process, things can go wrong and the company may encounter difficulties in achieving its objectives. This is the point at which the leaders are forced to start the change process. This process is known to be one of the most difficult undertaken within a company. This is why leaders must thoroughly examine the problem and be sure of what needs to be changed, so that it can determine how to implement the process. [5]

Taking into account the fact that the activity of companies take place in a dynamic business environment, which can be described as fast and choppy, companies must adapt to this trend to be able to meet the requirements of the market. As mentioned before, changing the culture in a company is one of the most difficult processes to be undertaken. It is important for leaders to be prepared and have a solid foundation of knowledge about the management of change. Correlation is required of such knowledge with a good analysis of the situation in which the company is located. Changing the organizational culture can be regarded as a part of a complete transformation. Its implementation may occur at the beginning or at the end of the transformation process. Change within a company can

start with amendments to business solutions or management actions and may be signed by the organization's culture, or vice versa. Cultural change is a species of organizational change, but one important, since any transformation parallels a reassessment of the basic presumptions that individuals take responsibility for them. Organizational transformations pushed by globalization have echoes in cultural layers. Either as the transformation occurs at the level of structure, form of property, the type of technology or managerial strategies, it requires cultural changes, because conservation and cultural inadequacy are opponents in the success of the process. [7]

3. CONCLUSIONS

Environmental and socio-economic transformations require changes in organizations at the level of the structures and the methods used. Organizational change is not an end in itself, but must be regarded as a natural process having as main objective the preservation of a competitive environment. The dynamics of the organization's activities requires at some point a change due to low performance obtained in comparison with planned results, important differences between strategy and what actually happens in the organization.

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INFORMATION TRANSFER STRATEGIES OR HOW TO REACH EQUILIBRIUM AND CONTROL IN DIRECT VERBAL COMMUNICATION

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This article focuses on identifying the means by which communication based interactions can generate wins in order to make direct verbal communication, like debates, more efficient. Communication optimization consists in designing and formally employing a mathematical model that can lead to qualitative equilibrium and subsequently to gaining an advantageous position in two way communication instances.

Key words: *communication, optimization, random strategies, entropy.*

1. INTRODUCTION

The concept of “information” acquires various meanings depending on the perspectives that define it, as well as on the goals it serves. Generally speaking, information transfer requires two parties involved in the process of exchange incurred by communication instances.

The idea of random interaction as part of open communication is to a certain extent formalized by Game theory. As Silviu Guiaşu stated back in 1973, random games among n parties are “one of the first non-trivial examples of reverse based connection systems”, a statement that obviously indirectly referred to cybernetics

[1]. Even though the concept has evolved, what it basically refers to is communication based interaction anchored into numerous means and techniques to express an intended message in a certain sequence and employed by entities that are present in a communicational environment. Communication structures are built on rules that, even if they are a priori established, they meet the contextual communication needs of the parties involved in the process which may be aligned, may be different or completely contradictory. A system that delivers verbal information in a competition based environment has its own constitutive elements.

Moreover, the mutual dependencies and connections make the relations that underpin the elements of an information system as a result of its evolution.

According to the mathematical theory of information and based on a broad definition of the concept, the process of conveying information is considered a random one. Communication among human beings, regardless of its type, is generated by specific goals and reasons. Consequently, the party delivering a message also becomes part of that is called "persuasion tendency".

In order to reach its goal, the entity conveying the message needs to adopt, depending on the context, a certain communication strategy. The latter actually offers the possibility to qualitatively analyze the content of vocal communication in a competition based environment. This study is to focus on the means by which in a two way communication process the transfer of information can reach a qualitative equilibrium, as well as on identifying the manner in which one can gain control in direct communication instances. The types of interactions of interest for this paper are the non-collaborative ones in which an entity conveying a message does not a priori know the intentions and resources of its communication partners. Moreover, another aim is to quantify the advantage that a participant to the communication instance who is also the message transmitter also

gains in a communication process as a result of employing random communication strategies based on entropic optimization.

2. RANDOM INTERACTION STRATEGIES AND THEIR ROLE IN ACHIEVING EQUILIBRIUM IN DIRECT COMMUNICATION

For any $i=1,2,...,n$ we call the formula $S_i = \{S_i^1, S_i^2, ..., S_i^j\}$ information partition of the i communication initiator. We note by F_i the *win formulas* of message initiators. An individual communication initiator's plan related to the communication interaction is called *individual strategy*. Thus, an i initiator's individual strategy in the Δ interaction is an x_i map defined as S_i that associated to any S_i^j information lot a unique value from the indexing lot. Hence, the **strategy B** signifies an initiator's means of expression that the latter is ready to use for any circumstances that may ensue in the communication process. An $\bar{x} \in X$ strategy is a point of equilibrium for the Δ interaction, if for any $i = 1, 2, ..., n$,

$$F_i(\bar{x}) \geq F_i(\bar{x}_1, \bar{x}_2, ..., \bar{x}_{i-1}, x_i, \bar{x}_{i+1}, ..., \bar{x}_n) \quad (1)$$

regardless of what the $x_i \in X_i$ strategy is.

Any communication initiator's desirable goal is to maximize the chances of having their own opinion prevail. Nonetheless, since the other communication parties' interests are generally different it seems that a

situation in which all entities involved in the communication process reach their own goals is unlikely. If a point of equilibrium were to be reached in the interaction, then that could provide the means by which neither communication initiator is at disadvantage or at advantage.

By transcribing (1) for the particular case on an interaction among two initiators $\Delta = \{X, Y, F\}$ it results that a (\bar{x}, \bar{y}) strategy of the interaction is a **point of equilibrium** if the following inequalities are satisfied:

$$\begin{aligned} F(\bar{x}, \bar{y}) &\geq F(x, \bar{y}), \forall x \in X \\ -F(\bar{x}, \bar{y}) &\geq -F(\bar{x}, y), \forall y \in Y \end{aligned} \quad (2)$$

which generates the double inequality:

$$F(x, \bar{y}) \leq F(\bar{x}, \bar{y}) \leq F(\bar{x}, y) \quad \forall x \in X, y \in Y \quad (3)$$

According to the Karuch-Kuhn-Tucker conditions, a point of equilibrium for the Δ interaction is a saddle point for the win formula F [2]. The meaning of this result, namely of the term ‘saddle point’ is revealed by the answer to the question: ‘What does an optimum means of expression signify in the case of both initiators of interaction Δ ?’. If, for example, the first initiator chooses an x personal strategy, the latter can only be ‘a priori’ certain of the win given by:

$$\min_{y \in Y} F(x, y) \quad (4)$$

In such a case, the optimum of his communication is reflected in the choice of a $\bar{x} \in X$ strategy that

allows for gaining the maximum from previous wins:

$$w_1 = \min_{y \in Y} F(\bar{x}, y) = \max_{x \in X} \min_{y \in Y} F(x, y) \quad (5)$$

That is actually the Max-Min principle that governs game theory in terms of the optimum criterion that guides the choice of the means of action. In our case, this principle represents the performance criterion in terms of choosing the optimum means of expression in competition based communication. If the previous inference which has the win function $-F$ is repeated from the perspective of the second initiator, the same Max-Min principle will determine the latter to adopt the $\bar{y} \in Y$ strategy that grants him the chance of a win of at least:

$$\begin{aligned} -w_2 &= \min_{x \in X} (-F(x, \bar{y})) = \max_{y \in Y} \min_{x \in X} (-F(x, y)) = \\ &= -\min_{y \in Y} \max_{x \in X} F(x, y) \end{aligned} \quad (6)$$

In such a case, the gain of the first initiator is maximum:

$$w_2 = \min_{y \in Y} \max_{x \in X} F(x, y) \quad (7)$$

The w_1 and w_2 terms are called the ‘max-min value’, and the ‘min-max value’ between which there is the following relation: $w_1 \leq w_2$. In the special case in which $w_1 = w_2 = w$, then $\bar{x} \in X$ and $\bar{y} \in Y$ so that:

$$F(x, \bar{y}) \leq w \leq F(\bar{x}, y) \quad (8)$$

Regardless of $x \in X$ and $y \in Y$, and:

$$w = F(\bar{x}, \bar{y}) \quad (9)$$

The value of interaction was noted as w . In such a case, the viceversa

is possible and is a necessary and sufficient condition for:

$$\max_{x \in X} \min_{y \in Y} F(x, y) = \min_{y \in Y} \max_{x \in X} F(x, y) \quad (10)$$

And for the F function to accept a saddle point. If (\bar{x}, \bar{y}) is a saddle point of F, then:

$$F(\bar{x}, \bar{y}) = w \quad (11)$$

and w is the common value of the two members of the previous equality. The result actually expresses the fact that in a communication stance involving two initiators, the point of equilibrium is rendered by the max-min strategies of the two. The concept of strategy in the communication process can extend given the non-determinate character of the means of expression of information message initiators. A random strategy of the communication instance Δ is a pair of random strategies of the two initiators. The lot of this strategies is noted as S_a . The interaction Δ is also defined by the **win matrix** $\Phi = (\phi_{ij})$, $1 \leq i \leq m$, $1 \leq j \leq n$. That includes in the case of the communication process the values of the vocal and acoustic parameters, the prosodic and emotional features, as well as the elements that derive from the content and style of composing the spoken texts.

A random strategy of the A initiator can be considered under the random m-dimensional vector $\sigma_1 = (p_1, p_2, \dots, p_m)$,

$$p_i \geq 0, \sum_{i=1}^m p_i = 1$$

A random strategy of the B initiator can be considered under

another random n-dimensional vector $\sigma_2 = (q_1, q_2, \dots, q_n)$,

$$q_j \geq 0, \sum_{j=1}^n q_j = 1$$

Given the decreased level of predicatability of the wins that the two initiators can obtain, we can only mention the *average* win of A or B. For example, for the A initiator, the average win is:

$$F_m(\sigma_1, \sigma_2) = \sum_{i=1}^m \sum_{j=1}^n \alpha_{ij} p_i q_j \quad (12)$$

A result that confirms the existence of a point of equilibrium in the case on communication interactions is the min-max theorem of von Neumann: '*Any matrix based interaction accepts at least one point of equilibrium consisting of random strategies*' [3]. In this context, we would like to increase the level of generality of a communication process by considering the case of non-collaborative communication interaction of variable sum between two initiators, this type of interaction does not necessarily involve the existence of contradictory interests. It can be the case of verbal communication in the form of debate, dialogue and not in the form of direct competition based interaction. Even if in such a case the interests of the interlocutors are considerably different, the rule according to which the win of an initiator triggers a diminished win for the other does not manifest. The attitude of both communication partners is rather indifferent; each of them focuses on one's own advantage [4]. The point

of equilibrium concomitantly grants the interaction partners a relative maximum win; if A adopts the (\bar{x}) strategy, B cannot obtain more than the (\bar{y}) strategy can grant, and vice versa.

All of the above considered, the (\bar{x}, \bar{y}) strategy of a Δ interaction, of a variable sum, between two initiators is a point of equilibrium according to the inequalities:

$$F_1(\bar{x}, \bar{y}) \geq F_1(x, \bar{y}); F_2(\bar{x}, \bar{y}) \geq F_2(\bar{x}, y) \quad (13)$$

for any $x \in X$ and $y \in Y$.

