




Review

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The Scientific Informative Review, Vol XIII, No 2 (29)/2015

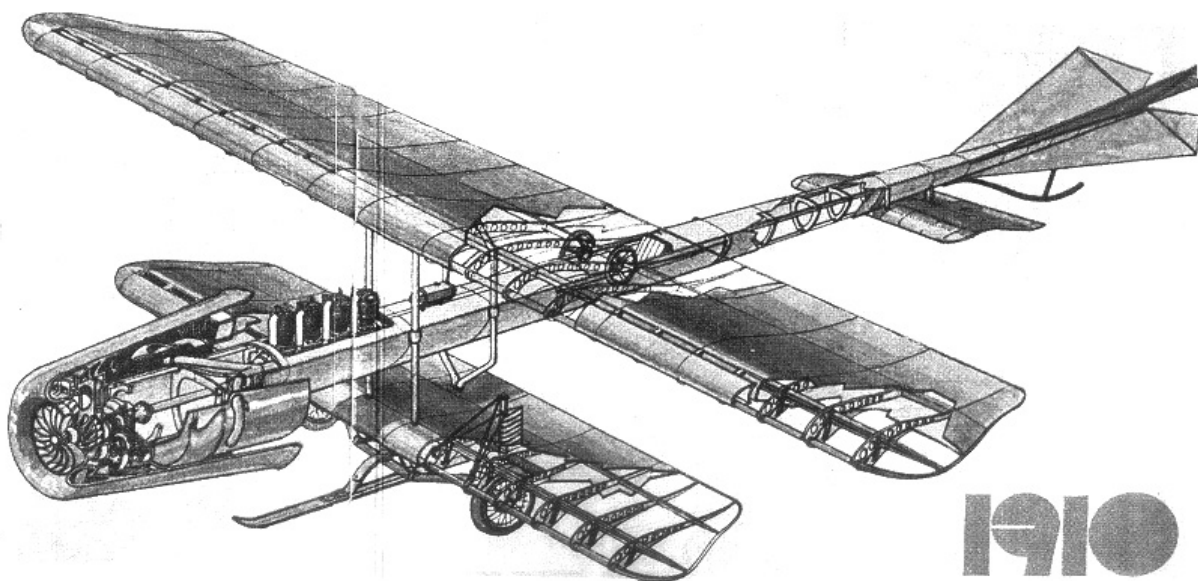
A large, dark, abstract monument stands on a square base. The monument has a central vertical column that is twisted and jagged. At the base of the column is a plaque with the Romanian motto 'Prostramur et manemus manu Ortilla'. The monument is set against a background of the Earth from space, with a blue and white horizon line and a dark blue sky with stars.

Celebrating 20th years of
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ELECTRONIC WARFARE IN THE ARMED FORCES OF THE REPUBLIC OF POLAND AT THE TURN OF THE 20TH AND 21ST CENTURY

Waldemar SCHEFFS

National Defense University, Warsaw, Poland

1. A Summary:

The political changes that took place in Poland in the 1980th began the process of shaping and adjusting the Polish economy and society to the new realities and freedoms resulting from the democratic life.

However, simultaneously they enforced the transformation of the Polish Armed Forces, which from the army prepared for performing offensive operations started to be remodeled into an army ready to operate in different environments and conditions, as well as in various geopolitical situations. The process of change progressed gradually.

The specified goals were accomplished by small steps and one might say that the process continues.

The article is characterized by a historical approach and its purpose is to present the general aspects of the Electronic Warfare (EW) changes in the context of the Polish Armed Forces, concentrating on the quantity and types of the electronic combat military units, as well as on the changes concerning the theory of the Electronic Warfare, which resulted from its transformed character.

The subject of this article are the results of the comparative researches, obtained as an effect of solving the problem defined in the form of a question:

How was the development of the Electronic Warfare shaped in the field of the Polish Armed Forces at the turn of the 20th and 21st century?

In order to find the solution of the main problem, it was necessary to define in detail the issues related to using the electronic combat units during military operations in three time intervals: years before the political transformation, period of time just before Poland joined NATO and time immediately after this event, and, finally, the first decade of the 21st century, when dramatic theoretical, organizational and procedural changes could be observed.

After the Second World War, the Polish Armed Forces were formed through integrating various military formations fighting on the Western fronts and the Polish army fighting together with the soviet armies on the Eastern front. Thus one single organism was created.

It must be emphasized that the number of the soldiers from the armies operating in the West comprised a very small percentage of the whole newly formed People's Army of Poland. It had at its disposal military equipment which was almost entirely produced in the USSR.

For the training purposes Polish regulations and doctrines were used. However, all of them were written in accordance with the soviet politics.

It was not earlier than during the political transformation in Poland that the army underwent some changes. The number of the soldiers was reduced from 450,000 (near the end of the 1980th) to 200,000 around the end of the 20th century.

At the time being, there are 120,000 soldiers in the Polish Armed Forces, including the National Reserve Forces.

Also, the amount of the military equipment was reduced, mainly the armored and mechanized. The first military units which started the modernization process aimed at achieving the level comparable to the NATO member states' armies are the intelligence units, the Special Forces in particular. Even before Poland joined the NATO, the Special Forces units had been training together with the NATO units and had been provided with the equipment purchased under the support program prepared by the NATO member states. Polish Special Forces were also able to implement doctrinal solutions in the field of reconnaissance, such as e.g. IPB (Information of Prepared of Battlefield). The series of changes involved also the Radio Electronic Warfare units and here not only their structure was transformed, but also the definitions related and the essence of the Radio Electronic Warfare (REW).

Finally, the summary of this article presents new development directions of the Electronic Warfare, possible to follow not only by the Polish Armed Forces, but also by the armies of the other NATO member states. The whole material presented below is based on conclusions drawn from the specialist literature analysis, which the author supplemented with results obtained from employing methods of direct observation.

2. Electronic Warfare before the political transformation

In order to characterize the transformation of the Radio Electronic Warfare within the Polish Armed Forces, one must go back to the Second World War and the time directly after its end, since it was then that the REW became explicitly divided into three types of operations – directed from the ground, sea surface and air.

This partition enforced directly the organization of the REW units.

The Western states concentrated on developing and modernizing the air units mostly, while the East preferred rather to invest in the land forces.

The Western countries developed mostly Radio Electronic Warfare systems to be assembled on planes and ships, which was the result of the Second World War experiences and the higher development level in the context of the electronics and technologies. At the same time, the states that had formerly signed the Warsaw Pact (and were at the time of the cold war the opponents of the West) developed the Radio Electronic Warfare applicable for the land forces, which was also dictated by the size of the mechanized and panzer armies.

While improving the technique and forms of leading Radio Electronic Warfare operations¹ often the experiences resulting from foreign local wars were used: Korea (1950-1953), Vietnam (1964-1973), Middle East (1967, 1973, 1981), Falklands conflict over the Malvinas (1982), the Persian Gulf (1990-1991, 2001), Yugoslavia (1999).

The military conflicts mentioned above have shaped the contemporary character of the REW. In the West, operations led in the environment of the electromagnetic waves started to dominate the air and marine combat operations, but in the East the Electronic Warfare appliances were used mostly in the land environment and only sometimes during air or maritime operations.

Only the Armed Forces of the USSR maintained the whole possible arsenal of the REW equipment in every type of armed forces.

The proportions concerning the amount and type of the REW equipment are perceptible until now. Such a differentiated approach to the REW systems resulted from the Second World War experiences, a sudden development of science and technologies at the West and the beginning of the arms race. Both the USA and the remaining NATO member states aspired to achieving the possibility to use advance military measures in every place of the globe, and that is why they needed systems able to detect and identify an opponent from a very long distance.

¹ The notion of the electronic combat was shaped in the 1950th and 1960th. Before, the term „radio war” was used. The phrase „radio war” appeared both in the Eastern and the Western literature. Over time, the NATO states started to use the notion of the „electronic warfare”, while the Eastern countries preferred the term Radio Electronic Combat. This situation was changed later by the doctrine concerning the Electronic Warfare, created by the Polish Armed Forces in 2003.

The dominating role in this context could be played only by the long-distance surveillance aircraft, since electronic intelligence from the space was at that time only vaguely considered and ten years had to pass when this idea could be implemented.

In that period of time, the strategic air intelligence of the USA Air Force determined the development directions concerning the electronic combat devices.

Very intense intelligence actions combined with jamming and, as well as maintaining radio contact in every part of the globe is the basis of developing new technologies in the field of Electronic Warfare.

The electromagnetic environment, or – in more general terms – electronic – became the obvious domain of the silent combat arms race.

At that time, the Polish Armed Forces operated on the basis of the offensive doctrines, according to which the actions concerning the REW were focused on radio electronic interaction mainly with the land opponent. One of such tasks was destroying the radio electronic devices of the opponent by means of firing assets.

It could be performed by the aviation, artillery or combat units.

A proper coordinates necessary for such operations were received from the intelligence systems, both national and cooperating (allied).

3. First changes at the end of the 20th century

After the period of political transportation, the intelligence forces underwent a process of integrating the electromagnetic intelligence units with the units responsible for radar and radio frequency interferences. A single element was formed – Radio Electronic Warfare.

There were a few arguments for such integration. One of them was the need to keep all the radio electronic information in one decision-making center, where the current situation would be evaluated and the needs of firing radar operations could be met.

In many units dealing with intelligence and the radar and electronic countermeasures the same type of equipment was used for performing the same tasks, which resulted in unnecessarily doubling actions, while the time of the information flow within the intelligence system caused too long period of time in the context of waiting for the decisions to be sent to interaction means.

It was also the time when the related definition and its elements changed into: “Radio Electronic Warfare (REW) means military operations and actions during which electromagnetic energy is used in order to identify and disorganize the radio electronic systems of the opponent and create conditions allowing the own analogical systems for stable work.”².

The REW was divided into the following elements: electromagnetic intelligence, suppression and defense.

Such a situation lasted till 2003, when a new doctrine concerning the Electronic Combat was introduced.

Poland belonged then to the NATO already, therefore it is easy to deduct that it took six years to transform the REW doctrine into the EW doctrine.

Such a long period of time was necessary to re-organize thoroughly the structure of the REW units.

Until joining the NATO, Polish army was characterized by the REW battalions on the army level and later on the corps level, as well as the independent regiments responsible for radio and electromagnetic intelligence, as well as for radio and electronic countermeasures.

After the first re-organization of the PAF, when some of the army structures were eliminated, the army radio-electronic battalions were subordinated to the radio-electronic intelligence regiments.

At that time, two such regiments were formed, along with the 8th radio jamming regiment, and 11th radio-electronic intelligence regiment.

² Principles of preparing and conducting the radio electronic battle by the PAF, Szt. Gen, Warsaw 1995 p. 5

The 10th radar recognition regiment and the 4th radar jamming regiment were dissolved, while the 9th radio-electronic intelligence regiment was moved to Lidzbark Warmiński. Simultaneously, after a complicated period of re-organization the National Defense Forces were integrated with the Air Forces into the National Air Defense Forces.

Table 1. Numbers and types of the REW units in the Polish Armed Forces before the political transformation

| Type | Location | Affiliation |
|--|------------------------------------|----------------------------|
| 1 st radio-electronic intelligence regiment | Grójec | Air and Air Defense Forces |
| 2 nd radio-electronic intelligence regiment | Przasnysz | Land Forces |
| 3 rd radio-electronic jamming regiment | Lidzbark Warmiński | Air and Air Defense Forces |
| 4 th radar jamming regiment | Giżycko | Land Forces |
| 5 th special communications battalion | | |
| 6 th radio-electronic intelligence regiment | Gdynia | Navy |
| 7 th radio intelligence regiment of Military Police | Skierniewice | |
| 8 th radio jamming regiment | | Land Forces |
| 9 th radio-electronic intelligence regiment | Biała Podlaska/ Lidzbark Warmiński | Land Forces |
| 10 th radar recognition regiment | Dziwnów | Land Forces |
| 11 th radio-electronic battalion | Zgorzelec | Land Forces |
| 12 th radio-electronic battalion | Kołobrzeg | Land Forces |
| 15 th radio-electronic battalion (only professional soldiers – with out conscripts) | Biała Podlaska | Land Forces |

Source: <http://www.serwis-militarny.net/forum/viewtopic.php?f=18&t=11484> [access 02.03.2015]

This structure included two regiments – one radio-electronic intelligence regiment and one radio-electronic jamming e regiment, which in 2000 were transformed into the 2nd radio-electronic battalion. At that time the Navy was provided with one radio-electronic regiment. All these transformations and reductions carried out within Polish Armed Forces resulted in the fact that by the end of the 20th century on the strategic and operational level the military units functioned within the regiment structure, while on the tactical level there were REW companies combined with the electronic countermeasures elements in all types of the forces.