In particular, in the bi-matrix interaction Δ with the win matrices $A=(\alpha_{ij})$, $B=(\beta_{ij})$, $1 \leq i \leq m$, $1 \leq j \leq n$, the pure strategy (i_0, j_0) is a point of equilibrium if:

$$\alpha_{i_0 j_0} \geq \alpha_{ij_0}, \beta_{i_0 j_0} \geq \beta_{ij_0}; i=1, 2, \dots, m; j=1, 2, \dots, n \quad (14)$$

In the same formalized context, we introduce the functions of average win forecasted by the two partners if they adopt the random strategies σ_1 , and σ_2 :

$$F_1(\sigma_1, \sigma_2) = \sum_{i=1}^m \sum_{j=1}^n \alpha_{ij} p_i q_j$$

$$F_2(\sigma_1, \sigma_2) = \sum_{i=1}^m \sum_{j=1}^n \beta_{ij} p_i q_j \quad (15)$$

In this case, Nash's theorem states that 'Any Δ bi-matrix interaction accepts points of equilibrium made of random strategies' [5]. In the context of non-collaborative interactions with variable sum, the wins differ by the different points of equilibrium.

The following result offers the conditions under which a point of equilibrium can be reached, in the context in which win matrices and random strategies are organized.

The pair of random strategies $\bar{\sigma}_1 = (\bar{p}_1, \bar{p}_2, \dots, \bar{p}_m)$, $\bar{\sigma}_2 = (\bar{q}_1, \bar{q}_2, \dots, \bar{q}_n)$ makes a point of equilibrium for the Δ bi-matrix interaction, with A and B win matrices, if and only if for any $i=1, 2, \dots, m$:

$$\sum_{i=1}^m \sum_{j=1}^n \alpha_{ij} \bar{p}_i \bar{q}_j \geq \sum_{j=1}^n \alpha_{ij} \bar{q}_j \quad (16)$$

and for any $j=1, 2, \dots, n$:

$$\sum_{i=1}^m \sum_{j=1}^n \beta_{ij} \bar{p}_i \bar{q}_j \geq \sum_{i=1}^m \beta_{ij} \bar{p}_i \quad (17)$$

If for the A matrix the row vector where the row elements are i is noted as A_i and the column vector, where the column elements are j , is noted as B_j , the previous formulas can also be noted as:

$$\bar{\sigma}_1 A \bar{\sigma}_2^T \geq A_i \bar{\sigma}_2^T, i=1, 2, \dots, m$$

$$\bar{\sigma}_1 B \bar{\sigma}_2^T \geq \bar{\sigma}_1 B_j, j=1, 2, \dots, n \quad (18)$$

The practical method to determine the points of equilibrium in such cases is to replace inequalities like (18) with a system of inequalities of linear inequalities that can be pretty simple to solve.

3. RANDOM COMMUNICATION STRATEGIES BASED ON ENTROPIC OPTIMIZATION

The discussion below concerns the larger context of a random communication interaction with n initiators of the information message. The communication partners may have common or different interests, or even completely opposite. These partners are noted as E_1, E_2, \dots, E_n and

their lot as Σ , and the lot of random strategies as S_a . communication partners can be also seen as representatives of complete systems of probabilities attached to a well defined lot composed of the means of expression characteristic and explicit of every information initiator. The E_i initiator can express himself as $m_i^{k_j}, 1 \leq k_i \leq n_i$, where there are n_i such expression possibilities, with the $p(m_i^{k_j})$ probability. The latter's strategy represents a random variable with the values rendered by the $m_i^{k_j}$ communication instances and which is noted as:

$$\sigma_i : \left(\begin{matrix} m_i^{k_i} \\ p(m_i^{k_i}) \end{matrix} \right); p(m_i^{k_i}) \geq 0, \sum_{k_i=1}^{n_i} p(m_i^{k_i}) = 1, 1 \leq i \leq n \quad (19)$$

Actually, the above signifies the lot of expression means that an initiator has available along with the probabilities that he can use. A set of successive communication instances formulated by n communication partners can be represented by the vector $(m_1^{k_1}, m_2^{k_2}, \dots, m_l^{k_l}, \dots, m_n^{k_n})$ with the probability $p(m_1^{k_1}, m_2^{k_2}, \dots, m_l^{k_l}, \dots, m_n^{k_n}), 1 \leq k_i \leq n_i, 1 \leq i \leq n$. If to $m_i^{k_j}$ a given importance is associated $u(m_i^{k_j}) = u_i^{k_j}$ then the average information amount supplied by the E_i initiator by adopting the $\sigma_i, 1 \leq i \leq n$ strategy is:

$$\Gamma_{n_i}[u_i; E_i] = - \sum_{k_i} u(m_i^{k_i}) p(m_i^{k_i}) \log p(m_i^{k_i}) \quad (20)$$

namely, the **balanced entropy**. The balanced entropy of the E_i information initiator becomes maximum if and only if the σ_i random strategy adopted by the later follows:

$$p(m_i^{k_i}) = \frac{2^{\frac{\alpha}{u(m_i^{k_i})}}}{e}, \quad 1 \leq k_i \leq n_i \quad (21)$$

where α is the solution to the equation:

$$\sum_{k_i=1}^{n_i} 2^{\frac{\alpha}{u(m_i^{k_i})}} = e \quad (22)$$

where:

$$\left[\max_{x_i} \right] \Gamma_{n_i}[u_i; E_i] = - \frac{1}{e} \left(\alpha - \log e \sum_{k_i} u(m_i^{k_i}) \cdot 2^{\frac{\alpha}{u(m_i^{k_i})}} \right) \quad (23)$$

In a more restricted sense, the importance of the manner of expression can be interpreted as a win or success that can be attributed to the initiator that produces it. In this case, the importance can also be negative, namely if the message expression is inadequate it can lead to loss or insuccess for its initiator, hence to a negative win. The indicator that is analysed in such a case is that of average importance and average gain for a given time period [6].

For a certain partner involved in direct competitive communication for a given time period, we can define the latter's average importance as:

$$U(E_i) = \sum_{k_i=1}^{n_i} \dots \sum_{k_n=1}^{n_n} u^i(m_1^{k_1}, \dots, m_n^{k_n}) p(m_1^{k_1}) \dots p(m_n^{k_n}) \quad (24)$$

Nonetheless, this concept promoted, for the information initiator noted as E_i

Who is in competition or at least in connection with the other partners, adopting a random strategy automatically leads to removing certain uncertainties, namely to obtaining information. Thus, considering the two different

components of importance and information from a quantitative perspective, we can quantify the total average win of a participant in the communication process as:

$$A_i(E_1, \dots, E_n) = U(E_i) + H(E_i), 1 \leq i \leq n \quad (25)$$

The optimal strategy of the E_i initiator for obtaining an average win needs to be:

$$p(m_i^{k_i}) = \frac{1}{e} 2^{\alpha + u_i^{k_i}}, 1 \leq k_i \leq n_i, 1 \leq i \leq n \quad (26)$$

where α is the solution for the equation:

$$\sum_{k_i=1}^{n_i} 2^{u_i^{k_i}} = \frac{e}{2^\alpha} \quad (27)$$

for the notation:

$$u^i(m_1^{k_1}, \dots, m_n^{k_n}) = u^i(m_i^{k_i}) = u_k^i, 1 \leq i \leq n.$$

In this case:

$$A_{i\max}(E_1, \dots, E_n) = \log e - \alpha = \log \left[\sum_{k_i=1}^{n_i} 2^{u_i^{k_i}} \right] \quad (28)$$

If we want to capture the qualitative input from the maximum and the result is:

$$p(m_i^{k_i}) = \frac{2^{\frac{\alpha}{u_i^{k_i}} + 1}}{e}, 1 \leq k_i \leq n_i, 1 \leq i \leq n \quad (29)$$

and that is the solution to the equation:

$$\sum_{k_i=1}^{n_i} 2^{\frac{\alpha}{u_i^{k_i}}} = \frac{e}{2} \quad (30)$$

and the maximum win is expressed as:

$$A_{i\max}(E_1, \dots, E_n) = \frac{2}{e} \log e \sum_{k_i=1}^{n_i} u_i^{k_i} 2^{\frac{\alpha}{u_i^{k_i}}} - \alpha \quad (31)$$

The concepts of importance and advantage generated by adopting random strategies are still

valid even when there is a shift from an information initiator or communication partner to a coalition of initiators, and hence the previous results can be generalized in this context.

4. CONCLUSIONS

Classically speaking, the goal of communication is accomplished through information exchange between a sender and a receiver. Unlike the latter, the dynamic perspective imposed by cybernetics reveals the interactional features of the information outlined in communication. Such features generate emulation given their reactivity at the level of the participants to the communication process. The latter become in their turn message initiators. Moreover, information can also be approached from the perspective of the messages it transmits, the importance of specific communication instances, but also in terms of the result or pragmatic effect of its processing. That is the context in which the context of direct communication in a competition based environment was modeled and adapted through parallelism with elements and concepts characteristic of game theory. Concepts like the win function, importance, random strategies that govern communication interactions have been identified and outlined.

The desirable goal of any communication initiator is to maximize the chances of having one's own opinion prevail in direct

explicit communication stances. The article emphasizes the importance of identifying the mathematical mechanisms, as well as of the possibilities to elaborate solutions that can be implemented in *speech analysis* in order to grasp in real time and via balanced entropy related concepts the maximum win of employing means by which individual communication parameters and procedures can be improved.

Along with the adequate monitoring and control, these solutions that could be put into practice might successfully be used in order to increase the chances of optimally transferring important information messages in competitive environments.

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FACTORS INFLUENCING SUSTAINED MANAGERIAL EFFICIENCY

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The concept of effectiveness is learnable in economic theory and practice with various forms of manifestation of the results obtained by the managers, such as profitability, the productivity of factors of production, capital efficiency, cost savings, etc. Regarded as the organizing principle and driving activity in the market economy, it has a much richer content and also favorable results of generalizing all derived by managers. Choosing effective in meeting needs with limited resources or powerlessness to maximize resource needs under restraints, are expressions through which efficiency is situated at the heart of economic theory and practice.

Key words: *influence factors, managerial efficiency, sustainable management.*

One of the most used terms in recent years, management is addressed at the level of microeconomic or macroeconomic level or even at social and organizational levels. Such a situation is not accidental. It is widely recognized that management is the most important factor in the economy and efficiency of organizations, which function within it, managerial performance being dependent on economic performance, commercial, technical and technological, etc. obtained in those areas.

The pair “managers-management” becomes the leitmotif of any strategic or tactical approach oriented to efficiency, effectiveness and competitiveness. That is why,

in the face of, will be given proper attention by the way the involvement of managers in the pursuit of performance management processes, being the target of constant achievements. [5]

The manager is, by far, the most important character of the organization, irrespective of the hypostases of CEO, President, Chief Executive Officer, Vice President, Director of Department, The Director of Profit Centre, Head Office, Head Office, and so on. It is engaged in the management processes with variable intensity depending on the hierarchical position which it occupies in the configuration of structural organization, i.e. decisions by influencing the decisions and

actions of others. Therefore, the Manager:

- forecasts, i.e. decisions concerning setting goals of the organization and its organizational subdivisions, outlines ways of achieving them, resize the resources to be employed for their accomplishment, the intermediate and final deadlines for the fulfilment of the objectives; the result of these decisions represent the production of forecasts, strategies, policies and programs, differentiated in relation to the horizon, degree of detail, the impact on the organization;

- arranges, broken down into its fundamental objectives, secondary objectives, specific and individual components and user defined sizes from procedural level to which they are carried out (functions, tasks, powers and tasks), and user defined sizes of structural components involved in work processes (posts, functions, compartments, etc.), ensures appropriate human "Endowment" of management and execution (compatibility with the official authority to consider fasting);

- coordinates to harmonizes decisions and actions of subordinates, in a bi-or multilateral communication.

- trains by adopting decision determined subordinates to participate in setting and achieving goals, taking into account the motivators; hence the need for a complex motives (focused on harnessing the rewards/sanctions-correlative with those materials voluntary moral/spiritual), gradual (meeting the needs of the individual

in relation to the scope and intensity of manifestation) and differentiated (rewards/penalties giving material and moral/spiritual, depending on the degree of achievement of individual goals, objectives and organizational subdivision of the individual and of the objectives of the organization);

- controls periodically and at the end, the degree of achievement of objectives, as well as the manner of compliance with them;

- evaluates periodically and final results, and none of the positive deviations detected malfunctions and correction decisions and/or the appropriate update.

A major component of the organization's management, resulting directly from the exercise of management processes is the decision subsystem (SD), materialized in managerial decisions and supporting mechanisms and adopting them. It is obvious that the quality of the decisions adopted are exclusively responsible managers, and their effectiveness, are responsible, for the most part, contractors, i.e. those who initiate actions for their implementation. In any decision-making strategic, tactical approach or operational data will be recovered and pertinent information, submitted by operative managers. Hence, the importance of informational subsystem (SI) which, through management decision-making function, provides informational support for managerial decisions and justification. The third component is the organizational subsystem (OSS) that involve formal and informal

organization. Obviously, a great deal of attention must be paid to formal organization, reflected in the organization process and structural organization, providing the necessary support for the adoption of decisions and initiate actions geared towards achieving the objectives. [3]

Decisions taken by managers on different hierarchical levels aimed at establishing and the breakdown of goals, specifying the means of achieving the necessary resources, more accurate sizing, intermediate and final deadlines, the delineation and size of the procedural and structural components are involved in achieving the objectives, coordination and training-motivating staff participation in setting and achieving goals, evaluate the results, detection of some causal failures and strengths, correction and/or update the objectives. [2]



Fig. no. 1. Managerial efficiency model

If efficiency implies the existence of causal effects compared with efforts to obtain their effectiveness lies in the attainment and exercise of managerial tasks and qualitative temporal terms. For the managers of the organization, subject to multiple and increasingly more complex challenges of contextual and endogenous issues because of the volume of information that needs to be harnessed in the decision-making, it is more important to the effectiveness of their benefit. Efficiency is materialized in obtaining managerial performance, mainly general and specific. [4]

The efficiency of a manager has to be measured both by its results, and on the basis of skill levels reached and implemented in achieving those results. In addition, take into consideration how the manager acts in the use of knowledge and skills (capacity). In the evaluation of some various companies some skills have appeared which could lead to the idea of managerial efficiency. Of these, the most important are:

- Orientation towards results. Managers need to know to establish goals and try constantly to reach them;

- Understanding the business. Every manager needs to know all the way to the smallest detail the business it represents, to be able to identify and take advantage of every opportunity;

- Communication skills are necessary in this area and here we refer to the negotiating skills of persuasion

or focus on client. A manager must know to focus on customers and their needs and expectations;

➤ The desire to help others develop. Even if it seems a specific attitude of the leader, and a manager have to help those around him develop, being aware that just may develop your business;

➤ Managers must have a large capacity, plus adaptive needs to know how to act in different situations;

➤ Ability to plan and organize different things and ideas is very important for any manager. Also, just so it will be able to run a company, a department, a project, etc. toward the best and most efficient direction;

➤ Problem-solving. This capability includes analysis of situations, their diagnosis, choice of solutions and identification, based on an extensive series of best and effective rationalizations.



Fig. no. 2. The role of management planning

A first performance indicator refers to the degree of scientification of the management of the organization. This is expressed quantitatively-the number of systems, methods and management techniques used at one time for the exercise of management processes. This performance depends on the degree

of “participation”, “involvement” of management instruments in the performance management process, which is given by the number and weighting systems, management methods and techniques to managers call for each exercise. These will need to be added and the competence of managers, which is given in the main management knowledge possessed by the managers of the three organizational levels of the organization. [1]

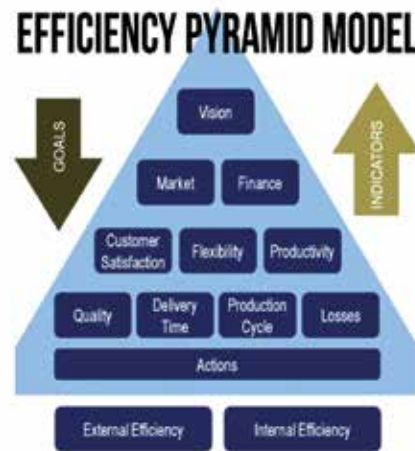


Fig. no. 3. The efficiency pyramid model, management perspective

The degree of resolution and decision-making problems facing the organization constitutes a performance that can be determined as the ratio between the number of decisions adopted at the organization level and the number of problems with which it was confronted, in a certain period of time. Another performance is the degree of implementation of the convention, which is determined according to the actions initiated in the field led to the implementation of

decisions. This performance indicator is determined by management as a whole and on organizational levels. This degree of satisfaction of needs of informational top-level managers, middle and inferior, determined as the ratio between the quantity of information provided and the quantity required for each manager. At the same time, it is considered and the degree of satisfaction of the needs of employees information, determined according to the same algorithm. [6]

The degree of assurance of procedural objectives assumed for a specific period, which highlights the extent to which the delimitation and dimensioning of work processes satisfy the claims required by the five categories of objectives-fundamental, derived I, II, specific derivatives. In the same context, it is considered a structural coverage and organizational processes involved in achieving the objectives. It is obvious that, in order to achieve the objectives, work processes, found in different forms of aggregation, in procedural components (functions, activities, tasks, tasks), and for the proper conduct of the necessary organizational framework outlined structural judiciously. We insist on the fact that any procedural component must have a standard organizational structure enclosed properly to be able to be exercised. Failure to observe these correspondences inevitably lead to deviations from the objectives.

Performance measurement is a specific task, important in the field

of human resources management, rapidly resulting in predicting individual performance, as well as the group. In any organization, daily, informal evaluations take place through which managers and subordinates to evaluate each other. Performance assessment refers to the determination of the formal and systematic manner in which members of the organization given its specific tasks of the post they occupy in relation to the wasted set, evaluation standards, with the methods used and the quality of the communication of the results.

Not all evaluations have a positive effect and that assessment work is sometimes regarded as one of the most detested. For example, those carried out for prizes, for layoffs or even for staff discipline are perceived by employees with fear, anxiety and may create feelings of insecurity. The same goes for when employees do not know or understand the criteria that are used for their evaluation when they think they are compared with others or when they concern the assessment that could lead to an improvement of their professional and moral activity within the organization. How the system is used and the manner in which the results of the evaluation are communicated can significantly affect the moral and organization climate and training processes, significant improvement, promotion, reward, etc. [9]

Fairness of performance appraisal procedures to the validity of the results: ability to reflect

truth; fidelity, the ability to provide identical results from repeated use; equivalent results-independent assessors must arrive at the same result; internal consistency, constant partial estimates; The process of performance appraisal is influenced by a number of factors, who do may cause distortion within it: the history of the organization and its system of values, because the dominant values of the managerial culture differs from one organization to another, preventing the optimal configuration for a specific employee's personality ideal; the size of the organization, because small companies within the informal assessment plays an important role; field of activity-through speed of development; strategic orientations of the organization that determines the selection of those criteria for performance to be in line with its mission, objectives and strategies of the organization; the influence of trade unions, which focus on the age of the employees within the organization, and not always on the performance obtained by them; practices used in the processes of hiring, pay and promotion, which are influenced by the performance of employees.



Fig. no. 4. Performance Management Process

Along time, the professional manager has been outlined as a powerful and individual kind of understanding, who knows exactly how to route and you have to dictate his team. But in an economy of increasingly competitive marketplace, it takes much more to lead a team to success. A good manager understands the needs and strengths of the team and each Member evaluates skills correctly. He perceives the potential of each employee, but distributes little tasks over its capacity, so as to encourage the overcoming of one's own limits. A leader knows that to get the individual notable performances, team members must be challenged to learn and to become more involved. [10]



Fig. no. 5. The performance management process/ managers versus associate

A manager knows that a strong and effective team forms in time and with patience. He cultivates relationships based on trust with employees, listen and advise when difficulty. Each team member must be motivated to get involved actively in the optimization of procedures, so that when a team has a positive result, the manager

must recognize publicly the merits of each employee. Each member of the team needs to feel that his opinion is valued right now, so an effective manager organizes periodically meetings within which employees to provide feedback and contribute constructively to the work of other members. A leader understands that the process of critique must have a positive purpose, not to intimidate. Through their criticism, so the manager and other employees must pursue one goal: raising the standard of performance of the team. [7]

Trust for the construction of a high-performing teams, and the manager has the mission to provide employees a positive environment in which to express their opinions, to work and to develop communication skills and problem-solving of problems. An effective manager knows that the decisions to be taken following a detailed analysis, in consultation with the team and towards thinking of the consequences of his actions. He will always find resources to retire and to weight decisions, even if this entails allocating more time for testing, feedback, analysis and debates. A thorough analysis of the internal crisis situations prevents and facilitates an understanding of the challenges faced by the company. The mission for managers in any organization is to motivate employees to success, to inspire, to guide and to keep their team together. Beyond fulfilling financial requirements and the need for acknowledgement of work employees, managers must

ensure that the efficiency of labour. Once aware of their responsibility, leaders can turn a group of employees with average performance in a team of loyal and committed professionals. [8]

At the level of organizations, it is evident that efficiency is a priority, getting economic-financial performance, expressed by means of indicators and indices, being the consequence of managerial performance, general and specific. We note, in this context, priority indicators of qualitative (efficiency) relating to: productive work, health, average salary, average gain/share etc. Management and pursuit are not an end in itself, but a decisive factor of amplification of the efficiency and effectiveness of the organization. To get the level of performance it is necessary an high performance management, provided by professional managers. Reengineering the management process has as a result a high performance management and, at the same time preparing for a “land” one sure to a higher stage, that of knowledge management.