4. Electronic Warfare before of the new century

The period immediately after Polish Armed Forces joined the NATO was characterized by intensified implementation of new procedures concerning the command, intelligence, REW and adapting the old and new equipment to the NATO requirements.

It must be emphasized that this process was not smooth in every case.

A lot of time was spent on discussions and reaching agreements, as well as understanding the philosophy underlying the changes to be introduced.

Many officers and privates were forced to learn new theory, which had to be turned into practice through command and staff exercises and trainings with the troops, to be used later during everyday work according to new procedures within the new staff structures.

According to the doctrinal assumptions of the 2003, the dominating environment for the Electronic Warfare was the electromagnetic environment, where the combat was carried on by all types of the armed forces.

It was of the universal character, which meant that all units were to participate within the scope of their competencies. The main effort of such operations rested on the specialized units equipped with electronic intelligence, electronic jamming and radio electronic defense devices.

The EW functions in the electromagnetic environment, which means that “the environment of the EW is the three-dimensional space in which the electromagnetic waves radiate from the radio electronic devices and are absorbed by some other appliances”. Hence, the electromagnetic environment is characterized by: scope of the spectrum of the electromagnetic waves which is used, density of the used frequencies, density (power) of the EM energy within the space, density of the radio electronic (RE) devices per square kilometer (W/km^2), arrangement of the deployed RE devices and their distance from the military line of the troops, listing and deployment of the important RE objects (mostly communication, radar posts, electronic jamming stations, RE intelligence centers, satellite communications terminals, intelligence and radio navigation posts etc.).

The EW is conducted on the same frequencies which are used by the radio electronic systems of the opponent's forces (including communications, radars, remote sensing, and radio navigation). These are frequencies from 30 kHz to 40GHz (but also 94-108 GHz), as well as infrared.

Apart from that, the EW staff cells continuously update the lists of the important RE objects assigned for intelligence and jamming, which allows for immediate identification of a given object along with its probable location, to be followed by prompt electronic attack. These actions are performed in order to direct the RE detection, define the optimal time of the jamming or conducting electromagnetic or fire attack.

The purpose of the EW within the framework of various tactical and operational actions of the forces is to acquire information on the electronic devices and systems of the opponent's army (land forces, air and anti-air defense, strike aviation, navy and space forces).

The next step is the electronic attack. Another equally important aim is disorganizing the work of the opponent's combat management systems

The environment of the electromagnetic waves (EMW) successively starts to be dominant in the combat environment. One could enumerate a lot of weapon systems, in which the electronic devices supporting the military operations play the leading role in the EMW environment.

The most important of them are the following:

- command and communications systems (C2W, Jaśmin, Szafran, Łowcza, Podbiał);
- radar command systems (Dunaj, Loara);
- weapons management and directing systems (missiles, UAV etc.);
- intelligence systems (e.g. acoustic Pilar Mk II, optoelectronic military observation towers Kobuz, military detection and supervision system MDSS);
- Suppression of Enemy Air Defenses (SEAD);
- EW systems (e.g. Przebiśnieg, Kaktus, which also include the EM impulse);
- IT systems (cybernetic, e.g. BITcom, Złocień, Służba);
- navigation systems (GPS, Glonass)
- different supporting systems of the air forces, land forces and the navy.

According to the approach presented here, the electronic devices of the EW systems work uninterruptedly during the peacetime, crisis and war, and only, depending on which period is concerned, if necessary, the scope and intensity of the electronic activity of military character and significance grows.

This approach is task-oriented, which means that the operating both of the EW system and the theory concerned within the PAF applies to precisely defined tasks. During peace time the military staffs prepare for operating within the defined time and space framework. These experiences later translate into concrete solutions during the exercises.

The officers (planners) of the EW cells analyze the actions of the opponent, evaluate the threat, plan concrete operations, conduct them and then examine the effects (through signals emitted after the military action by the opponent's electronic devices, in all frequencies). If the operation proved to be successful, then the next step follows, and if not, the operation is repeated or the formerly made decision is verified and a modified course of action is taken. This general regulation of planning and operating (plan – operate – evaluate – verify), which was historically shaped, proved to be successful in every army involved in EW actions.

5. Electronic Warfare at the beginning of the XXI century

The beginning of the 21st century brought consecutive theoretical, procedural and organizational changes for the EW units of the PAF. The doctrine implemented in 2003, which was mentioned above), resulted in slightly altered approach towards the EW theory and practice. Apart from changing the name of this warfare itself, into the Electronic Warfare, a new definition was introduced: “The Electronic Warfare means military operations involving identification of the opponent's sources of electromagnetic emission, disorganizing the working of his electronic devices and systems using the EM energy, including the beam energy, simultaneously providing the conditions for effective usage of such waves by one's own forces”³.

This definition is already completely in accordance with the one that is in force within the NATO structures. In addition, the subdivision of the EW also changed into: electronic intelligence, electronic countermeasures and electronic defense. These assumptions made suggest explicitly that we enter a period when we have to take into account not only the possibility of typical radio or radar jamming, but that from now one more focus should be put on the pulse and directed EM energy interactions.

That is the purpose of the reorganization of the EW units. Fire attack, emphasized so strongly in the context of the previous definition, although effective, becomes limited to striking with the precision guided munitions.

The assumptions made indicate that the EW is characterized by two main streams:

Offensive – active influencing the electronic devices of the opponent by using the operational intelligence and electronic countermeasures;

Defensive – creating environment suitable for undisturbed operating of one's own electronic devices, so that they could fulfill the function they were appointed on the battlefield.

However, since 2004 the Polish EW theory mentions a third stream (called reconnaissance stream at that time),⁴ characterized by achieving the EM information about the currently operating electronic devices and systems of the opponent in a complex way. In addition, it assumes monitoring the magnetic fields, resilient waves, power-driven courses (electric signals) within the IT webs, and by analyzing this data (character and direction these signals come from) determining all possibilities of using this information for the intelligence purposes.

The second stream was aimed at complex and active influencing the electronic devices of the opponent in order to disturb or disrupting their operating, or even destroying them. The goal of the thirds stream was creating safe environment for one's own electronic systems so that they could work undisturbed.

This meant securing the process of gathering, processing and distributing electronic data. The further step would be blocking the electronic devices of the opponent and not allowing them for collecting and sending information, as well as damaging them.

³ W. Scheffs, *Electronic Combat during the peace-supporting operations*, National Defense Academy (AON), Warsaw 2005, W. Scheffs, *Electronic Warfare system during the crisis operations*, National Defense Academy (AON), Warsaw 2006, W. Scheffs, *Electronic combat during the asymmetrical operations*, National Defense Academy (AON), Warsaw 2007.

³ *Electronic Warfare*, Szt. Gen., Warsaw 2003, p. 7.

Development of the EW within the PAF was determined by another reorganization of the EW units, which started at the beginning of the 21st century and lasted until 2007.

Implementation of the new doctrine resulted in disbanding the radio-electronic intelligence regiments, which were replaced with Radio Electronic Intelligence Centers, one for each type of the armed forces.

The tactical level is more stable and did not changed, while the EW unit remained as a company. During peace time the EW company is trained within the structure of the radio-electronic battalion⁵, which was created on the basis on the 8th radio jamming regiment. During the training the company is delegated to one of the divisions. At the beginning of the next decade the 8th regiment was included into the structure of the Radio Electronic Intelligence Centre.

The Air Force underwent similar changes⁶, which also meant disbanding of the radio electronic regiments and creating the Radio Electronic Intelligence Centre. At the beginning, two radio-electronic battalions became compliant with it, but they were disbanded in 2007 as well and this was when the Radio Electronic Intelligence Centre's structure was transformed to the level of the company. In a similar way, the radio electronic regiment of the Navy was transformed into the Radio Electronic Intelligence Centre.

The new structures fulfill the modular assumptions concerning the task forces, within which proper EW forces are to be appointed and directed from the Radio Electronic Intelligence Centers in order to perform a given task. If necessary, it may be even a radio-electronic battalion.

6. EW – towards new challenges

Since 2007 the member states of the North Atlantic Treaty Organization started to reconsider the ideas concerning the EW, which lead to initiating the process of changing the general concept of the EW and updating the EW doctrines⁷.

⁵ The 8th radio electronic combat battalion kept the old name of the radio electronic combat.

⁶ As a result of the transformation of the Air Defense Forces the Air Forces were established. This name was in use since July 1, 2004.

⁷ The process of changing the NATO EW idea described here started in 2007 and it was initiated by a review prepared by the

The modification which has been thus triggered off is indispensable mainly because of two factors: re-defining of the combat field threats, which have appeared ever since the break-up of the Yugoslavia and adjusting the EW to the requirements of the future military operations to be conducted by the NATO forces. The previous document defining the EW policy – MC 0064 – NATO *Electronic Warfare Policy* – was replaced by a new version MC 0064/10, which delineated the basic notions related to the EW and indicates its development directions. Simultaneously, this document contains the requirements for the future EW systems. The new definition goes as follows: „Electronic Warfare is military action that exploits EM energy to provide situational awareness and achieve offensive and defensive effects”⁸. At the same time, this new definition introduces new notions⁹: Electronic Intelligence (EI) – use of the EM energy to provide situational awareness and intelligence¹⁰; Electronic Attack (EA) – use of the EM energy for offensive purposes; Electronic Defense (ED) – use of EM energy to provide protection and to ensure effective friendly use of the EM spectrum.

Such form of the new document MC 0064/10 prove that the above-mentioned definitions have been introduced in order to highlight the new character of the EW forces, which is equal to implementation if the idea concerning the Effect Based Approach to Operations (EBAO)¹¹

NATO Electronic Warfare Advisory Committee (NEWAC), entitled *Concept for the Future NATO Electronic Warfare and Related Disciplines*.

⁸ MC 0064/10 – *NATO Electronic Warfare Policy*, NEWAC, 2008, p. 3.

⁹ Ibid. p. 3.

¹⁰ Instead of the term Electronic Intelligence Polish authors often use the notion of the Electronic Guarding.

¹¹ The EBAO concept in the context of the EW assumes, among others, expanding the field of activity related to EW and introducing not only new definitions for the so-far existing EW elements (EI, EA and ED), but also a new element - Electronic Warfare Management (EWM). It assumes management of the spectrum, data links and data bases, functioning of the Signals Electronic Warfare Operations Centre (SEWOC), creating the EOB etc. See: *Concept for the Future NATO Electronic Warfare and Related Disciplines*, NEWAC, 2007, p. 8. More about the new NATO EW concept in: D. Kołasiński, K. Dymanowski, *Changing WE Concept within the NATO*, in: „Przegląd Sił Powietrznych” (Polish Air Force Review), No. 11/2009, pp. 4-13.

Therefore, it is easy to notice that such so-far used definitions of the EW elements as Electronic Warfare Support Measures – ESM; Electronic Countermeasures – ECM; Electronic Protective Measures – EPM, are of a narrower character and subordinate to the new ones: Electronic Intelligence (EI), Electronic Attack (EA) and Electronic Defense (ED).