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THE FOOD RUSH. A SECURITY RISK AND A CAUSE FOR INTERNATIONAL INTERVENTION

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Access to food is more than ever a question of interest. The world needs to produce at least 50% more food to feed 9 billion people by 2050. The land, biodiversity, oceans, forests, and other forms of natural capital are being depleted at unprecedented rates. Unless we change how we grow our food and manage our natural capital, food security – especially for the world's poorest – will be at risk. In this context we expect that the struggle for food to generate migration, conflicts and, why not, international intervention defined by the new Copenhagen School of Security Studies paradigm. Since March 2008 governments, UN agencies and many social movements have adopted positions on the causes of the food crisis and the means to address it. Unfortunately, while these parties are trying to coordinate their activities and suggest new approaches, the old recipes for producing more food are often brought up. Contradictory proposals are made and the thought given to the causes underlying hunger and the food crisis (social, economic and political discrimination and exclusion) has gone largely unheeded. The first Millennium Development Goal, which called for cutting the percentage of hungry people by half by 2015, is clearly out of reach. But the food crisis might lead to a new world food order.

Key words: globalization, international intervention, food security, world order, conflicts, migration, security risk.

1. INTRODUCTION

Global debate on food security intensifies, more in some corners of the globe as there appeared internal conflicts, population growth, and resource depletion.

Considerable differences in development between countries of different continents accentuate disparities for population which are

facing with issues in accessing to food. Even though aid programs implemented by governments or international organizations in order to reduce the differences are not enough to ensure food security for all people, first access to food and then a proper diet.

The problem is not only unequal distribution of resources in the world, but also notable differences

in the level of development, level of education, how existing natural capital is managed and lack of local strategies dedicated to this sector.

Food security is a topic of interest because they are expected major global risks unless measures are taken. Fight for food triggered and will trigger increasingly deeper, starvation, internal and international conflicts, waves of migration, and various forms of international interventions generated by actors of the international community.

A real challenge in terms of food security is the difference of approach, once a part of completely different contexts states and regions are facing. Mention the US and Europe each face different realities; African countries facing starvation, the Central Asian countries that deals with the resources scarcity.

Food security has various meanings in the specialty literature:

- Targets providing worldwide access to a healthy food;
- Targets ensuring food availability;
- Ensures and respects the right of any individual to have access to food and the desire to have a healthy diet;
- Is the basic component of social stability, economic and explicit national security of a state (either with or without agricultural potential) (Moseley, W.G. and B.I. Logan. 2005)

Food security landscape has two main components: food policy and nutrition policy. Food policy occurs on two levels: one on the supply and quality, and the other reported directly to the consumer and consumption capacity.

These interventions relate to one or more of the following objectives:

- Setting food prices to the fluctuations of international prices;
- Ensuring a particular nutritional level of the population undernourished;
- Controlling food prices;
- Limitation of inflationary pressure by controlling food prices.

Therefore, food policies comprise government and legislative measures, regulatory, administrative and financial measures, with clear objectives defined in advance. Nutritional policy aimed at ensuring a balance between physiological needs of food consumption and intake of nutrients to meet them.

The source of legitimacy of a state is its ability to provide security or to protect and maintain the rights of its citizens and to ensure the perfect environment to satisfy all needs. In the pyramid of needs expressed by Abraham Maslow, the need for security is placed on the second level of importance immediately after physiological needs.

Causes and influences that threaten food security are:

- Global warming, desertification and land degradation;
- Inefficient use of the agricultural potential in favor of excessive imports, the lack of a national strategy for food security;
- The global economic crisis;
- Lack of independence of food security;
- Different levels of development between regions and countries;

- The volatility of prices;
- Lack of immediate actions, lack of coherent policies;
- Lack of control and traceability of the food chain;
- Lack of control and practical actions at global level;

Food safety is closely linked to economic growth and social progress, as well as with political stability and peace.

For many experts, the food security of a country is the most important dimension of national security.

A state has national security only when it has food security and only when it has sufficient availability of food and agricultural products able to meet the requirements of food for all inhabitants included within its borders and to ensure, at the same time required stocks to feed animals and water in case of natural disasters, war, crises, etc.

Not being able to assure food security can generate very quickly, internally, severe convulsions and social tensions, may damage the physical and mental health of the population, create conditions for economic and political instability, and externally may attract diplomatic pressure with economic and political undesirable and dangerous effects to national security.

2. GLOBALIZATION AND THE FOOD CRISIS

The food crisis it seems that exploded overnight, bringing fears about being too many people in the

world. According to the Food and Agriculture Organization of the United Nations studies there were record grain harvests in 2007. The main conclusion is that there is more than enough food in the world to feed everyone. In fact, over the last 20 years, world food production has risen steadily at over 2% a year, while the rate of global population growth has dropped to 1.14% a year. Population is not outstripping food supply. The problem is that the people are too poor to buy the food that is available.

The executive director of World Hunger Program, Josette Sheeran, said: *"We're seeing more people hungry and at greater numbers than before. There is food on the shelves but people are priced out of the market."* (Holt Giménez & Peabody, 2008).

In the first place we must taking into account that the food crisis is a symptom of a food system in crisis. Bad weather, high oil prices, agrofuels, and speculation are only the proximate causes of a deeper, systemic problem.

The root cause of the crisis is a global food system that is highly vulnerable to economic and environmental shock. This vulnerability springs from the risks, inequities, and externalities inherent in food systems that are dominated by a global industrial agri-foods complex. Built over the past half-century – largely with public funds for grain subsidies, foreign

aid, and international agricultural development – the industrial agri-foods complex is made up of multinational grain traders, giant seed, chemical, and fertilizer corporations, processors, and global supermarket chains.

On the other hand “*Climate change is exacerbating more risks than ever before in terms of water crises, food shortages, constrained economic growth, weaker societal cohesion and increased security risks. Meanwhile, geopolitical instability is exposing businesses to cancelled projects, revoked licenses, interrupted production, damaged assets and restricted movement of funds across borders. These political*

conflicts are in turn making the challenge of climate change all the more insurmountable – reducing the potential for political co-operation, as well as diverting resource, innovation and time away from climate change resilience and prevention,” said Cecilia Reyes, Chief Risk Officer of Zurich Insurance Group.

The 11th edition of Global Risks Report 2016 through its analysis of the interconnections between risks, also explores three areas where global risks have the potential to impact society. These are the concept of the “(dis)empowered citizen”, the impact of climate change on food security, and the potential of pandemics to threaten social cohesion.

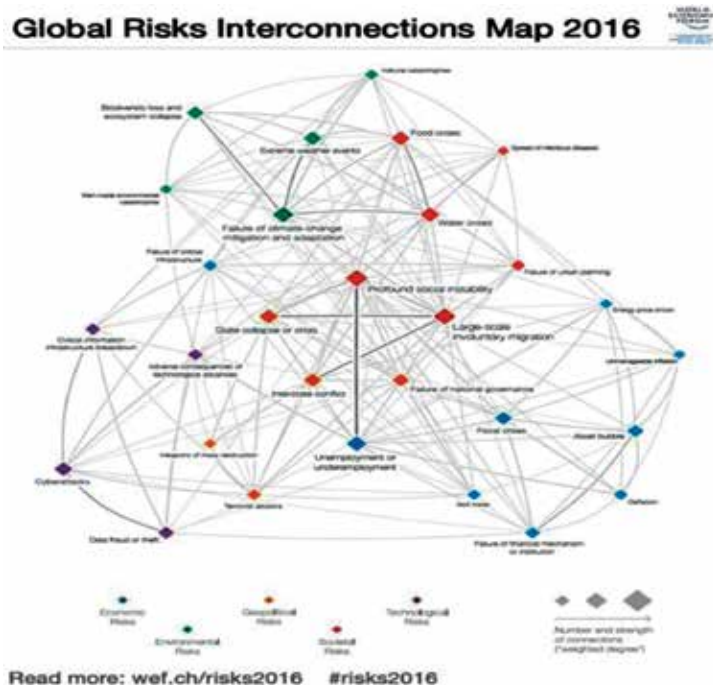


Fig. no. 1. Global Risks Interconnections Map 2016
Source: World Economic Forum, 2016

Knowledge of such inter-connections is important in helping leaders prioritize areas for action, as well as to plan for contingencies. *"We know climate change is exacerbating other risks such as migration and security, but these are by no means the only interconnections that are rapidly evolving to impact societies, often in unpredictable ways. Mitigation measures against such risks are important, but adaptation is vital,"* said Margareta Drzeniek-Hanouz, Head of the Global Competitiveness and Risks, World Economic Forum.

3. THE FOOD RUSH: A CAUSE FOR INTERNATIONAL INTERVENTION

The types of interventions international caused by the global food issues is about creating policies and comprehensive programs or took the form of humanitarian aid, grants and support through financial aid programs. A complex picture of the types of intervention mentioned above it provides the EU with the Common Agricultural Policy, a policy programmed to be reformed and expects a new version responding to new global, political, economic, demographic risk. In this regard, about the future CAP, Tassos Haniotis explained that it is necessary to be found a balance between maintaining

competitiveness and environmental protection, between subsidiarity and simplification, between job creation and growth.

We can see that these forms of intervention aimed at treating symptoms and not the cause, nor does propose solutions to eliminate or at least minimize the risks.

The food system landscape has two major parts – the industrial North and the South. Having that in mind, the issues are different, according to the specificity of each region.

But, the common point is that if is wanted to solve the food crisis is need to redesign all the food system. That entails re-regulating the market, reducing the oligopolistic power of the agri-foods corporations, and building agro-ecologically resilient family agriculture. It is important to make food affordable by turning the food system into an engine for local economic development in both rural and urban areas.

These tasks are not mutually exclusive—it is nor necessary to wait to fix the food system before making food affordable, marketing fair, or farming viable. In fact, the three need to work in concert, complementing each other.

On the other hand, over the next 35 years, population growth, reduced access to fresh water and declining arable land will place mounting pressure on global food and water security. The greatest pressure will

be on those countries least equipped to deal with these challenges, increasing the risk of both inter- and intra-state conflict.

Food and water insecurity is not necessarily about a dearth of resources – we have enough food and water globally to meet demand. But demand for food and water is expected to outpace the supply of globally available resources. The majority of the world's population growth to 2050 is expected to occur in Asia and Sub-Saharan Africa, but both regions are ill-equipped at present to access the required resources and meet the basic needs of their growing populations.

In his book, *The Coming Famine*, Julian Cribb writes that the wars of the 21st century will involve failed states, rebellions, civil conflict, insurgencies and terrorism. All of these elements will be triggered by competition over dwindling resources, rather than global conflicts with clearly defined sides (Cribb, 2011).

Conflict is likely to be driven by a number of factors and difficult to address through diplomacy or military force. Population pressures, changing weather, urbanization, migration, a loss of arable land and freshwater resources are just some of the multi-layered stressors present

in many states. Future inter-state conflict will move further away from the traditional, clear lines of military conflict and more towards economic control and influence.

Food and water insecurity in any part of the world affects everyone. What is ultimately required is unprecedented international cooperation.

It is important to stress that conflicts often occur together with other shocks (for example, other conflicts, natural disasters, price shocks, and so on). The interdependencies between shocks (such as droughts occurring in the context of conflict) often lead to “complex emergencies” (Clemens Breisinger and all, 2014).

For that there is intense discussion about building resilience.

To illustrate how resilience to conflict can be built through food-security policies and programs, the framework in Figure 2 differentiates between national- and household-level food security (Ecker and Breisinger, 2012).

Resilience at the national level is mainly built through policies and investments and is a precondition for resilience at the household level. Household level resilience can be further enhanced through specific programs, either from governments or from international partners.



Fig. no. 2. The conflict resiliency-food security framework
Source: Ecker and Breisinger, 2012

4. CONCLUSIONS – TO GO FROM GLOBAL TO LOCAL

Rebuilding national food economies will require immediate and long-term political commitments from governments. An absolute priority has to be given to domestic food production in order to decrease dependency on the international market. Peasants and small farmers should be encouraged through better prices for their farm products and stable markets to produce food for themselves and their communities. Landless families from rural and urban areas have to get access to land, seeds, and water to produce their own food. This means increased

investment in peasant and farmer-based food production for domestic markets.

Contrary to conventional wisdom, agro-ecological farms, growing throughout the world, are highly productive and – according to a path-breaking study from the University of Michigan – can easily provide us with all the food we need. As industrialized farming and free trade regimes fail us, these approaches will be the keys for building resilience back into a dysfunctional global food system.

The democratization of food systems requires a social change in the way it is managed food. It is necessary to reduce the political influence of the industrial agri-foods

complex and strengthen antitrust laws and enforcement. These changes will require both changes in practices and in legislation in order to establish a regulatory context for sustainable and equitable food systems. These changes also depend on the degree of political will on the part of business, on legislators, and on communities.

All this conclusions could be translated by less international intervention in agri-food sector. Multinational companies, states, international organizations have to have the willingness to sustain this solutions in order to have all a winning game.

The future will always be a mystery, but one can gain insights by thinking about these trends in terms of scenarios and alternative futures.

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AGENDA 2030. NEW PERSPECTIVES

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Agenda 2030 has set up a global partnership revitalized which has facilitating involvement intensive worldwide in support of the implementation of all objectives and targets, bringing together governments, civil society, private sector, United Nations system and other stakeholders and mobilizing all available resources .

Key words: *United Nations (UN), Agenda 2030, World Bank, International Monetary Fund (IMF).*

1. INTRODUCTION

According to the latest reports from 2015 of the United Nations, World Bank and OECD Planet Earth goes through a time of great and complex challenges for sustainable development. Billions of people live in poverty and are deprived of a dignified life and the gap between rich and poor has widened. Globally, were registered data regarding the growth of the various inequalities in the various regions within countries and between the countries.

In recent years at international level unemployment has become a major concern. In all fields, was recorded huge discrepancies and gender inequality remain a reality and a challenge. Number of times that are classified as increased global health threats and natural disasters are more frequent and more intense.

Human progress achieved in recent decades is threatened by a

series of conflicts that propagates and multiplies in various regions of the world, often accompanied by violent extremism and terrorism, followed by humanitarian crises caused by forced displacement of persons.

The list of challenges facing humanity is complemented by natural resource depletion through mining disinterested and negative effects of environmental degradation including desertification, land degradation, freshwater scarcity and biodiversity loss. Climate change is one of the biggest challenges of our time and its negative effects undermine the capacity of all countries to achieve sustainable development. Increases in global temperature, sea level rise, ocean acidification and the presence of other effects of climate change seriously affect coastal and low-lying coastal countries, including least developed countries and small island states in the developing world. It can be concluded without

dramatize the reality of the survival of many societies and ecosystems of the planet is in danger. (Gilpin, R. 2016).

The major objectives of this work lies in stressing the need for global a new Agenda 2030, the rationale for achieving it and motivations United Nations have adopted in August 2015 but especially bringing to the attention of the international community a new way by which can work together in terms of a global commitment to a different future for people and planet - one that brings humanity on the path of development.

2. THE NECESSITY FOR A NEW AGENDA IN 2030

This Agenda is considered by its initiators, UN representatives, an action plan for people, planet and prosperity. There is an international determination to achieve a common insurance so that all human beings to achieve their potential and equal in dignity and in a healthy environment. A world with universal and equitable access to quality education at all levels, health care and social protection, which are reaffirmed international commitments regarding human rights to safe drinking water, sanitation and hygiene. A world where human habitats are safe, strong and sustainable and that are sufficient and nutritious food, safe products are affordable. There is also a universal energy access affordable, reliable and sustainable. To implement this agenda is the need to mobilize the

necessary means through a global partnership revived for sustainable development, based on a spirit of global solidarity strengthened, particularly focused on the needs of the poorest and most vulnerable countries and involving all countries, all parts of society and all people interested.

Universal objectives set out in Agenda goals are integrated, indivisible corresponding to the three dimensions of sustainable development and involving the entire world, developed countries and developing.

17 Objectives of Sustainable Development contained in Agenda 2030 are:

1. Eradicate poverty in all its forms globally;
2. Eradicate hunger, achieving food security and improving nutrition, promoting sustainable agriculture and sustainable;
3. Creating and ensuring a healthy life and promote well-being for all people at all ages;
4. Achieving and ensuring quality education and promoting inclusive and equitable educational opportunity throughout life for all people;
5. Achieving gender equality, promoting and supporting the development of women and girls;
6. Ensuring an adequate and sustainable water management drinking for everyone;
7. Ensuring access to sustainable energy sources, renewable, safe and cheap;

8. Promoting sustained economic growth inclusive, sustainable, full and productive employment, decent work for all people;

9. Construction of infrastructure networks, promoting inclusive and sustainable industrialization based on innovation;

10. Reducing inequality between countries;

11. Construction of cities and human settlements safer, inclusive, sustainable;

12. Ensure a sustainable model of production and consumption;

13. Take urgent action to combat climate change and their impact;

14. Conservation and sustainable use of the oceans, seas and marine resources for sustainable development;

15. Protection, reviving and promoting sustainable use of terrestrial ecosystems, sustainable management of forests, combating desertification and land degradation and halting biodiversity protection;

16. Promote peaceful and inclusive societies for sustainable development, access to justice to all people and building effective institutions at all levels of functional and inclusive;

17. Strengthening of implementation and revitalization of the Global Partnership for Sustainable Development.

The new Sustainable Development Goals have entered into force since 01 January 2016 and will guide the decisions of states in the next 15 years. According to UN experts, all

signatories will seek to implement Agenda 2030 at regional level and in their own countries. At the same time, will comply with national policies for sustainable and inclusive economic growth, particularly in developing countries, policies that will further connect the relevant international rules and commitments. It will emphasize the importance of economic integration and inter regional and subregional dimensions of sustainable development. Programs that will develop regional and subregional will have an important role in facilitating the effective transfer of strategies for economic development and implementation of policies and actions at national level.

Among the motivations adoption of Agenda 2030 highlights the uniqueness scopes covering all countries, taking into account different national realities, capacities and levels of development and respecting national policies and priorities.

In our view, the most relevant principle of Agenda 2030 is **to establish a global framework again to eradicate poverty and achieve sustainable development by 2030, based on the achievement of the Millennium Development Goals (MDGs) which were agreed in 2000. the United Nations has taken a historic decision in adopting this Agenda 2030 which is considered to be complex, large scale and people-centered and universal goals for transformation.** Action Plan and implementation is designed

for a duration of 15 years and covers topics ranging from education to environment and sustainable development objectives are intended to be implemented by both countries in developing as well as developed ones.

2.1. Millennium Development Goals (MDGs) in 2000 and the results globally and in the European Union

In 2000 it was implemented by the international community Objectives of the Millennium Development Goals (MDGs) which provided an important framework for development: eradicate poverty, hunger, disease, gender inequality, access to water and sanitation and ability to improve the lives of people in developing countries.

These objectives have guided the Millennium Development Goals and development policy of the European Union for 15 years, and the Union has made an important contribution in achieving objectives. The EU and its Member States are collectively one of the largest donors of development funds in the world so far, contributing 58 billion euros in 2014 UN and OECD reports on eradicating extreme poverty and hunger, noted that more than 1 billion people were lifted out of extreme poverty since 1990 MDG targets of halving the proportion of people living in extreme poverty and hunger were met ahead of schedule. However, the world is far from eradicating extreme poverty and

hunger. In 2015, an estimated 836 million people still live in extreme poverty and 795 million still suffer from hunger.

Sustainable agriculture development and food security, the European Union is considered one of the major contributors worldwide. It supports more than 60 countries in their efforts to improve food security and nutrition, economic growth based on sustainable farming systems, which can help to ensure political stability.

Achieve universal primary education was another ODM pursued globally during 2000 -2015 and in developing countries primary enrollment rate has reached an estimated 83% in 2000 and to 91% in 2015 according to UN experts their reports. According to the same sources, the number of children not attending school has fallen by almost half since 2000, and the literacy rate for young people aged 15 to 24 increased from 83% in 1990 to 91% in 2015.

UNICEF and UNESCO statistics showed that in 2015 the 57 million primary-age children worldwide, more than half of them live in conflict-prone areas and are not yet in school.

There were also advances over the past two decades and to promoting gender equality and developing the capacity of women and girls through education, employment and political representation.

In the case of European Union, since 2004 contribution on promoting gender equality is reported statistics

through 300,000 new female students who were enrolled in studies in higher education by 2015 and more than 18,000 female students in education higher which took part in EU mobility programs such as Erasmus Mundus, which offers scholarships to students from developing countries to study in Europe.

Between 2000- 2015 according to European Commission statistics were registered unprecedented progress in reducing deaths of children under five. The mortality rate under the age of five has halved since 1990 from 90 deaths by 43 deaths per 1,000 live births in 2015. Effective treatment at affordable prices was improved service delivery and political commitments have contributed to the results presented above. However, progress has been insufficient to achieve the objective of reducing by two thirds of deaths among children fewer than five years until 2015 and still exists in global value 16,000 children dying daily.

European Union supported the health sector in 39 developing countries whose main objective was the child's health. He made an important contribution by giving financial support to the Global Fund to Fight AIDS, Malaria, Tuberculosis (GFATM) and the Global Alliance for Vaccines and Immunization (GAVI). Thanks to EU support, at least 20 million children were vaccinated against measles between 2004 and 2014. Between the years 2004 to 2012 the Union has helped build or renovate to over 8,500 units

in global health. Significant progress has been made in reducing maternal deaths and ensures universal access to reproductive health. Although maternal mortality rate internationally was reduced by 50% in the period 1990-2015, the maternal mortality MDG in internationally provided for a reduction of this indicator by 75% by 2015.

There are profound health disparities among groups that are vulnerable due to their level of education, place of residence, age and economic status. Also, the capacity of each country must be strengthened to help reduce inequalities in availability and quality of health-related acts and the registration of births and deaths.

Globally governments involved in MDG supported the development and implementation of national health policies and strategies; and strengthening health systems and specialized information to improve access to maternal health, universal access to quality and affordable human reproduction.

UN statistics show that EU support in the period 2004-2012 was over 7.5 million births attended by skilled health personnel between and almost 17 million consultations on reproductive health that took place during this period. Regarding the prevention and combating the global HIV / AIDS and malaria, the same reports reveal that between 2000 and 2013 the number of new cases of HIV infection fell by 40%, from 3.5 million 2.1 million cases.

In the European Union, 570,000 people with advanced HIV infection receiving antiretroviral combination therapy for the same period.