The new NATO EW concept (MC0064/10) is explicitly influenced by the ideas presented in the American EW doctrines. Such an impact of the American thoughts should not surprise anyone, since the US Armed Forces lead in the field of introducing new technologies and military ideas, not only in the context of the

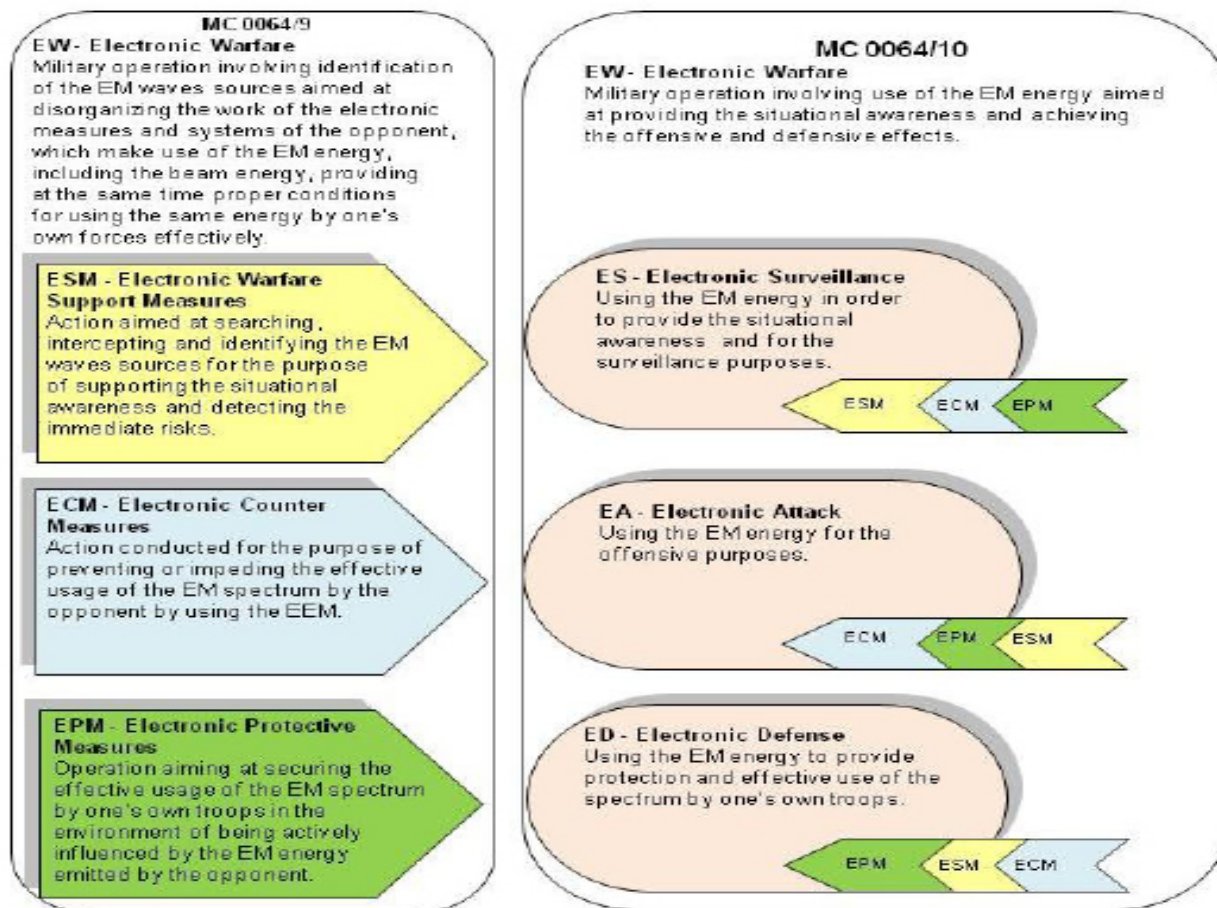


Fig. 1. Comparison of the EW definition and its elements in the subsequent versions of the MC 0064 document. *Source: own materials.*

Electronic Warfare Support, Counter Measures and Protective Measures, as well as other military measures conducted within the EM environment (radio communication, microwave transmission, radar communication wave, radio navigation and others), can be integrated during one single operation (performing a specified task). The principal and superior goal of such an operation (informative, offensive or defensive) shall determine, which of these components shall dominate, qualifying thus the operation to one of the main fields: EI, EA or ED (see fig. 1).

EW, but of the other forces as well. At the same time, the US army has the greatest military experience, which is the result of the recent military conflicts.

The new EW concept assumed increase of the offensive character in every type of operation. This included possibility of using the EW for attacking not only the equipment and infrastructure, but also its personnel of the opponent (which is a novelty in comparison to all the previous EW concepts).

Also, such an approach allows the commander of a given level to command directly all the EW Support Measures subordinate to him¹²

12 K. Dymanowski, *Electronic Warfare in the Air Forces...*, Ed. quot., pp. 82-83.

At the time being, the planners must at first define the desired effect of conducting the EW in the EM environment and its influence on performance and success of the whole joint operation. It enforces to take up a new approach towards the planning, preparing and conducting the EW – an approach which would exceed the current framework.

According to the old formula, having at one's disposal a given amount and types of the EW equipment, evaluation of the possibilities concerning influencing the electronic potential of the opponent would be followed by just rough estimation of the effect, assuming repetitiveness of the actions until achieving the desired effect.

The new approach allows for defining the desirable objectives, to which the amount of the necessary equipment, methods of operating and structure are adjusted.

If any NATO member state, its army or one of the military levels lacks the necessary EW potential, then a support of the NATO forces is provided. Therefore, according to the new EW formula the basis of conducting EW are the joint operations, which shall be the basis of the future actions taken up within the EM environment.

The theoretical WE assumptions of the new doctrine have been expanded by applying an innovative attitude represented by R. Elder.

Apart from the three typical EW components, the R. Elder one more element – the EM spectrum control, which is to be achieved by means of successful management of one's own electronic systems and coordinating their work, applying at the same time counter measures towards the analogical systems of the opponent¹³.

In my opinion, the EM spectrum control should rather be the *goal* of the EW than its component. And such a goal can be accomplished just by skillful managing the EW forces and proper coordination of their operations.

Therefore, I do not share the opinion according to which we control the spectrum and manage the frequencies on which both we and the opponent operate.

The new EW doctrine AJP.3.6. also assumes managing the EW by: administering the EM spectrum, data links and bases, the EM environment, EW databases, coordinating the EW through Electronic Warfare Coordination Cell (EWCC), Signals Electronic Warfare Operations Centre (SEWOC), managing the EW potential through the supporting military staff, managing the map of the electronic situation.

Another very important field of EW activity is coordinating the EW tasks with the operations involving influencing the computer networks - Computer Network Operations (CNO), Civil-Military Cooperation (CIMIC) and informing the public opinion about actions which, according to the NATO and US approach, are not a part of the information operations, but are closely related with them¹⁴. Quite a serious problem is the correlation of the EW during operations conducted on the borderline of crisis and war or Peacetime and crisis. Such activities often involve participation of civilian institutions, media, non-governmental organizations (NGOs), religious institutions of different religions and churches themselves.

Almost all of them use the systems and devices emitting the EM waves on a large scale, for the purposes of communicating and transmitting TV and radio signals.

Therefore, it is necessary to coordinate the usage of spectrum by the military and civilian bodies. Such activities are strongly emphasized in the American EW doctrine.

It also stresses the necessity to prepare proper procedures concerning the electronic interference. Some NATO documents also accentuate the role of the civilian and military electronic systems and devices operating together during joint operations.¹⁵ The main purpose of such coordination is to prevent errant jamming of the electronic devices and systems working for civilian institutions and other neutral organizations.

13 R. Elder, *21st Century Electronic Warfare*, Association of Old Crows, 2010, pp. 1 and 6.

14 See K. Dymanowski, *Electronic Warfare in the Air Forces...*, Ed. quot., p. 86.

15 W. Scheffs, M Łokociejewski, *Electronic Warfare in operations and combat*, National Defense Academy (AON), Warsaw pp. 75-79.

Already since the beginning of the 21st century the process of developing the new EW theory initiated in the Polish Armed Forces have been leading to gradual replacement of the old EW equipment with new elements. At that time, the EW units of the tactical levels became equipped with the new Przebiśnięg system, of a highly mobile character and capable of instant reception and detecting all types of modulation used then.

In addition, a new system called BREŃ was implemented and it was assigned for identifying the radar signals. Both systems went through numerous modernizations when the new implementation process of the new EW doctrine has started, they proved to be a modern equipment basis ready to perform identification and jamming tasks on the tactical level and in accordance to contemporary military requirements.

However, the equipment modernization was not limited to the land forces. The most serious equipment replacement took place in the Air Forces. Apart from the modern F-16 planes and EW systems produced especially for this type of the aircraft, all the equipment produced in the USSR was replaced. Due to many international contracts and the fact that Poland has joined the NATO, Polish army gained access to the newest intelligence technologies and the equipment was bought from such companies as Rohde&Schwarz or Thomson.

Radiolocation recognition stations were modernized and the MSW-R station started operating, replacing the Gunica system. An automatized identification system Wólczienica. Was introduced. These are just the main systems that started working in the PAF and which meet the standards of the new EW doctrine, which is being implemented right now. In the nearest future another EW system KAKTUS shall be introduced on the operational and tactical levels, very modern and completely compatible with the equipment of the allies. Polish Armed Forces face challenges related to mobility and speed of operating, which directly influences the effectiveness. The EW units must provide undisturbed flow of the information from every location, where the combat units operate, which is absolutely essential for the effectiveness of the operations. It is an important requirement, but is it the most important one? Another one that the PAF will soon have to meet is related to the activity of the EW units within the computer networks.

Contemporary combat operations are frequently transferred to the virtual world, where the soldier shall soon be just the effect of the action. The tools used here mean specialized equipment and the man, being a component of the system, must be able to operate it, often operating from far distance, but effectively. The few experiences gained during the peace and stabilization missions in Iraq or Afghanistan are not sufficient. At the moment, solution to this problem is being sought for by the military decision makers.

It is always unclear what the future shall bring, but already now we have to get prepared for this, what might happen. The new EW theories implemented now must serve not the current situation, but the future operations. The equipment introduced now is already outdated, and while designing new devices, we must concentrate on the future. Hence the immense importance of the specialized knowledge and imagination, which shall together create new images of operating.

The growing meaning of the electronic and IT indicate future joint operations conducted in different types of the environment. Asymmetrical and network-centric activities are just a part of the future operations conducted by the modern EW. The cyberspace which has not been explored may entail serious risks. The attacks directed towards government internet network that have been revealed in Latvia and Georgia prove without doubts that the role of the virtual world is increasingly important and the fight takes place within the computers, the weapon being the bits of the IT programs.

Who is going to win this fight? At the moment, there is no answer to this question, although the adversaries of the new concepts shall say that the winner is always this party which is first to choose the location and weapon.

But what would happen if the opponent was prepared for the attack, because he had been monitoring the situation beforehand?

The IT answer can bring catastrophic effects for all the people, not just those directly engaged in the conflict.

These effects may spread to other countries. Parodying the words of the famous s-f writer, Stanisław Lem, who wrote, that „...the future war shall be atomic, and the next one shall be the waddy war”, I could say today, that first there is going to be the bits war, and then the waddy war.

CONSTRUCTION OF EMERGENCY RESPONSE FORCE

XUEWU LI

Military Economy Academy, Wuhan, China

Abstract: *Emergency response is an important task facing China and even all over the world. This article is based on China's emergency response to the problems existing in the construction, and putting forward the principle of the construction of emergency response force of China should follow and the measures to be taken.*

Keywords: *Emergency, response force, principle & measure*

1. RELATED CONCEPTS OF EMERGENCY RESPONSE

1.1 Emergency. Emergency, a sudden unforeseen crisis (usually involving danger) that requires immediate action, it often has a certain effect on the country's economic and social order, the current academic circles to the definition of emergency did not form a unified understanding.

International, the representative definition of emergency has two: one is the European court of human rights for the interpretation of the "public emergency", namely "a kind of special and immediate crisis or dangerous situation affects all citizens, and pose a threat to the normal life of the whole society" [1]. Another definition of emergency, can be roughly summed up as: announced by the President of the United States, on any occasion, any scenario, any place in the United States to the federal government intervention, provide supplementary assistance, to help state and local governments to save lives, to ensure public health, safety and property or reduce, transfer disaster caused by the threat of a major event [2].

In China, according to the emergency response law of the People's Republic of China made the following definition: the concept of emergency incident referred to in this law refers to a sudden, cause or may cause serious social harm, need to take emergency measures to deal with natural disasters, accidents disasters, public health and social security events [3].

According to the nature, extent, controllability and influencing factors such as the scope is divided into 4, major is I level in particular, significant is II level, larger is III level, general is IV level.

1.2 Emergency response. Emergency response is a complex problem involving social each aspect, refers to the leadership of the government or people help themselves, the government response force as the main body, the joint public, enterprises and social organizations, using a variety of ways, methods and means of crossover and integration to prepare for a sudden, cause or may cause serious damage to natural disasters, accidents disasters, public health events, ecological environmental damage and social security events, monitoring and early warning, emergency disposal and rescue, recovery and reconstruction, to guarantee the people's life and property security, social stability and national security purposes.