Expanding global healthcare networks antimalarial took effect during 2000 - 2015 to avoid over 6.2 million deaths from malaria among children under five in sub-Saharan Africa. They were sent and distributed in this area of about 22.6 million insecticide-treated nets EU. Action at the international level for the prevention, diagnosis and treatment of tuberculosis has saved a total of 37 million lives between the years 2000 to 2013.

The European Union has allocated substantial financial resources for disease control through country programs through the Global Fund to Fight AIDS, Tuberculosis and Malaria, and through research programs such as the Partnership on Clinical Research in European countries and countries Developing.

The global objectives on access to drinking water for a large number of people living in slums were made before the deadline, but the loss of environmental resources and biodiversity has not been halted. MDG on ensuring drinking water was fulfilled in 2010, five years ahead of schedule. But much remains to be done: 748 million people - especially the poor and marginalized - still lack access to improved water sources; almost half of them live in Sub-Saharan Africa.

Regarding the international sanitation services has improved

sanitation increased from 49% in 1990 to 64% in 2012. But more than a third of the world's population - about 2.5 billion people still lack access to sanitation installation.

The EU supports partner countries to promote the sustainable management of natural resources, in particular: land, forests, coastal and fisheries for ecosystem protection and combating desertification. In 2007, the Union launched the Global Climate Change Alliance (GCCA) in order to strengthen international cooperation on climate change. It currently supports 51 programs in 38 countries and has allocated 316,5milioane euro. Since 2004 through the assistance, the European Union has provided access to quality drinking water to more than 74 million people and provided sanitation services to over 27 million people.

ODM have established a genuine global partnership to achieve the overall objectives. Official development assistance (ODA) from developed countries was increased by 66% in real terms between 2000 and 2014. In 2014, 79% of imports from developing countries were developed duty free. At the same time, developing countries' access to markets rose.

The European Union continues to be a major donor in the world, providing official development assistance (ODA) amounting to 582 billion in 2014 and pledging to reach the UN target to raise the level of ODA, representing 0.7% of gross

national income (GNI) in the time of Agenda 2030.

International Conference on Financing for Development in Addis Ababa, gave a period bold and comprehensive measures with the means of implementing the 2030 Agenda for financing sustainable development, ensuring policy coherence, promoting good governance and national actions and renewed efforts to mobilize innovation, science and technology for sustainable development.

2.2. Agenda 2030. Sustainable Development

In August 2015 Agenda 2030 was agreed by consensus informally to the United Nations and was sent to be formally adopted by the General Assembly.

Adoption of Agenda 2030 marked the culmination of a process based on inclusion that began in 2012 (formerly known as “development agenda post-2015”), which was characterized by participation unprecedented civil society and other parties concerned. Agenda is the result of the Millennium Development Goals (MDGs), the UN Conference on Sustainable Development Rio + 20, as well as conferences on financing for development. It also contributed to the negotiations of the new global agreement on climate change, COP21, which ended in Paris. New Agenda in 2030 trying to redefine how the international community work together in terms of a global commitment to a different future for

people and planet - one that brings humanity on the path of sustainable development.

In this context, it should be noted that although the objectives of the Millennium Development Goals (MDGs) aimed at countries in developing Agenda 2030 is the first global agreement establishing an action agenda comprehensive and universal vocation, which will affect all countries, including their internal policies.

The plan was designed for a period of 15 years, with themes ranging from education to environment and sustainable development objectives are intended to be implemented by both developing countries and the developed ones. Agenda 2030 includes also Agenda for Action Addis Ababa United Nations, adopted in July 2015 which sets out the various means necessary for the implementation of Agenda 2030, including domestic resources, private financing and Official Development Assistance (ODA).

Currently, Agenda 2030 includes a set of 17 Aims for Sustainable Development - SDO (Sustainable Development Goals -SDG) and 169 specific objectives, mobilizing all interested countries and global players: parliament, government, cities, rural areas, entrepreneurs, large corporations, civil society, academia and scientists.

According to international experts the UN new sustainable development goals and objectives associated will ensure balance between the

three dimensions of sustainable development - environmental, social and economic - covering areas such as poverty, inequality, health, food security, sustainable consumption and production growth, employment, infrastructure, sustainable management of natural resources, climate change and gender equality, peaceful and inclusive societies, access to justice and responsible institutions.

Along with the continuous development priorities such as poverty eradication, health, education and food security and nutrition agenda sets targets a wide range of economic, social and environmental. Also promises more peaceful and inclusive societies. A very important aspect is that it defines the means of implementation. Reflecting the integrated approach in the table below, we can see that there are profound interconnections and cross members for many new goals and targets.

2.3. Agenda 2030: launch of its implications

The new Sustainable Development Goals have entered into force since 01 January 2016 and will guide the decisions of states in the next 15 years.

The European Union was committed to implement this agenda and Union by helping poor countries, promoting gender equality, improving environmental conditions, biodiversity and business. An example is the EU initiatives on its strategy in the field of circular economy, designed to tackle more

sustainable patterns of production and consumption, but also its external policies by supporting the efforts of implementation in other countries, especially those whose needs are most urgent.

Global Summit in 2015 in Mexico City, the OGP decided completion of the Open Government Declaration goals of sustainable development Agenda 2030 states must commit themselves to action plans promote its principles.

Agenda 2030 is based on the inclusion and active participation by including all stakeholders in decision-making processes at all levels. These elements are essential for ensuring respect for the commitments and that it will act at the joint. Vulnerable and underrepresented groups should be actively involved in decision making as partners and rights holders, but also as a source of knowledge.

Regarding the eradication of poverty by 2030 was intended to remove all dimensions and shapes global poverty, even extreme poverty which is currently represented by the number of people living on less than 1.25 US dollars daily. All people of the world must have a minimum standard of living, including social protection system. It sets the goal and eradicating hunger and ensuring food security as a priority, halting all forms of malnutrition. In pursuing this objective, an important role will continue to Global Food Security Committee and the Rome Declaration on Action and Nutrition Programs.

The Agenda was agreed specific objective which states that by 2025, at an international level to be over death of children under five years is due to hunger, to pay particular attention to the needs of nutrition adolescent girls, pregnant and nursing women and older people.

It will allocate resources by 2030 for developing sustainable agriculture, rural areas, local producers, fisheries, small farms -in particular those developed by women - in developing countries and especially in underdeveloped countries. It is estimated doubling production and incomes of these types of farms due facilitate easy and equal access to land, resources and other productive inputs, knowledge, financial services, markets and opportunities that bring extra value.

Another specific objective of stopping hunger refers to support 2030 food production systems and implementing resilience to agriculture leading to increased production and productivity safeguarding the maintenance of ecosystems. Thus, in this way will strengthen resilience to climate change, drought, floods and other disasters achieving a gradual rise in land quality and soil. Globally it is foreseen that by 2020 in sustainable agriculture to preserve the diversity of plant breeding and seed through a special management of national banks, regional and international, allowing access to a fair and equitable exchange and the benefits that come the use of genetic resources, traditional knowledge

sharing provided by international treaties.

Also focus on increasing investments, including international cooperation in rural infrastructure agricultural research, technology development and seed banks to increase agricultural production in developing countries and especially in underdeveloped countries. Another direction is the one that refers to correct and prevent restrictions on agricultural markets, including the elimination of all forms of export subsidies and all related measures affecting exports, resulting from the agreement respecting the mandate of the Doha Round. It will adopt a series of measures that will ensure a better functioning of markets for consumer goods and their derivatives and facilitating access real-time market specific information, including those relating to market food reserves to limit volatility in their prices .

The objective of sustainable development which concerns the establishment and ensure a healthy life and promote well-being for all people at all ages is primarily envisaged that by 2030 globally to reduce the maternal mortality rate and reach in 70-100000 births, and infant mortality rates to go below 12 per 1,000 live births in children under 5 years this ratio to fall below 25 per 1,000 live births.

UN experts who participated in drafting the Agenda 2030 concluded that the number and quality of the global population may be the result of a strategy reproductive

health which should be properly implemented in national strategies and programs through services including: education, information and planning Family.

Achieving universal health protections include financial risks on people that can be controlled through access to health services: essential, reliable and quality; and easy access to necessary medicines and vaccines. In this regard will be sustained research and development of vaccines for communicable diseases and non-communicable affecting developing countries, will facilitate access to medicines and vaccines according to the Doha Declaration on the Agreement Trade Related Aspects of Intellectual Property Rights (TRIPS) and Health public which supports the rights of developed countries and developing the use of all resources to protect public health.

By 2030 it was agreed to halve the number of people who fall ill or die from water, air, soil contamination and pollution. An important role in this regard will play the consolidation and implementation of the World Health Organization; will pursue further implementation of universally Tobacco Control Program. Education is a key factor in the ability to participate effectively in the development and acceptance of ownership of development processes. All stakeholders at all levels, private sector, civil society, scientific communities, including indigenous people Governments have a role to play in the implementation

of Agenda 2030 must participate and contribute. To this end, support the political leadership by heads of state and government is very important.

The specific objectives aimed at achieving and ensuring a quality education inclusive and equitable provide global insurance by 2030 all boys and girls have access to a quality development in childhood and preschool education better in order to ensure a fair start primary and secondary school education to prepare them for enhanced learning in a trade specialization required to easily insert them into society. Regarding adults, men and women, will facilitate equal access to technical specializations, vocational and tertiary education, including university. It also plans to increase the number of young people and adults with relevant specializations, including technical and vocational specializations needed employment in decent jobs and companies. Regarding the increasing number of school globally, 2020 is set target of doubling this indicator in developing countries and the poor countries. For African countries developed or developing, the focus is on increasing the number of young people attending university specializations including: vocational, technical, communications and information technology, engineering and scientific programs.

It aims to achieve fundamental changes in the way societies produce and consume goods and services.

Governments, international organizations, businesses, individuals and other stakeholders will be involved to contribute to changing patterns of unsustainable consumption and production, including by mobilizing all sources of financial and technical assistance to strengthen the countries of scientific development, technological and innovative towards more sustainable consumption and production. (McMichael, 2016).

According to Agenda 2030 will be internationally supported an increase in economic productivity through diversification based on technological innovation, added value including mobilization of skilled labor sectors, e.g. IT. It will promote development policies oriented productive activities, creative entrepreneurship, creativity and innovation and encourage the development of micro and medium companies through access to financial services. It will be supported implementation of the Framework X programs on sustainable production and consumption patterns. Globally developed countries will lead and will implement these programs, followed by all other countries, given the development and capabilities of developing countries.

Regarding employment rights, safety and security environment in which the works will be ensured international framework for all workers, including migrant workers, particularly migrant women in all fields. Tourism 2030 Agenda aims to promote sustainable tourism and

sustainable development creates jobs and promotes local culture and products.

An important role in achieving these objectives will increase the capacity of local financial institutions that will encourage and expand the banking, insurance and financial services for all people. In this respect are essential actions that provide increased aid and trade support target developed countries and the developing and underdeveloped as through the integration of commercial treaties and programs of technical assistance to underdeveloped countries. Developing global strategy for youth employment, known as the Global Job Pact of the International Labor Organization, it is designed to implement and operate until 2020.