It is not hard to see, emergency response force in addition to including government expertise, but should also include enterprises, social organizations, social groups such as people's power, its related to fire, rescue, medical care, transportation, communications and other fields.

Dealing with object refers to all kinds of emergencies, and the means of dealing with should include tools, methods, methods of many subjects and their intersection.

2. THE CURRENT PROBLEMS EXISTING OF THE EMERGENCY RESPONSE FORCE IN CHINA

In China, after years of construction and the practice of emergency response, emergency response to China's power construction has obtained certain achievements, but the comprehensive practice in recent years, there are still some problems, mainly including:

2.1 Some unreasonable power allocation.

At present, the emergency reaction force of the structure of the allocation also exist some unreasonable.

Aimed at the reality of China's natural disasters, for example, setting up the corresponding reaction force, such as the national drought flood control and professional response force, reaction force for earthquake relief work, etc.

But, in the process of the outbreak of the incident, often accompanied by secondary disasters such as complex situation, the single structure of reaction force function is the relatively limited, apparently to some secondary disaster situation is not effectively curbed, sometimes need to wait in line of expertise to facilitate carries out rescue mission, cause a delay of time, and cut down the quality and efficiency of the whole task.

2.2 The lack of effective coordination mechanism. At present, the coordination problem in current emergency response in China was very obvious.

China's big cities are face with all kinds of emergencies, the frequency increases, the corresponding emergency power are set up for all sorts of natural disasters, but there are still lack of effective coordination mechanism to deal with institutions, social organizations in their own way to participate in force, cause the city once the outbreak of a major incident, or a variety of emergencies occur simultaneously, it is difficult to effectively integrate the power of the existing government response force, and even cause a delay of time and waste of resources.

Accordingly, multiple force participation means that emergency response to specialization and independence of each force in the growing, more needs to be between the forces of efficient coordination mechanism, eliminate barriers on information communication and the lag of information transmission to grasp the best time to respond to emergencies.

2.3 The public crisis awareness and participation is not high. Currently, the government in emergency response in a core position, while the government has the advantage of the various resources, just rely on the government's response to emergencies is still limited. NGO is closely with the society, not only in the emergency disaster relief, after the accident inspection stage, and in the early stage of early warning, monitoring can play a big role. However, in the process of the emergency response, they failed to play its proper role. This is mainly due to the majority of Chinese citizens are still lack of understanding of emergency response and participation, although the government and relevant departments also recognize the importance of civic crisis awareness, but there is no standardized mode of operation, thus weakening the composition of the emergency response to strength. Therefore, we should pay more attention to the positive role of social forces in emergency response, in order to form resultant force in the process of emergency response, jointly cope with emergencies.

3. EMERGENCY RESPONSE TO THE BASIC PRINCIPLES OF FORCE CONSTRUCTION

3.1 Overall planning. Emergency response is a kind of the government-led, involving multiple government departments and institutions and social power integrated activities. Emergency should adhere to the principle of overall planning works smoothly, in an orderly way to fundamental guarantee.

Overall planning for the allocation of resources, use, personnel deployment, the corresponding task division of power and so on carries on the macroscopic planning, better play to the overall efficiency of all kinds of reaction force.

According to the geographical environment, natural climate and social environment fully imagine possible emergency, making the plans scientifically. At the same time, should also pay attention to the unified leadership, the unified command of all levels of emergency response force, connect each link disposal action into one organic connection and orderly operation of the process, thereby improving overall efficiency.

3.2 Diversity participation. When the emergencies occur, the arrival of the expertise has certain hysteresis. If it can be effectively used of social forces, such as non-governmental organizations and the public first to implement emergency response, will greatly reduce the public emergency of the damage caused by the public and society. Multiple participation, refers to the emergency response to the force - the government, enterprises, non-government organizations and citizens, with the aid of certain system and information platform, such as effective integration, coordination, in order to effective prevention, response and eliminate the crisis. Through the participation of multiple forces, making the emergency response, run through certain mechanism, makes the relationship between the social forces involved in the incident response can form the largest force, thus effectively control and improve the ability of dealing with spread of emergencies.

3.3 Scientific allocation. Relying on the power of a single configuration certainly cannot adapt to sudden emergency, complex and diverse characteristics. Emergency response to the scientific rationality of the power configuration is in play to the disposal efficiency of the guarantee. Therefore, there must allocate the emergency response force scientifically. Emergency response force of science and allocation, is in the process of precise mobilization to ensure, by means of information technology, unified agglomeration integration of various resources, to build the power of function module, the structure of flexible combination, form a reasonable structure, function optimization, the flexible and efficient comprehensive security force, the use of flexibility in the process of implementation, nearby conveniently, can in an orderly way to respond to emergency disposal of all kinds of situation.

3.4 Simulation practice. Simulation practice is to meet the needs of the emergencies, according to the response plan and scheme, the simulation should be organized and conducted in advance, thus improves the accuracy of all kinds of reaction force applied, that is to realize the important way of rapid, accurate and efficient purpose. Modern simulation technology can create lifelike environmental emergencies, so emergency response force can take this familiar with all kinds of events content, procedures, methods, and combined with emergency factors such as size, style, time, environment, inspection of emergency response plan for effective correction, to improve the emergency response to strength the actual rapid response and high efficiency implementation to provide strong support.

4. MEASURES TO STRENGTHEN THE CONSTRUCTION OF THE EMERGENCY RESPONSE FORCE

Combination of the construction of the emergency response to strength the basic principles and main problems of current, to strengthen the construction of the emergency response force, should be mainly from the optimization of emergency professional power structure, improve the emergency response coordination mechanism, strengthen the emergency response to the practice of power, and increase the ability of social participation and response to four aspects.

4.1 Improve the structure of professional emergency power. Firstly, make the modular allocation scientific and reasonable. Modular organization can effectively improve the professional team quick reaction capability. On allocation, innovating the existing organizational system, making all kinds of emergency rescue and fire fighting brigade forces such as modular combination, form into small, capable, a variety of professional team, according to different requirements, using different professional team, to achieve power unified, complementary functions, improve overall quality and efficiency of carries out the task.

At the same time, must strengthen the modular combination link platform, network management, establish and timely adjust allocation database in time, effectively for different power system implementation of modular combination to provide detailed and accurate information.

Besides, emphasizing the construction of the professional team. Professionalism is a basic requirement of establishing emergency response professionals. Emergency response is often involved in the power needs to be a strong professional and technical requirements.

Therefore, dealing with the power construction, should according to the needs of different circumstances, the outstanding professionalism as the focus of the construction team.

To focus on strengthening and emergency repair in emergency, health protection, fire control, security, chemical defense and epidemic prevention, communications, flood, earthquake and other professional team construction, flexible use of various professional forces, implement scientific organization, targeted to develop its professional advantages in the disposal of emergency.

Finally, construct in combination with regional characteristics. According to different areas of possible emergencies and the task, strengthen the construction of professional team in their respective regions.

There must pay attention to use of local colleges and universities, research institutes and other benefits of good, strong power, high-tech talent, concentrating the advantages of the system of perfect and stable structure, increasing the technological content of professional team.

Establish a suitable for the local professional team, to ensure rapid response, flexible implementation.

4.2 Improve the emergency response coordination mechanism of force. For emergency response to forces which diversity, in emergency response should give full play to the advantages of coordinating the power, so as to realize the emergency response to a complicated system engineering structural optimization.

Therefore, it should be further clarify the responsibilities of each reaction force, through establishing and perfecting the joint conference on information sharing and coordination mechanism, strengthen the supervisor, the connection between the department of industry and communication, strengthening the coordination between the response forces in order to deal with all kinds of major events effectively. On the one hand, on the basis of the existing structure, promote the information resources sharing, transfer and integration ability. Government system by adopting the joint, regional coordination, project cooperation, such as communication mechanism, in accordance with the requirements of different types of emergencies, preparing for the work plan, to optimize the power structure, arrangement and ensure orderly cooperation. Strengthen the subject between departments, government, social organization forces and the communication plus coordination between social organizations, regulating all aspects of the relationship between each other, to ease the contradiction between the parts.

On the other hand, relying on the government information network infrastructure, establish a unified, standard, transverse, longitudinal through information sharing platform, to provide material basis for smooth coordination mechanism, strengthen management departments at different levels of information sharing ability, in order to improve the efficiency of information acquisition, transmission, distribution and quality. Through the digital link, realize information sharing between the different players. In technical aspect with a newspaper, Internet, radio, television, and grass roots network of vertical crisis information sharing network, build different collaboration unobstructed information exchange channels between the main parts.

4.3 Strengthen the emergency response to the practice of force. Sudden and uncertainty is the most significant characteristics of emergencies. They make it hard to predict the time of the incident, location, size, shape and influence degree, cannot respond in a timely manner.

Such as the 2008 WenChuan earthquake under the defenseless people instantly killed tens of thousands of fresh life, hundreds of thousands of people homeless. And the uncertainty, back and forth throughout the incident happened in reason and change direction, the results are no rules, it is difficult to accurately predict and grasp. Accordingly, in emergencies, uncertainty is due to the limited rational not on the influencing factors of the emergency to make comprehensive, accurate, timely grasp. To reduce the degree of uncertainty, it is necessary to strengthen the emergency drill, formulate scientific and reasonable preparedness measures, for emergency response to effective play to provide more reliable basis of strength.

On the one hand, in view of the situation events, according to the emergency plan and organize the implementation of the event early warning, emergency response, command and coordination, on-site disposal and rescue evaluation component and comprehensive practice.

Through the simulation practices, obtains the actual combat experience to modify defects of contingency plans. In the inspection plan practicability, reliability, and improve the plan operability, at the same time also test the emergency response coordinated response and actual combat ability of power, so as to realize the rapid response of dealing with power, efficient implementation.

On the other hand, the standard practice is needed. To organize the implementation of orders from emergency response to drill the task, each implementation plan formulation, program design, organization of command, to practice the arrangement of the task, the implement of safeguard measures, as well as the practice summary report drafting, the aftermath of the processing, etc., must be orderly operation, standard implementation, make emergency response drills standardization and estimation and which would be helpful to the rapid release of emergency response force capability.

4.4 Improve the ability of social participation and response. The construction of the emergency response force not only includes the strengthening of the professional strength team, but also should play the role of social forces in emergency response.

The role of citizens in emergency response should not be passively accept management, and should be actively involved in the response.

Congenital advantage of the folk force with social contact closely, in the process of the emergency early warning, response and later can play a huge role in the recovery process, therefore, must increase the ability of social participation and response, mobilize all the social forces and resources to deal with emergencies, giving full play to the advantages of civil society forces, effective enhance all kinds of emergency response capacity.

Specifically, to start with, the government propaganda and education departments, news media should actively carry out emergency knowledge propaganda and education, through propaganda album, play video data and school education way for people to carry out the crisis education, make them has a detailed understanding of the process of the development of various emergencies and emergency response law of China, and teach the basic method to cope with the situation, to strength and reasonable effective self-protection and implement necessary rescue.

Moreover, according to the actual circumstances of the place, for those who are prone to emergency special practice on a regular basis, improve psychological quality and response capacity of the citizens in the process of emergency evacuation and rescue.

At last, China should draw lessons from foreign advanced experience, maximum absorption, such as folk charity groups, religious organizations and other social forces to participate in the emergency response work.

Technical training for the personnel, through all kinds of ways to make it not only in daily life play the role of propaganda and popularize knowledge of emergency, but also in sudden incident can assist government to cope with work, in order to improve the efficiency.

**5. CONCLUSIONS &
ACKNOWLEDGMENT**

Along with the advancement of globalization and economic development, all kinds of emergencies occur frequently, the damage caused by the consequences are serious increasingly. From the SARS outbreak in 2003, to 2008, a wide range of low temperature rain and snow freeze disaster, WenChuan earthquake, and then to large area of H1N1 flu outbreak, Yushu earthquake, etc., presents the outbreak of more frequent and more and more serious damage, more and more serious threat to people's life and property safety, the stability of the society. Therefore, the force of the emergency response to construction has become an important hot topic in the field of contemporary China's development.

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TECHNIQUES, TACTICS AND MODERN FIGHTING PROCEDURES AGAINST AGGRESSIVE BALLISTIC SYSTEMS

Ioan MUNTEANU

“Carol I” National Defence University, Bucharest, Romania

Abstract: *Considering the great danger posed by ballistic missiles, lately the perception politico-military strategic defense has began to change, emphasizing on improvement of the missile defense weapons, especially rockets, considered the key to the future, especially in terms of accuracy striking and mobility. This article want to bring some information on techniques, tactics and procedures of modern combat systems against ballistic aggression, given the heightened concerns in „ missile defense shield" construction.*

Keywords: *aggression ballistic systems, air defense fire systems; C4I2 systems; distributed network of employment; surveillance and early warning systems;*

1. INTRODUCTION

Mankind is facing new attempts in arms race escalating. Holders of ballistic missiles are interested in upgrading their own ballistic means seeking: increasing distance research, discover, control and air cosmic destruction means; increasing the number of nuclear load; efficient ways of deception regarding the objectives and real types of cargo; production new and more efficient means to combat ballistic potential of some opponents, capable to destroy any missile shield.

All those strategies are a response to the evolution of contemporary conflicts, which highlighted the defensive actions system and air defense protection measures to the detriment of offensive actions.

So, the SCUD missiles in the Gulf War were very late discovered, being combated in the final stage of the aggression because, installations, masking and specific operations training prior to rockets hindered quite a lot finding their fire positions and aviation indication to destroy them.

NATO deals with the issue of missile defense as an extended aspect of air defense, able to protect the ground forces, territory and population against short-range missiles.

By 2017 the alliance intends to achieve the capacity to protect deployed troops against short, medium and long-range ballistic missiles, by intercepting them on the initial, middle and final trajectory¹.

This intention translates into practice through: developing theater missile defense capabilities to protect troops wherever carried out against short, medium and long-range ballistic missiles; examining options to protect forces, territory and populations against the full range of missile and NATO - Russia Council activities to support future defense operations during crisis response missions.

NATO defense architecture for future missile is likely to include defense on two levels, upper and lower. The lower level provides protection against aircraft, cruise missiles and ballistic missiles with range below 1,000 km.

The upper level would protect NATO forces against ballistic missiles with longer range.

Hopefully this system on two levels is to ensure a rate of leaks (percentage ends combat penetrating defense) below 1% and meet the following four missions: detection of the missile, tracking the rocket in flight, identification of real missile of false targets and destruction the attacking missiles.

¹ Hans Rosjorde, *Missile Defence and Other Challenges to Alliance Unity*, „Air Force Magazine”, October 2001.

Ballistic missile threats have not immutable nature, possibly being redefined in time, according to international political-military developments which would lead to the redefinition of architecture and emergencies in the MD system. By redefining the level of protection against ballistic missiles (lowering the level of ambition) can achieve substantial reductions of MD system components (by taking into account only mobile interception system) and the necessary funds for their development.

2. Tactics, techniques and practical means to combat aggressive ballistic systems

Specialized literature provides, as practical means to defense against ballistic missile, following types of actions: defensive actions, attacks, protection and C4I measures. Depending on the situation, we can consider that the success in missile defense operations lies in flexibility, integration and synchronization of air defense fire systems.

Offensive actions were designed to destroy and neutralize ballistic missiles before, during and immediately after launch. The purpose of offensive actions is not limited to destroying launchers but also to prevent the firing of rockets by the adversary.

Manners to achieve this purpose are: hitting the infrastructure of ballistic missile, attack the network communications equipment necessary to limit movement of the haul; attacking critical points under the temporary aspect (launchers, fueling vehicles or other targets within them); an increased rate of operations.

Success in operations must use offensive actions counter-infrastructure, counter-mobility, against critical targets and rhythm control in an integrated manner.

The integration of special forces, intelligence, surveillance and research, artillery and air defense missiles, aviation, helicopters and missiles land (together with other means) requires improving command relations, the development of common doctrine and interoperability of C4I system.

The American concept called "Ring of Fire" summarizes how a network can be created to tackle high mobility targets such as missile launchers. For example, a sensor, in a sensor network, discovers and identifies a launch system. This information goes to a distribution network controlled by an algorithm by which each target is assigned to a gun and missions are sent to fire units. If we request a confirmation from other sensors or if there are no available weapons, the same algorithm can direct another sensor to the same target. The algorithm in response to information procured, performed the best distribution of weapons and sensors for considered targets. Target data with action orders are sent directly to the shooters and attacks operators launching. Distribution algorithm must consider the target priority, weapons available, the degree of target identification, likelihood of success, the risk factors

American analysts have concluded that the efficient use of "Ring of Fire" concept implies substantial changes in doctrine, command and control processes and technology. Switching from a general view to one based on building control algorithms and determines the extent and location of human interface requires new levels of joint action. But for offensive actions to be successful these changes are absolutely necessary.

Through air combat actions are destroyed enemy air assets and / or missiles in flight. As the missile speed is higher, the area where it can be combated and the probability of interception are lower. For short-range ballistic missiles, short flight duration does not allow the defense system to discover and destroy the missile before impact. In case of medium and large-range air defense missiles rarely there will be enough time for a classic engagement putting necessary corrections. Ammunition must be launched as quickly as technology allows. Even when integrating a system with shorter range, speed ballistic missiles may not allow evaluating the results before taking the decision to use short-range system. In this way an overlay coating provides better protection, but with higher consumption of ammunition.

Targets selection or calculation of air combat vectors is technically difficult and affects directly the endowment. The need for selection comes not only as a result of deception or passive jamming, but also as a result of phenomena related to launching (eg separation of rocket stages). Ideally it would be launched one interceptor related to one air combat vector. Missing data can lead to the use of multiple interceptors for a poorly discovered target.

Air defense missile systems designed to intercept extra-atmospheric means will allow interception in the ascending and median trajectory of missiles. The difficulty lies in limited possibilities to act in several areas simultaneously. While the area where ballistic missiles are launched expands, the system must withdraw to defended area, reducing and sometimes eliminating the possibility of interception on missile upward trajectory, thereby reducing defended area. Similarly, the need to use two or more missiles is tactically safe, but is lowering the possibility to defend a larger area. In areas where the launch points are more disperse the effect on defense is dramatic. Targets selection remains a difficult issue.

Air defense missile systems are expensive and must cover large areas. While combating ballistic missiles in the first two phases is the mission of military satellites networks using lasers in this moment, combating ballistic missiles in the final phase (rocket re-entered the atmosphere with a speed of 4000 km/h.) is the field of air defense missile systems.

Significant steps have been made in the development of air defense missile systems capable to combat effectively the threat of ballistic missiles. In small panoply of such achievements are distinguished American air defense system PATRIOT series, Israeli air defense system Arrow and Russian S-300 and S-400 series. By including ballistic missile systems among probable targets of air defense rockets was extended the use of missiles with high initial speeds, with engines solid fuel, which does not require any large initial time-consuming process in technical subunits and does not require an initial cycle of preparing on the launch pad, thus reducing the firing cycle as the first way to increase nominal firing capacity

of air defense missile systems.

Another way to increase the nominal firing capacity was increasing the number of channels for targets, currently leading to S-300-PMU complex with 24 channels for aerodynamic targets and 16 channels for ballistic targets.

Air defense protection represents those measures taken to put our own forces in a less vulnerable posture and to reduce the effects of ballistic missiles actions.

However, for the foreseeable future it remains essential. Protection is achieved not only through early warning when the offensive and air defense actions fail but also through the measures taken before the launch or even before starting the campaign. Protection efficiency results from understanding that no defense system is perfect; some objectives (troops, areas) will remain unprotected; launches will occur; some will penetrate the defense, where it was organized.

Where total avoidance is the preferred option to attack, early warning and masking are still important. Avoiding attack can be achieved by deceiving the enemy (deception and concealment), using effective air defense actions or by an appropriate outflows speed to prohibit releases. This involves knowledge of the situation, possibilities and limitations of missile defense system by commanders and troops.

If the forces acknowledge the limitations of other solutions, they can reduce the probability of an incoming attack or the destructive effect of a possible attack by protective measures. Ideally, each unit should know his weaknesses and be able to take appropriate countermeasures, and every commander should know the threats for its subordinates and must be able to share it in time to decision makers. This implies the existence of a network whose results could be used to influence leadership in offensive actions or deployment of air defense forces. The command, control, communications, cooperation, information and informatics system is designed to ensure management in actions through real-time situational awareness, decision-making and its transmission, coordination and capabilities integration of joint forces.

In order to succeed in the struggle with ballistic missiles, the commander must have a conception of action flexible, dynamic, integrated and technical means to transpose this vision into practice.

The concept of action and C4I architecture capabilities must be dynamic enough to recognize the uncertainties of war. A rigid doctrine or based only on technical capabilities will not allow the operational forces commander to adapt circumstances. Concept must be dynamic enough and to be able to acknowledge the changes in rhythm, targets selection and areas defended. Integration does not simply refer to the systems interoperability but especially to effects integration. This assumes that a small number of air interceptors, affects the rhythm of attacks and protection measures. It is also the recognition that the movement of an infantry company and the arrival of a transport or supply affect to some extent the struggle with ballistic missiles. Such changes occur in few minutes, and any concept or plan must have an organizational and technical level of integration that will enable it to adapt accordingly. Air defense actions are carried out following a dynamic planning process that should establish what districts (objective troops) must be protected, in what means and how.

A network type solution, including the ability to conduct coordinated actions and employments increases the number of options and efficiency. In general, using a large portion of the electromagnetic spectrum complicates countermeasures but increases the precision and flexibility. Sensors network (radar, infrared or other) may provide a more consistent aerial image and can assist target selection and identification. A coordinated engagement capability consists in overlapping areas of employment, layering forces leadership, in targets assessment and sending new missions. This integration optimizes the use of weapons and ammunition consumption in a scenario based on networking, launching a ballistic missile is initially detected by satellites (via infrared sensors) or radar.

In a distributed network the launch is also reported by other sensors. For radars this signal allows limiting the initial research area. In a single network unit entered data are accurately determined. Single network has the advantage of differentiation the frequencies while sensors have the advantage of different aspect for radar charts. Accurate information regarding sites of site of the launching installation, the launch time and impact point are sent to all units. A distribution algorithm take into consideration the interception trajectory, speed, resistance to countermeasures and available weapons, to calculate the probability of destruction and the most appropriate means of interception. One or more air defense missile units receive by operation order recommended number of missiles to launch on the target, interception height and other information. Combat collateral damages, missing the target or another release order require changing the action orders.

An engagement network as described belloved require technical and doctrinal fully integrated solutions, based on a unique vision upon the fight. This level of coordination and integration of forces is necessary to avoid their schematic use with huge material consumptions, by dividing the area of operations in sectors or arbitrary division of responsibilities in certain periods of time.

Ballistic missiles can be countered before launching, immediately after the launch, on the intermediate flight course or in the terminal flight phase. The issue of combating ballistic missiles before launch is very complicated but not impossible. It is known that Barbarosa plan, the attack planned by Germany in Russia which was implemented in June 1941, was on the Stalin table in December 1940. Today, information sources, multiple and placed in all environments, can provide necessary information to combat ballistic missiles before launch. A problem remains the legitimacy of the attack before launching.

Defending the ballistic missiles in their initial phase has several advantages: the rocket travels at relatively low speed and has a large mark in infrared gamma; missile can be attacked as a unitary target before launching their sub munitions (multiple battle heads)

and electronic traps; target parts as results of hitting falls, usually in the area occupied by the enemy; provides defends for largest areas with the lowest number of means. In order to engage ballistic missiles in this stage is necessary to meet the following requirements: very low reaction time, safe decisions and multiple possibilities of approaching the fight (diverse range of combat capabilities). The development of opportunities struggling with high power lasers and systems for rapid interception decreases enemies "chances of success" and achieve viable systems arranged in space.

Currently are assessed many defense concepts by intercepting ballistic missiles in the first part of their trajectory. Some of the concepts under study are based on high-energy laser weapons; others are kinetic energy weapons systems. Laser weapons will be disposed on satellites, on large planes, airborne laser will be installed on Boeing 747 or on robot - aircraft (the Boeing plane CONDOR). Weapons systems with high kinetic energy are considering the use of "vehicles of destruction" (missiles) with high kinetic energy, ground-launched and sea-launched, which will destroy ballistic missile by collision.

Air Force antiballistic program based on airborne laser (ABL) has focused on short and medium range ballistic missiles.

There are settled clearly defined stages for the preparation of ABL and conducting of certain strategic defense missions. With sensors disposed on board each aircraft equipped with ABL will run out long range surveillance missions over large areas where enemy missiles could be launched.