The global nature of climate change calls for the widest possible international cooperation to reduce gas emissions exacerbate the greenhouse world and addressing adaptation to the adverse effects of climate change. There is a deep concern about the significant gap between the cumulative effect of global annual emissions of greenhouse gases by 2020 and ways to reduce gas emission units consistent with a possible chance of keeping global average temperature increase below 2 degrees Celsius, or 1.5 degrees Celsius above pre industrial.

It is known that in each country there are different approaches, visions, models and tools available according to national circumstances

and priorities to achieve sustainable development. In this sense, in the context of sustainable development and poverty eradication, green economy is regarded as one of the most important tools available which could provide options for policy, without this to be a rigid set of rules. They should contribute to sustained economic growth, enhancing social inclusion, improving human welfare and creating opportunities for employment and decent work for all, while maintaining the healthy functioning of ecosystems Earth. Implementation of policy green economy by countries trying to apply for the transition towards sustainable development must be carried out as a joint action overall, but while each country must choose an appropriate approach in line with the development plans sustainable national strategies and priorities. According to UN analysts, application of green economy will increase the capacity of states to manage natural resources sustainably, reduce negative environmental impacts, increase resource efficiency and reduce waste. Globally, international organizations campaigning for the urgent adoption of sustainable production and consumption and promote environmental sustainability aimed at conservation and sustainable use of biodiversity and ecosystems, regeneration of natural resources and promoting equitable global growth sustained and inclusive growth.

Sustainable Development Goal that relates to reducing inequality

between countries requires that by 2030 to achieve and sustain basic income growth of the population by 40% compared to the national average. It is important to promote and implement social inclusion, economic and political life for all men without distinction based on age, sex, disability, race, ethnic origin, religion or economic status. It also aims to ensure equal opportunities and reducing inequality arising from policies, laws and discriminatory practices and promote legislation in this regard, Policies and appropriate practices. In this regard, they recommended the adoption of policies, especially fiscal, social protection progressively lead to the achievement of equality. Improving regulation and monitoring of financial markets and institutions are actions that can help correct implementation of the strategy to reduce the inequality between countries globally.

The United Nations supports the involvement and a better representation of developing countries in international institutions of economic and fiscal decisions overall, because these institutions more credible and more appropriate decisions, legitimate. A special role is played by implementing special and differentiated terms for developing countries, particularly the less developed countries, the WTO Agreements. It also encourages the development of official financial assistance and financial flows, including foreign direct investment to countries in need, particularly

in developing countries, African countries and island countries in need of development in accordance with national plans and programs.

International migration is considered by the signatories of Agenda 2030 as a positive element in inclusive growth and sustainable development. This is considered a multidimensional reality of major importance for developing countries of origin, transit and destination, requiring consistent and comprehensive answers. Therefore seeks international cooperation to ensure safe migration, orderly and regular involving full respect for human rights and humane treatment of migrants, regardless of their migration, refugees and displaced persons. Such cooperation will allow a strengthening of the resilience of local communities to refugees, particularly in developing countries. Maintain the right of migrants to return to their country of citizenship, where they must be received and supported properly. Till the year 2030 was established the specific objective of 3% cost reduction for the transactions made by migrant remittances. (Walsh, 2016).

The objective of Sustainable Development Agenda 2030 which relates to strengthening of implementation and revitalization of the Global Partnership for Sustainable Development focuses on three areas: finance, technology and component includes capacity-building and trade.

Under the direction finance it is to strengthen domestic resource

mobilization, including with international aid for the country's development in order to increase internal capacity to collect taxes and revenues. Developing countries is an objective to fully meet commitments of the international assistance for development, which provides for many developed countries fulfill the target of devoting 0.7% of national budget revenue for official assistance (ODA / GNI) needed development country of 0.15 -0.20% (ODA / GNI) for the underdeveloped countries.

It aims to mobilize international financial resources from multiple sources to developing countries. Assisting developing countries will achieve sustainable long-term loans through coordinated policies based on flexible financial loans and restructured external loans adapted, even for highly indebted poor countries to reduce debt stress. It will adopt and implement investment promotion in the underdeveloped countries.

Direction technology globally, an important role will strengthen corridor North-South, South-South and triangular cooperation regional and international access to science, technology and innovation and knowledge sharing through the use of agreements, cooperation and coordination existing mechanisms, particularly within the United Nations by facilitating global technology mechanism. The strategies will be implemented according to international agreements to promote the development, transfer,

dissemination and diffusion of new technologies in high-tech fields. Also, in the underdeveloped countries will operationalize the 2017 information science and technology and banks will be encouraged action on technologies and in particular in the field of information and communication. (Walsh, 2016). Regarding capacity building for sustainable development, Agenda 2030 provides support internationally through areas North-South, South-South and triangular cooperation for the implementation and capacity building efficient, targeted especially to countries emerging to support national plans for implementation of all sustainable development objectives.

Department provides trade promotion functioning multilateral trading system universal, open, non-discriminatory and equitable under the World Trade Organization, respecting the conclusions of the Doha Development Agenda. It aims to increase exports significantly in developing countries and doubling the share of global exports of least developed countries by 2020. In this regard, an important role will be implementing in a timely and sustainable market access without customs duties and without quotas for exports of all underdeveloped countries, in line with the decisions of the World Trade Organization, including by ensuring that preferential rules applicable to imports from LDCs are transparent and simple, and contribute to facilitating market access.

3. CONCLUSIONS AND FUTURE DIRECTIONS

According to representatives of the United Nations, in implementing this new agenda and ambitious objectives and targets can be achieved only with a revitalized global partnership, strengthened and specific means. Global revitalized partnership will facilitate an intensive involvement worldwide in support of the implementation of all objectives and targets, bringing together governments, civil society, private sector, United Nations system and other stakeholders and mobilizing all available resources.

The purposes set out above, an important role will be played by national sustainable development strategies, supported by national funding frameworks integrated. Each country will have primary responsibility for its own economic and social development and the role of national policies and development strategies will be appropriate. Agenda 2030 provides that space policy and leadership of each country should be respected in order to create a climate conducive to implementing policies for poverty eradication and sustainable development, while remaining consistent with relevant international rules and commitments. Thus, national development efforts need to be supported by an enabling international economic environment: coherent and mutually supported global trade, monetary and financial systems and global economic

governance strengthened and improved. The focus is on processes to develop and facilitate the availability of adequate knowledge and technologies globally, as well as capacity building. Globally, it will follow consistent policies and an environment conducive to sustainable development at all levels and by all actors, and revitalize the global partnership for sustainable development.

Romania is among the countries that have signed the Joint Declaration of Governments for Implementation of Agenda 2030. This requires from governments to be more efficient and responsive to the needs of citizens, and for this requires close cooperation between government and civil society. Thus, by participating in OGP and three national plans developed during 2012-2016, they have intensified efforts to promote transparency and fighting corruption, encouraging civic participation in public life and the use of new technologies in the administration, and the actions planned national strategies.

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THE HISTORY AND THE EVOLUTION OF UAVs FROM THE BEGINNING TILL THE 70s

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Unpiloted machines have known an upstanding dependent evolution since those times. The development of UAV produced a change in the concepts regarding the architecture and operations through the evolution of their characteristics and capabilities. Thus, they generated continuous construction designs and a wide range of domains in which UAV's can be used.

Key words: UAV, remotely piloted vehicle, UAV history.

1. INTRODUCTION

The idea of flying preoccupied man since the beginning of time. The wish to fly has been put to test since ancient times (Dedal and Icar), and then to projects with fundamental science (Leonardo da Vinci 1452-1519, Montgolfier 1783). The flight dream never stopped here, it continued with light flyable machines that were easier than air (Santos-Dumont 1899, Zeppelin 1900-1909), then machinery that was heavier than air (Otto Lilienthal, 1890-1896), and then continued in World War I and World War II.

The evolution of unpiloted machines had known the same evolution as the one's with human command, and military conflicts would have proven which is more efficient.

The technological and design evolution influenced the development

of unpiloted machines, thus reaching a complex design over the years, see figure 1.1.

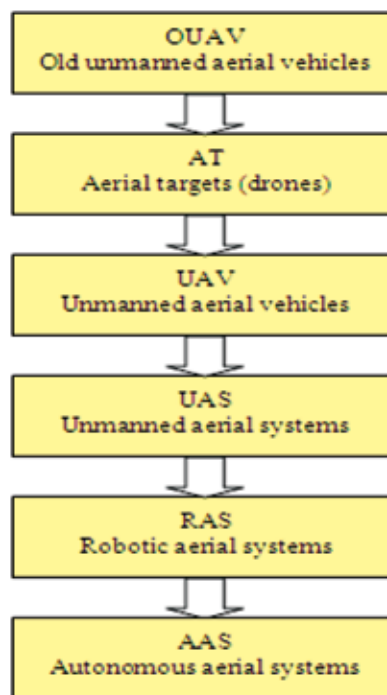


Fig. 1.1. Evolution of the UAV

Specialty references [1, 15 and 28] offer a series of categories of UAV's, the most representative being captured in figure 1.2.

Unpiloted aerial systems have known many names and acronyms throughout history: drones, RPV (remotely piloted vehicle), UAV (unmanned aerial vehicle), UCAV

(uninhabited combat aerial vehicle), FVO (organic aerial vehicle), UCAV /S (uninhabited combat aircraft vehicles/system), RPA (remotely piloted aircraft), RPH (remotely piloted helicopter), aerial robotics, MAV (micro aerial vehicle) and the list goes on [16, 28].

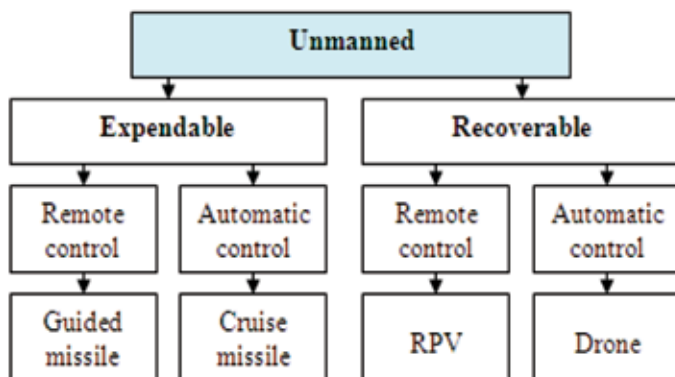


Fig. 1.2. Clasification of the UAV

2. HISTORICAL LANDMARKS

Specialized references provide sufficient cues to highlight the most important moments in the evolution

of unpiloted aerial systems. A number of significant projects from beginning till 1980 can be viewed in Figure 2.1.