The short term activity, concerning ABL will focus on actions taken on the ground to develop and demonstrate the technologies components and subsystems required for an operational laser disposed in space and to design and put in place an experimental integrated aircraft, scheduled to be tested in space. ABL project is based on long experience in the field and on reducing the technical risk as quickly as possible in the design process.

Ballistic missile defense on the medium part of the trajectory (MDS) is the most targeted field for the future.

On medium section of ballistic missiles flight trajectory, are achieved more reliable ways of counteracting them.

MDS program is divided into multiple elements, which include ground/sea based systems, operating on the part medium part of trajectory. This succeeds the national missile defense program (BMD) and enlarged marine forces program related to combat actions. In accordance with previous BMD program, is now developed a single system that can run interception on medium trajectory section in order to counter ICBMs - *The national missile defense program*.

Given the spatial scale of ballistic missiles fight on their medium trajectory, the rules of engagement exceeds the national framework, some becoming international, and more than that, involving countries outside NATO.

Details regarding the rules of engagement of ballistic missiles on their medium course and the consequences of their total or partial destruction are not shown in this study due to limited access to specific information related to interception systems.

The optimal ways of sensors arrangement for early warning, fire control and sensor interceptor missile on the medium course started with the assumption, as a result of political consultations that will not result in limitations / impediments of the Nations location.

Any such limitations, leading to an increased number of positions and their redistribution as a whole, in order to reach the level of ambition on populations and territory defense.

Within the study, Romania is taken into account for early warning sensors location and for interception sensors of missile on the medium trajectories. Location of launching interception systems is planned for the first phase, the initial operational capability (IOC).

Defending the ballistic missiles in the terminal phase of its flight (TDS) is really the area where we can include air defense. TDS allocates resources to support the establishment and modernization of defense capabilities designed in the fight for the destruction of ballistic missiles in the terminal phase of their trajectory.

TDS main projects aimed THAAD system (defending zones at great heights in combat actions) and program for achieving Israeli Arrow system.

THAAD program, with the participation of France too, represents the tactical connection between extra atmospheric weapons and air defense points. Extra atmospheric weapons include cosmic and ground missiles. Missile defense points include PATRIOT rockets and new ERINT (Extended Range Interceptor). THAAD missile system composition will have a range of 150-200 km, a ceiling of 150 km and fly at the speed of 1500-2000 m/s. Will be almost certain the use of missiles which destroy targets through direct impact, making them, thus lighter by removing combat load.

4. CONCLUSIONS

From the research concerning the development of missile defense systems consider at least the following conclusions:

- the solution of implementing a missile defense system, military advanced and economically acceptable, is based on the system of measures on strengthening the architecture of intimidation zonal concept promoted by the US, based on the evolution of threats area that spreads from Iran, Syria and North Korea, threats that cannot be countered only by „armoring” international democratic environment ballistic systems, ie., missile shields”

- worldwide, there is an inflation of missile shields; missile shield is currently the only mean (for now) with which we can defend against ballistic missile attacks carried out by any type, from the short to intercontinental action range, carrying nuclear, chemical or bacteriological loads; it should not be excluded that Russia is preoccupied with promoting new technologies concerning production of missile systems, having with certainty achievements in the field of missile shields; The future missiles designed to destruct ballistic rockets will have equipment based on proximity warheads and auto routing heads whose operation will be within the principles: radar, laser, termovision. There is a trend to reduce the missile size to solve the problem of radar mark and to increase their maneuverability.

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MILITARY PROCUREMENT MANAGEMENT SYSTEM AFTER 1989

Costel LOLOIU

"Carol I" National Defense University, Bucharest, Romania

Abstract: *The article analyses the military procurement system after 1990. After 1989, in order to absorb quantitative oscillations and shocks specific for military orders, sectors of manufacturing consumer goods have been created alongside the production of military equipment. The new defense procurement system is a single system. Under this system, military procurement includes research, development, testing and evaluation, production, and maintenance equipment operational units of combat.*

Keywords: *military production, military acquisition, military procurement programs, research, development, testing and evaluation*

1. INTRODUCTION

After 1990, former European communist companies underwent unique changes on a large scale, which involved simultaneous development of several processes: large-scale institutional changes, economic restructuring (primarily industrial), structural adjustment and macro stabilization. Usually, the general population does not realize the extent of such changes. For this reason, different perceptions persist about the real changes and the speed of making them, features interpreted differently on one hand by the population and politicians on the other. These different interpretations act as a source of social tensions and seeds for flawed macro-measures.

One of the most contentious aspect of this period is the requirement for reallocation of resources and the system's capacity in undertaking rapid changes. In Eastern Europe, particularly in Russia, economy's structure and to a small extent the allocated resources, have made the system to be extremely limited and sensitive to internal and external shocks

Reallocation of resources and industrial restructuring requires privatization. In order to accelerate this process, in the case of pronounced economic downturn and acute shortages of local funds for investment, direct foreign investments, mobilization of all domestic resources, especially human resources, political will and political consensus are essential.

The so-called "benefits of peace" that led to the conclusions of the "Treaty on the Non-conventional armed forces in Europe", signed in Paris on 19 November 1990, led to massive reorientation of the military allocated resources towards the civilian sector.

For the national defence industry the keywords are: re sizing, restructuring and increase in effectiveness based on economic and necessity criteria, revamping the competitive sectors, privatization, clustering into businesses and national companies, mixed structuring, civilian production, including the use of dual technology, alongside military production, reorientation of surplus staff.

Also, in order for the surplus staff to avoid diminishing their skills, staff which was specialized in "buffer" economic units, and in order to attract them in need, ways were needed to be found to utilize them.

Furthermore, other keywords are as follows: conversion of some capacities, participation in integrated allied programs of research and development.

To carry out the national defence missions, or those resulting from participation in alliances with other states, to provide an effective support for humanitarian missions, the armed forces need equipment to cope with both the extended field of action, in particular for offensive maneuvers, as well as with environmental conditions.

The defence industry envisions the armed forces as a potential market, the national authorities as clients and the troops that use these resources as the actual consumers.

The task of this industry is to design, develop and produce, mainly in close cooperation with the authorities responsible for signing contracts, the required defence equipment and in the case of extensions to ensure their absorption in third markets.

Because state-subsidized companies are an obstacle both to international cooperation and to industrial strengthening and companies receiving state protection are not profitable in the long run and cannot remain competitive, Romanian military enterprises have been privatized, most focusing on European cooperation.

In the context of international alienation, the international cooperation programs have pointed out difficulties in sustaining competition.

Competition is the most important factor in driving the process of reorganization and modernization of the arms industry.

It stimulates the design in the respective field and the development of the products; cost reduction encourages trade with the necessary equipment based on economic principles and allows governments to acquire defence equipment by applying the "best value for the money" principle.

2. THE INFLUENCE OF GLOBAL ENVIRONMENTAL CHANGE ON MILITARY PROCUREMENT PROGRAMS

After 1990, global environmental alterations have drawn changes in technology markets, labor, production, organizational conglomerates, and emphasis on leadership and organization structure.

Technology has moved from an electromechanical base to a computerized base. Markets that previously were stable are now dynamic and rapidly changing.

Labour based on muscle strength has turned into brainpower – the time of the white-collar worker has arrived.

Manufacturing went from mass production to a consumer-based production. Instead of focusing on management, organizations are now focusing on customers, and switched from a horizontal to a vertical, team-oriented hierarchical structure.

These changes have brought about a series of amendments in the methods of organizational approach. In the past, organizations have focused on domestic activities; they used fixed goals for performance, set relations in a hierarchical framework, concentrated decision-making process in the hands of the general manager and used a control-based leadership style.

Today, the organization's focus is outward-oriented due to the global changes in business. Instead of fixed goals, continuous improvement represents the basis for performance. Workers' relationships are now team oriented and not hierarchical. The employee and not the leader holds the power.

Drastic labour and budget cuts within the Ministry of Defence resulted in major changes in the acquisitions methodology - fewer funds, fewer people and fewer programs. These major changes in the MoD environment led to consequences involving those who work and manage military acquisition workforce. These consequences include the need for effective leadership and management, the need for flexibility and adaptability and the need for development of the remaining workers.

Because global changes also took place within the Ministry of Defence, the most effectively type of leadership style changed from a supervisory management to a participatory management, and then teamwork. Supervisory leader explains decisions, directs people, trains them, leads, resolves conflicts and reacts to decisions.

Participatory leader involves people, gathers data for decision-making, develops individual performance, coordinates group-effort, resolves conflicts and implements exchange.

The team leader builds trust and teamwork, facilitates and supports team decisions, expands the team's capacity, creates team identity, takes advantage of the differences between the teams, and influences the change.

In the past, managers of the military acquisitions program were primarily engaged in planning and financing, organizing and providing personnel, inspecting and problem solving. Today, considering the problems created by the reduction and the changes in the global environment, program managers need to focus on their role as commanders.

They must be proactive in setting the course of programs, aligning personnel with the scope of the program and motivating people.

The activities of the acquisitions manager take place in the framework of global changes. As a result, a modern acquisitions manager must understand the "big picture" of how the items given by the suppliers transform into products and customer service.

An open system perspective is useful to allow the manager to understand the complexities of managing the program.

Teams composed of representatives from all functional disciplines working together with an appropriate team leader in order to build balanced and successful programs, identify and solve problems and make healthy decisions on time.

Making decisions for the team based on the entire team's data (e.g. program management, technology, manufacturing, testing, logistics, financial management, procurement and contract management), including customers and suppliers.

Experts have identified seven paradigm shifts necessary for success in the 1990th:

1. The first involves redefining the quality. A new way of thinking about quality has begun since 1980th. This change in quality paradigm involves the following: we don't believe anymore that high quality costs more, we actually know that quality costs less; we don't believe anymore that products should have a short service life, we know that durable products allow a company to increase their market share; we don't think of quality as defined by the technical experts, we know it is defined by the client; we don't think of quality as being synonymous with luxury, we know that is defined as satisfying customer requirements; we don't believe that the current performance

will ensure future success, we know that today's excellence is tomorrow's mediocrity; we don't believe anymore that quality is defined by local competition, we know that we have to measure ourselves against the world's highest quality standards.

2. The second paradigm shift, constant improvement, comes from the belief that people are determined to improve and that improving will give meaning to work. Continuous improvement is determined by the client and requires a focus on the customer and constant examination of the value they receive every step of the process.

3. Third paradigm shift recognizes that people make the difference. The employees are the blood of the company. Employees are catering to customers, are improving the processes and are always thinking of a better way in which to do their jobs.

4. The fourth paradigm shift is improving the process against the result. A step from the exclusive concern of obtaining results to a concern that focuses on how to get results - focus on process.

5. The fifth paradigm shift is systemic thinking/approach. It is a step from a reduction-driven culture (where trying to gain a greater understanding of things by dividing them into the smallest possible pieces) towards a system-designing culture (where we are trying to gain an understanding seeing how parts fit throughout). The synergy, the total is greater than the sum of its parts, comes from partnerships with customers and suppliers.

6. The sixth is a shift towards a horizontal structure, thus replacing the vertical functional organization, which becomes dysfunctional. Horizontal structure represents the way in which the work is done. As a result, managers act as coaches who are providers that add value to the process operators - workers.

7. The last (seventh) paradigm shift involves teams as a system. A team system is formed when individual teams are linked with other teams of the organization in relation to the client-supplier chain. Having a dynamic partnership between any two depending teams results in perfect execution.

Process improvement teams have the opportunity to become a team system - a team of teams

Fixed organizations are the ones that did not adapt to the new paradigms. These organizations are managed from within and are functionally concentrated and focused on management.

Fixed organizations are managed from within - they make decisions based on their professional or departmental interests and not on renewed information regarding the customers' changing needs. Also, are functionally concentrated - are organized as a collection of separate functional departments and spend time and energy while competing with each other for resources and rewards. The overall impact of this type of concentration is a reduction in quality and an increase in time and costs. Finally, organizations are focused on management. Leaders see themselves as key players in the organization and assume the need to control almost everything. Often, these result in the denial of information, skills, experience and authority that workers need to improve the processes.

By contract, organizations that have adapted to new paradigms of the 1990th are called dynamic organizations. They are customer-driven, focused on process and involves employees.

Dynamic organizations are customer-driven, so they can rapidly and continuously understand, meet and exceed customers' ever-changing expectations. They cover the gaps between functional departments by understanding, monitoring, improving and speeding up work processes through horizontal movement within the organization.

Finally, dynamic organizations recognize that the world is moving too fast for managers to know enough things to be accurate in an acceptable manner, to have sufficient time to control occurring events and prevent the organization to become stuck. Thus, dynamic organizations are becoming involved in terms of employees.

They make a systematic effort to build and benefit from the knowledge, skills and involvement of their non-managers.

Because of their proximity to the business processes and customer and due to their numbers, non-managers can quickly know enough things in order to improve business processes.

These paradigm shifts have triggered the need for leaders and managers to change their roles. In the old paradigm of the early 90th, which defined the traditional environment, maintaining control was the most important task of the leader. As a result, managers determined and planned workload, tasks were clearly defined, training was seen as inefficient, most of the information was considered "management property", the training of non-managers focused on technical skills, risk taking was discouraged and punished, people worked alone, rewards were based on individual performance, and managers determine the "best practices". A team environment emerged with the advent of new paradigms for the 1990th. This new environment has made the anticipation of change to be the most important task of the leader. As a result, managers and team members jointly determine and plan work, tasks require broad skills and knowledge, and training is the norm.

Moreover, most information is freely shared at all levels, continuous learning requires interpersonal, administrative and technical training for all, reasonably risk-taking behavior is encouraged and supported, people work together, the rewards are based on individual performance and also on contribution to team performance and everyone works to continuously improve methods and processes.

A leader needs different type of skills for being successful in a traditional environment compared to teamwork-based environment. We will take into account the skills and characteristics of a supervisory leader, a participatory leader and a team leader.

Supervisory leader has the ability to direct people, to explain decisions, to train individuals, to contain conflict and react to change.

This type of leader highlights the downward authority of his position, which is sufficient in the traditional environment but not in a team-based environment.

Participatory leader has developed abilities to work with the employees and not just command them. This type of leader involves people, gathers data for the decision-making process, enhances individual performance, coordinates group effort, finds a resolution for conflicts and implements changes.

Team leader steps away from “controlling” and focuses involvement and responsibility by sharing command. This type of leader builds trust and enhances teamwork, facilitates and sustains team decisions, foresees and influences changes.

3. MILITARY PROCUREMENT MANAGEMENT SYSTEM

Given the significant changes in the Romanian society after 1990, both in economy and in the new defence policy guidelines and also in the general structural transformation, the Armaments Department aims to match the requirements of the NATO standards in terms of procurement management concept and of own’ and subordinated structures’ organizational chart.

In this respect, data was analyzed over a period of several years regarding structure and procurement management system of traditional NATO countries. Study visits and presentations by experts from these countries provided the information in order to achieve and implement a similar system. To create the capability of introducing a new procurement system, the Armaments Department underwent constant restructuring.

The new defence procurement system is unique so that the Ministry of Defence plans, develops, acquires and maintains the fighting techniques, equipment, establishments and services. The system includes regulations and procedures designed to identify and prioritize the necessary resources, to coordinate and control the process, to sign contracts and report to relevant entities (Government, CSAT, Parliament).

Under this system, acquisitions include research, development, testing and evaluation, production, supplying the operational units and maintenance of fighting technique.

Starting from the basic principle that, in the field of procurement, one person having full control is not possible, regulations and procedures govern the procurements integrated-management framework.

In the decision-making process of acquisitions, three systems that are involved, interact and ensure the effectiveness of decisions:

- The issue of requirements;
- The procurement management system;
- The planning, programming and funding system.

The issuing system of requirements is the responsibility of the General Staff and the staffs of all armed forces categories and is led by the Supervisory Board of Requirements. In the context of changing threats, political line, orientation, military strategy and tasks, these components of Ministry of Defence must constantly assess the current capacity as opposed to the required capacity in order to identify any inconsistencies between them, hereinafter deficiency.

Once identified, these deficiencies must be resolved, and as a first measure should be taken into account changes in organization, doctrine and tactics and eventually additional training.

These alternatives, called immaterial alternatives, are primarily taken into account due to the relatively low cost and ease of implementation.

In certain cases, this analysis can be performed through a detailed evaluation, called Domain Analysis Mission (DAM). If it is necessary to adopt a material solution, then the Mission Needs Document (MND) is drafted and respectively the Operational Requirement Document (ORD), the activity which presents the deficiency or the new technological possibilities within a MND which refers to general operational capacities.

These documents are revised by the Requirement Oversight Council (ROC) for validation and approval by the Chief of General Staff. After this step, they are submitted to the Department for Armaments for triggering the procurement program.

Procurement management system is the responsibility of the Department for Armaments, being led by the Procurement Council – CODA – and is regulated by the Ministry of Defence instruction 1000.2, which refers to:

- Structuring the acquisition process on the following phases: concept study and selection, system defining, technological development, production and delivery to troops, handling and logistic support. The transition from one phase to another is done by major decision points, on which occasion take place the assessment on the fulfillments of the requirements, the costs and risk projected by the program;

- analyzing several alternatives prior to starting an acquisition program, taking into consideration the latest technological achievements as well as the specific information of the acquisition programs;

- Procurement contract to take into account fair allocation of risk between Ministry of Defence and producer;

- Assigning the execution of the programs will be made based on competition;

- Costs, implementation schedule, performance parameters will be established at the beginning acquisition program, and will be evaluated and adjusted throughout the program

- The decision in the major decision points will be made at the appropriate level, but the lowest possible one.

4. CONCLUSIONS & ACKNOWLEDGMENT

Planning, programming and funding processes are directly subordinate to the Minister of Defence and are responsible for providing the requirements and funds necessary for developing procurement programs, as well as setting, together with the two other systems, the priorities in resource allocation included in the budget law. Planning, programming and funding processes are cyclical, every couple of years, being led by the Council for Planning and Resource Allocation, which is chaired by the Minister of Defence. This Council includes the Head of the General Staff, Secretary of State for Procurement, Chiefs of Staffs of all categories of armed forces and the Manager of Financial Division.

Every couple of years, the Directive for Defence Planning is developed, which includes, for a preliminary budget, the strategic military objectives, provisions concerning the use of defense resources in order to ensure the best capabilities for the armed forces (training, equipment, logistics, and infrastructure). This Directive is subject to review by the Council for Resource Allocation while the Minister of Defence approves it.

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ANALYSIS ON DEVELOPMENT OF SPECIFIC HUMAN RESOURCE IN NATIONAL DEFENSE ECONOMY

DAN ZHOU, HUI ZHANG, YANJUN YANG
Military Economy College, 430035 Wuhan, China

Abstract: *The fields of national defense economy have more special high-intensive and high-level professional relative to other areas of society nowadays, furthermore, development and management of such a dedicated human capital are more important, especially in the current high-quality military personnel construction. At first, this paper analyzes the current situation for specific human capital stock in the field of national defense economy, and comparing the phenomenon of usage for dedicated personnel with which in civil industry; secondly, pointing out the "rip-off" issues that may arise in the condition of incomplete contract, and then combining with psychological contract theory to analyze the development and management of dedicated human capital in national defense; moreover, the author make a comparison of the four western countries' experience in defense personnel training, military research and management, as well as the requirements of current military information technology transform under conditions of military personnel quality construction, and carrying out the comparative analysis; finally, making suggestions, refer to specific human capital's development and management issue in the field of national defense economy.*

Keywords- *national defense economy; specific human resource; incomplete contract*

1. INTRODUCTION

In recent years, the field of the development of the national defense economy increasingly reflect the characteristics of the high-tech talents and the change of this kind of high-tech human capital stock also affects the speed of economic development of China's national defense.

Technology professionals involved in the defense and military secrets unauthorized depart and inaugurate in foreign-funded enterprises, even to study abroad.

This phenomenon is shocking, and more than 60 national defense science and technology personnel leave an aircraft manufacturing company in the last decade, 32 person depart from a weapons research institute.

It is reported that a similar problem exist in a lot of defense-related research and military enterprises [1].

High-tech talents in national defense economic field are special kind of talent, the loss of such a talent, not only the loss of the dominant material, information, knowledge, technology, and more importantly, it is possible to make the defense cutting-edge technology

leak and the failure of intelligence, bringing the invisible loss of potential for development of national defense science and technology, research and innovation and talent reserve capacity, and thus directly affect the safety of the state, nation and the rise and fall of the armed forces.

Therefore, the world attaches great importance to national defense science and technology talent retention and reserves.

2. THE FACTS

The specific human capital in the field of national defense economy is the only specific businesses and post valuable, and corresponds to the concept of general human capital, apart from specific businesses and jobs there is no value of human capital.

The general human capital refers to the skills and knowledge in any work and any enterprise are the same value. A large number of facts show that specific human capital, especially in the new era of highly skilled specific human capital determines the development of a modern enterprise.

Dedicated highly skilled human capital is the main source of power to promote technological innovation, and the gradual establishment of unconventional products or services competitive advantage of enterprises. In the defense economic sphere, for example, R & D personnel who is responsible for the quartermaster equipment, camping gear, ground transportation and equipment, these dedicated highly skilled human capital to create value far exceeding the value of general human capital.

In the field of civil industry, highly skilled personnel, the same as the "gold collar" and "white-collar" management of decision-making and perform layer "blue collar", are Employees of enterprises whom are important part of corporate human resources.

But highly skilled personnel, who have proficient expertise in technology, with superb operational skills, be able to solve manufacturing problems, constitute enterprise scarcity of specific human capital.

Personally, the frequent changes in the industrial structure in China in the process of economic development, the risk of specific human capital investment is relatively large.

In conclusion, no matter what field specific human capital investment is subject to a specific enterprise or industry, investment event cannot be metastatic.

And different form the investment in general human capital, its knowledge structure is more specific, skills applicable narrower, limited employment opportunities under the influence of, easy to make a loss of "crowding out specific quasi-rent" (when the trading party, such as sellers made specific investments, seller firmly "bundle" deal if he quit the contract will bear the high cost, this is crowding out specific quasi-rent.)

It's positive correlation with dedicated assets. In extreme cases, if the specific assets cannot be diverted, the crowding specific quasi-rents should at least not less than the full cost of the specific investments.

3. SPECIFIC HUMAN CAPITAL DEVELOPMENT IN THE REALM OF NATIONAL DEFENSE ECONOMY

Signing in a world of uncertainty, it is necessary to predict all possible state is almost impossible; predicted to accurately describe each state is also very difficult; even if described, because of the afterwards asymmetry, when the actual conditions happens, the parties may also debated on the actual situation; even if information symmetry between the parties, the court can not be confirmed; execution cost may be high even if the court confirmed. Thus, the contract which total matter not listed in this contract is incomplete contract [2]. Under incomplete contract conditions, it's very prone to have the phenomenon of "rip-off". According to Klein et al study [3], when the transactions included some key specific investments, even prior transactions is competitive, but once put into specific assets it is difficult for its intended purpose, so after the transaction often in the seller monopoly or monopsony situation. In this case, one is "stuck", and the other exist opportunistic behavior to take the quasi-rents generated by specific assets as their own, that is a "rip-off" phenomenon. Simply put, the "rip-off" is refers to traders' post-contract opportunistic behavior, that seeking for crowding out quasi rents from the trading partner's specific investments in incomplete contract. The special nature of the asset is stronger, can occupy resistance quasi-rent more, thereby resulting greater the likelihood of the generated "rip-off" problem.

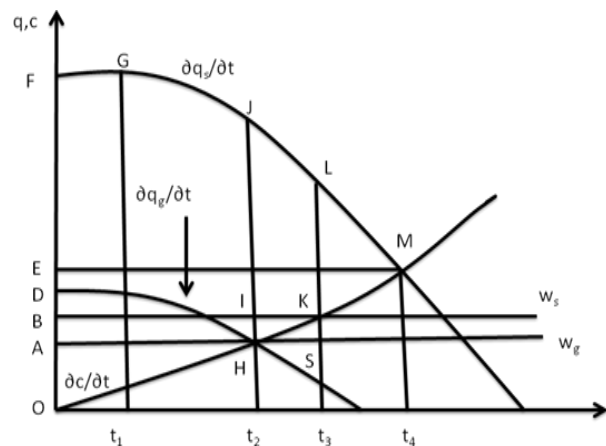


Fig.1 Specific human capital to participate in the sharing of organizational rent

As it shows, the horizontal axis represents the efforts of the staff, and the vertical axis indicates the output performance and the efforts of the owners of human capital costs.