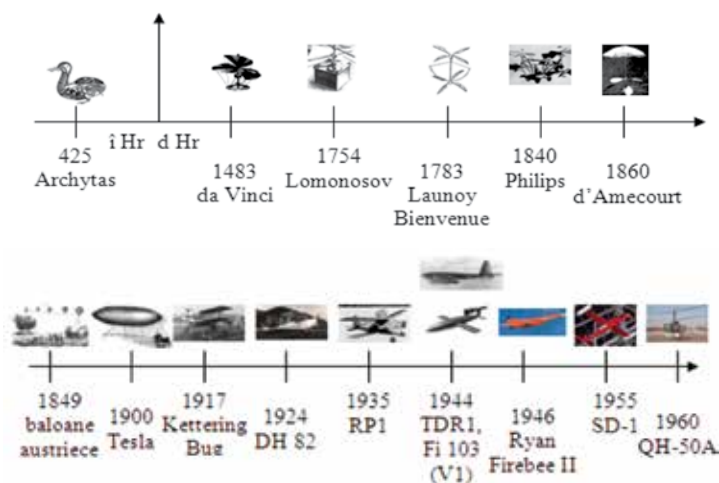


Fig. 2.1. Development of the first projects

2.1. The first projects

The first major contribution to the discovery of autonomous mechanisms occurred during Pythagoras and is attributed to Archytas of Tarantas

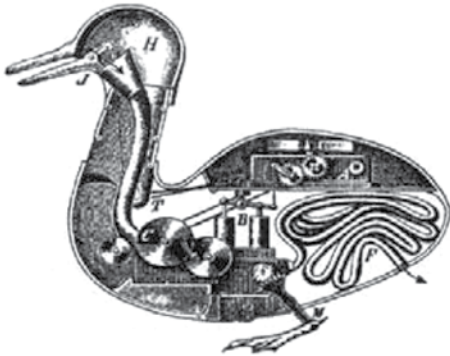


Fig. 2.2. The first UAV, Archytas din Tarantas

In the year 400 BC China has been documented in the idea of a device that achieve vertical flight. Leonardo Da Vinci in 1483, has designed an aircraft capable of vertical rise (see figure 2.3), considered by some experts as the ancestor of today's helicopter [2]. Also in 1508 da Vinci designed a mechanical bird that contained a double crank mechanism that descended along a cable, [3].

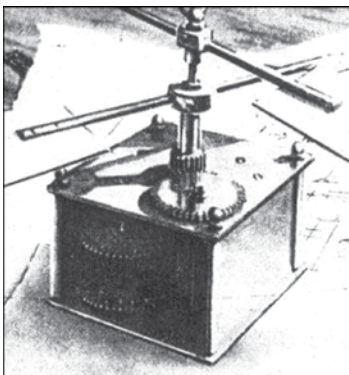


Fig. 2.4. Axial rotor, Lomonosov -1754

(southern Italy). He has implemented a set of geometrical concepts, thus creating in 425 BC the first UAV, as a mechanical bird (see figure 2.2) which can fly by a mechanism placed in the stomach [1].



Fig. 2.3. Leonardo da Vinci's screw

Later in 1754 Mikhail Lomonosov has designed an axial impeller (figure 2.4) and in 1783 Bienvenue Launoy and a counter-model propeller (figure 2.5), based on the Chinese idea [4, 22]. George Cayley designed a carriage convertaplane [1] which remained at the stage of idea due to the propulsion systems gauge which at that time were only available for steam locomotives (Figure 2.6).



Fig. 2.5. Contra-rotating propeller, 1783

In 1840 Horatio Phillips has designed a machine capable of vertical flight routes. It contained a miniature boiler to generate

steam and in 1860 Ponton d'Amécourt flew smaller helicopters models powered by steam (see Figure 2.7) [1, 6].

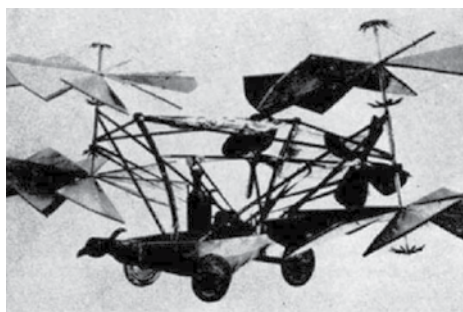


Fig. 2.6. Convertoplan carriage, G. Cayley

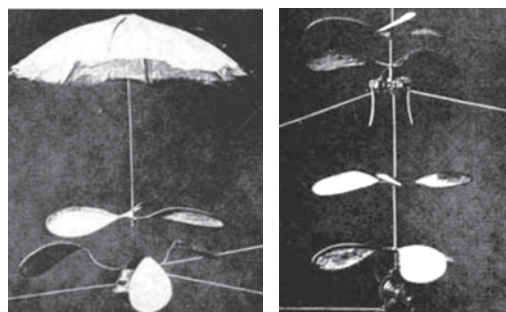


Fig. 2.7. Mini Helicopter, d'Amécourt - 1860

2.2. The first uses of drones machines

In 1849 it was first used an unmanned combat air vehicle when the Austrians attacked the Italian city of Venice with 200 unmanned

balloons (Figure 2.8) loaded with bombs fitted with timer devices. [7].

In 1900 Nikola Tesla (1856-1943) presents the concept of wireless control of the balloon (figure 2.9) and in 1915 described a fleet of unmanned aerial vehicles in aerial combat, [7].



Fig. 2.8. The Austrian balloons, 1849

WWI

In 1916, occurs the earliest attempt to use an unmanned aerial vehicle powered so-called „aerial target” by Archibald Montgomery Low (1888-1956), target planes were controlled from the ground by an automatic Hewitt-Sperry known and as the „flying bomb” [8, 16, 26], which is integrated in the control of a gyroscope (1917).

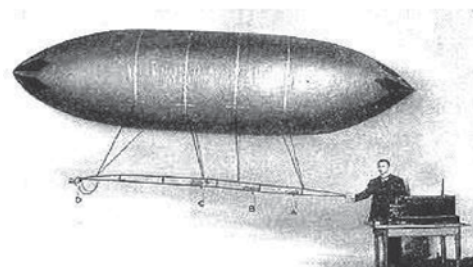


Fig. 2.9. The concept of Nikola Tesla

In 1917 November Kettering Bug plane (Fig. 2.10) called „aerial torpedo”, flew in automatic mode for representatives of the US military, though he was not ready to fight in the war, [21, 22, 23].

In 1917, after the war aircraft conversion took place, Standard E-1 (Figure 2.11) in drone see features in Table 2.1 [10, 27].



Fig. 2.10. The unmanned system- Kettering Bug



Fig. 2.11. Standard E-1

Tabel 2.1 Caracteristici Standard E-1

| | | | |
|-------------------|--------------|-----------|---------|
| Span | 7.31 m | Speed max | 16 km h |
| Mass empty/ total | 520 / 811 kg | Distance | 290 km |
| Engine Rhone | 60 CP | Ceiling | 4420 m |

The interwar period

In 1922's first launch of a target (RAE 1921 - larynx, Figure 2.12) unmanned carried aboard HMS Argus by the US military, [9].

In 1924 September, it held the first successful flight of the same target,

RAE 1921 for 39 minutes and in 1933 the British fleet used for withdrawals of practice and training drones in the Mediterranean. De Havilland DH-target drones 82B Queen Bee (Figure 2.13) were Tiger Moth biplane based ubiquitous, [21, 22, 26, 28].



Fig. 2.12. RAE 1921 - Larynx



Fig. 2.13. De Havilland DH-82B

In 1935 there were developed a series of RPV (Figure 2.14), projects led by Reginald Denny. (1891-1967).

In 1939 the same Reginald Denny introduced a low-cost RC aircraft

for training AA gunners. In the same year, he demonstrates another prototype for U.S. Army:RP-RP-3 and 4 [15, 17].

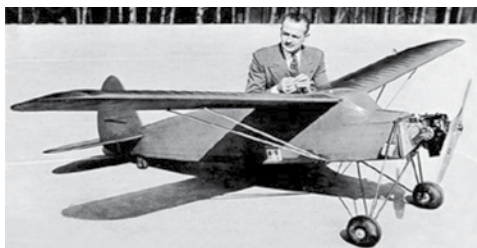


Fig.2.14. RP-1 (Reginald Denny)

The Second World War

June 1944 Germany used Fi-103 (V1) (Figure 2.15) during the Second World War known as cruise missiles, [11, 24, 26].

In October 1944, the first combat mission and use of a UAV is made from Balla islands. Japanese positions were bombed by 10 bombs



Fig. 2.15. Fi-103 (V1)

The postwar period

In April 1946 the first aircraft flying unmanned scientific research Northrop: Northrop P-61 Black Widow who have the task of gathering weather data for U.S. Weather Bureau. In 1951 the first jet engines were used (Teledyne Ryan Firebee type I) [13, 15, 21], see Figure 2.17.



Fig. 2.17. Ryan Firebee II

In 1959 takes place the official birth plan of the on unmanned flights with RPV / UAV, when the USAF is concerned about the loss of US pilots in hostile territories in theaters at the time. In 1960, the launch of the program UAV codenamed „Red

aboard TDR-1 built by the Interstate Aircraft Company in Los Angeles (Figure 2.16) belonging to US Navy, [12, 20, 26]. Also in 1944 held project Aphrodite, a program that converted the US B-17 and PB4Y-4 into bomb flying drones. They were used later to nuclear tests in the classical missions „dirty” [18, 19].



Fig. 2.16. TDR-1

In 1955 takes place the first flight of an unmanned aircraft in reconnaissance (Northrop radioplane SD-1 Falconer/Observer) subsequently used by the US military and the British company Beechcraft. Entered the game with the Model 1001 for the US Navy, [22, 25], see Figure 2.18.



Fig. 2.18. SD-1 / MQM-57
Falconer

Wagon” take places, when Francis Gary Powers piloting a U-2 was shot down over the USSR and in August the same year takes place the first flight of a helicopter unmanned Gyrodine QH-50A in Maryland see Figure 2.19 [21, 22].

In August 1964, in Gulf of Tonkin the U.S. used a UAV in the conflict between U.S. Navy and North Vietnamese Navy. Since 1964 until the fall of Saigon in 1975 USAF Strategic Reconnaissance Wing 100 3435 launched Ryan drone reconnaissance over North Vietnam in which they lost 554 unmanned aerial vehicles, [22].

In 1966 initiating the project Lone Eagle (later called Compass Arrow) for the design of UAV



Fig. 2.19. Girdina UAV QH-50A

3. CONCLUSIONS

UAV tests and functional vectors have been developed both in rotary wing and fixed-wing concept (heavier than air) and inflatable wing (lighter than air).

A viable solution would be the conversions of UAV from piloted aircraft (de Havilland DH-82B).

UAV development in the field resulted in a shift of architectural concepts through the development and operation of UAV in terms of features and capabilities continuously generating constructive types on one hand and on the other areas of use.

Unmanned airborne systems continuously developed, especially

necessary reconnaissance missions over China, so arises D-21 (Figure 2.20) following a competition launched by the US Airforce which was also attended by North America Ryan Aeronautical. The objective was to perform photo reconnaissance missions at high altitude [5, 14].

In 1976 - the recognition aircraft utility was demonstrated in Vietnam. These are the first steps for use in combat of UAVs at sea and on land.



Fig. 2.20. D-21 Tagboard

major advantages: the ability to operate in hazardous environments without human risks.

The current challenges are related to human removing aircraft, the need for data link flight control and monitoring, this component has a significant positive impact due to the fact that it can perform aerial overload developments far beyond human limits. In terms of design there are obvious advantages compared to piloted aircrafts, UAVs can be designed in any size suitable to the mission profile, starting from tactical missions and ending with the strategic operative.

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