The marginal product curve in the military organization for member S is $\partial qs/\partial t$, in which member S have defense specific human capital.

And marginal product of military organization for general members of human capital is $\partial qg/\partial t$, both of which marginal cost is the same as $\partial c/\partial t$. W_g and W_s represent the price of general and specific human capital respectively. For specific human capital, its equilibrium point is M, that is total output is O_t4MF . By the comparison with the general human capital's marginal product line $\partial qg/\partial t$, we can find that only if line $\partial qs/\partial t$ above the line $\partial qg/\partial t$. Specific human capital owners do not have to worry about to be pushed by general human capital out of the competition, and thus their lack of effort, and will not reach t_4 , then to form "Rip-off" phenomenon.

National defense scientific research in the field of enterprise, some personnel in accordance with enterprise system management is mainly distributed in the military industrial enterprises; the part of the staff is active duty military, mainly located in the Institute and other institutions to grasp the core R & D technology. Gaps from the national education system in accordance with the personnel of the enterprise system management, many specialty are both of the military and general-purpose, such as computer, medical, flight, and because of highly comparable and frequent exchanges between the military and civil, and the existence of gaps of benefits, which make talent involving high-tech proprietary became executive search and local competition enterprise's prey. Moreover, flow more freely and frequently, appear phenomenon before mentioned. Increasingly serious loss of leak problems due to the movement of persons is the current focus of our military to prevent the problem. In addition to taking signed confidentiality agreement and the constraints of the formal labor contract, but no other restrictions. Type of "rip-off" phenomenon for specific human capital is inevitable. Under the condition that formal indentured is invalid; the theory of psychological contract is an option to alleviate this problem.

Specific human capital is attached to the body of the individual owners, so this paper studies the individual level psychological contract.

4. WESTERN COUNTRIES EXPERIENCE

Nowadays, Western powerful countries in defense technology like the United States, Britain, France, Germany and other countries are all focused on the establishment of national defense science and technology institutions of higher learning to develop academic, technical talent as the main purpose, or of a similar nature. Proved, these institutions play an important role in national defense personnel training and military science. At the same time, these countries also take full advantage of the disciplines of national colleges and universities and civilian research institutions, human resources, equipment and facilities; provide services for defense personnel training and military scientific research.

Respective regimes need to select defense personnel training and military research management mode; they played a key supporting role in the process of the modernization of national defense.

4.1 U.S. U.S. defense talent's sources from three ways: the culture of the military academies, the delivery of the national education system and absorbing common culture talent worldwide, in which the role of the national education system is particularly evident.

The national education system in the United States is the world's most developed education system, through the national education supply and joint military personnel training mechanism, it provides a broad space and a solid foundation for the U.S. military with high-quality personnel and high-tech. The U.S. main relying on ROTC established in the local University to train officer.

4.2 U.K. Defense personnel training, U.K. is very high regard for the military academies and local colleges and universities, "marriage", this will not only highlight the professional characteristics of the military academies, but also use the advantages of a well-known University disciplines.

British military research institutions mainly are National Defense Science and Technology Research Institute, Kinetic, the British National Space Centre and the Atomic Energy authoritative technical institutions, including National Defense Science and Technology Research Institute is both a scientific research institution and the functions of the Board of the British Ministry of Defense.

The British Ministry of Defense is not engaged in basic research work, mainly in the form of a contract, this part of the work entrusted to institutions of higher education, such as commissioned by the University of London, Imperial College and the City University, and other colleges and universities to participate in military research, covering electronics, aerodynamics, material and a fuel system, etc..

4.3 France. Most of the French army's junior officers and senior military officers should through the academy training to receive their training and promotion.

France's military academies are mainly to be higher military institutions, mid-level military academies, junior military schools and preparatory military academy.

French land, sea and air force has Military Academy Command in the General Staff, so as to have unified leadership and management of the institutions. Some technical forces requirements, the officers of the military academies do not have to or unable to set a professional culture, taken from local institutions receiving or selected officers commissioned to entrust training. France also establishes a junior military academy and direct access to the higher military academies after graduation. Military research task is completed by three parts which directly under the Department of Defense research and experimental institutions, universities and the military industrial enterprises, scientific research institutions. Government research institutes, in addition to the direct leadership of Education and Research and Technology Ministry to the National Research Centre, the rest implement dual or multiple management from the Education Research and Technology Ministry, the Industry Ministry, the Department of Defense Ministry and other departments.

French government military research cooperation with universities mainly through two ways: First, the use of the contract system of indirect management; procure external research institutions and universities in close cooperation.

5. CONCLUSION & ACKNOWLEDGMENT

Accelerate the revolution in military affairs with Chinese characteristics, building computerized armed forces and winning the information war, the key is to train and bring a large number of high-quality new military personnel. Central Military Commission awarded the army to the implementation of the "military talent strategic project planning", and implementing the strategy of strengthening the army, and implementing the strategic project, the key is the implementation of effective incentive especially proper compensation, creating an environment conducive to training to attract and retain mechanisms, and with good talent.

The "five teams" is a talent group, which must adhere to the principle of unity of mental stimulation and material interests.

On the basis of a general increase in military wages, construct the innovative talents income distribution incentive mechanism to attract talent, and let the first-class talent to get first-class treatment.

Building computerized armed forces need a large number of knowledge-based high-tech talents, however, knowledge-based personnel, especially the cultivation of high-tech military cycle length is long, input is large, more difficult to retain. If you do not increase investment and provide more favorable growth conditions for high-tech military personnel to generate, to create a favorable environment conducive to the growth of talent, it is difficult to protect the construction and stability of the high-tech military personnel.

5.1 Use of Psychological Contract to mitigate "rip-off" problem.

5.1.1 Psychological contract can reduce insecurity of both organizations and individuals, because it can fill the blank of the formal contract to a certain extent, of reducing insecurity is conducive to enhanced mutual trust between the two sides, so that the human capital owners and organizations as possible maintain fair trade in order to achieve a win-win state;

5.1.2 Psychological contract can regulate the behavior of individuals, military organizations to give their own responsibility to measure every act of their own treatment of tissue, make it as the standard regulating individual behavior, norms of individual behavior can reduce their "lazy" and "free-rider" behavior, that can reduce both the specific investments opportunistic behavior;

5.1.3 Psychological contract allows individual emotional reaction on the organization of the event, the two sides after the negotiations may lead to less willingness to change the intended contract, which enables individuals are more willing to comply with the original contract, to prevent the generation of "rip-off" behavior.

In short, the introduction of the psychological contract in the organization can be to some extent alleviated the problem of specific human capital "rip-off". But need to pay attention to the psychological contract is based on a foundation of trust between the two sides, so once the trust is broken psychological contract violation formation (Turnley & Feldman, 1999) [4], the relationship between the individual and the organization will become more tradable, individual more attention to the direct economic benefits and lead to opportunistic behavior.

5.2 Relations contract incentives to reduce the brain drain. If you can establish a good relationship between the parties contract, you can very well alleviate the risk of specific human capital exit; the existences of relationship contract, as well as the importance of relationship values of the both sides, making the organization more stability. Thus, in order to encourage specific human capital investments, the organization through the effective action to strengthen the relationship outside the formal contract. Specific measures include: offered long-term contracts; uncertainty too much makes it impossible to sign a long-term contract in the future, to unilaterally increase the dedicated physical capital investment to enhance the confidence of the specific human capital owners; prior agreement a fair re-negotiation mechanism to respond to the crisis of the organization possible.

5.3 With the disciplines advantage of the local colleges to develop the special talent of the national defense economy. China mainly by recruiting local college graduates directly on active duty, and relying on local college to culture national defense students, two ways to train defense personnel, while you can see from the experience of Western countries for many years, defense personnel training have a flexible and comprehensive system of standardized system, adequate well-established faculty and stable source of funding. The military and joint training of defense personnel has formed a certain scale and a mature teaching system. However, in this regard, China is in the exploration and the initial stage, the relatively small scale of local colleges and universities to train defense personnel. Therefore, in order to increase the intensity of relying on local colleges and universities to train high-quality personnel for the military, and institutionalize standardized. Many universal Professional can completely with the completion of the national education system. To strengthen the military and university cooperation, the one hand, local colleges and universities should take positive measures to provide training and education opportunities for officers in active service; on the other hand, we can take joint enrollment, joint training and cooperation in scientific research, information exchange and discipline to build various forms of cooperation, each play a role in the defense personnel training, and accelerate the speed and efficiency of the Professional Training for the troops.

5.4 Material incentives to increase efforts to reduce the gap between the military and civil industry. For the dedicated professional personnel in the field of national defense economic sacrifice, dedication and the risk, their material benefits should also be better than other members of society. Incentive to meet their material needs it to reduce the survival and development pressure due to a lack of material resources and dissipative forces, which worry about their work, and to contribute to national defense and army building.

In Fig. 1 in order to avoid "rip-of phenomenon, military organizations should be raised to pay specific human capital, and to motivate specific human capital owners pay a higher level of effort. Otherwise, potential competitors would replace, then lose income higher than the opportunities cost of market in specific tissues. So the proprietary nature of human capital will be efforts to t_4 , but due to incomplete information and asymmetric, the optimal level of effort is difficult to achieve, so the pricing of specific human capital may be in the t_2 to t_4 middle of a point, by adjust the level of remuneration, to specific human capital also will adjust the level of effort to reach an equilibrium. Our military has the foreign armies unmatched political advantage, introduction and cohesion of the military high-tech talent, strengthen ideological education at the same time, starting from the adjustment of policies and systems, and continuous improvement of high-tech military personnel benefits, more dedicated personnel to promote the national defense economy worry about their work, resist the temptation to make up for a formal contract imperfect problem.

Specific human capital investment is of great significance for military organizations to maintain the core fighting. Defense specific human capital is largely from individuals through the process of "learning by doing" which have accumulation of specific human capital. Therefore, the management of specific human capital of the national defense economy, on the one hand the need to strengthen the incentive to avoid slack, on the other hand, through the psychological contract to make up for the lack of a formal contract, making this part of the special human capital to better service for the national defense.

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OLD & MODERN WARS – POLITIC'S MOBILE CENTRES OF GRAVITY

Cătălin ANTON

Regional Department of Defence Resources Management Studies, Brasov, Romania

Abstract: *Peace and war are important words which cover a large spectrum of life. They are important for mankind because of them assure enough space for living in a friendly environment or can turn off the light of hope. Modern wars have tried to solve so many issues, in so many ways, that the strategists try to melt all circumstances to discover relevant elements of the initial time and to understand the reasons of starting. There are struggles among them because everyone tries to show the better way in which a war can be predictable, or can be stopped, or can be prolonged in order to assure necessary time to reach the planned objectives. Nowadays there are important mutations to enhance the theory of war, in order to achieve the level of supremacy. Modern wars have to be confronted with new strategies that must cover the whole spectrum of political-military will.*

Key words: *intelligence cycle, mission, coalition, allied, decision-making, military.*

1. INTRODUCTION

The wars of all times and in all forms (civil, interstate, revolutionary etc.) have had and will have all ingredients needed to determine decision makers (political-military and military) not to let certain tolerance levels fall below the acceptance in order to maintain their political, economic or social systems. According to the phenomenon thinkers, the war must resolve paradigm to which a society has reached and cannot continue in the same direction because of rifts between civil society and the political and military divisions that often go beyond the political boundaries state.

Modern war is somewhat different from those already entered in the history books. Modern wars foundations are far deeper, being strong accelerated by transformations which take place globally. Major global changes will redefine the moral values of war in the context of achieving of some common values, values that can be imposed from certain levels.

Who will be the ones to decide if the correct trigger to determine a new military conflict is? What are the motivations that determine taking such a decision? Where should act to preserve the values and ideals of society? There are solutions backed by strong arguments to stop thinking in violent way?

To these questions we have had a lot of answers and rumors in the last 2,500 years, starting from Sun Tzu's time, who explains the motivations that led to that kind of decisions, and, of course, their description.

And Machiavelli help us to clarify these with his philosophy presenting that the Prince *should take decisions* (act) to ensure state security. Then we have the famous dictum „*L'Etat c'est moi*” of Louis XIV, King of France, saying that “he is well and if his state fills in the same way”.

Regarding arguments can be reminded Richard English, the author of the *Modern War - A very short introduction*, says that the History teaches us that "behind every war there are some lies as justification" and, also, as a different meaning, Mr. Herbert George Wells, a British specialist, who says that the essence of modern wars is *the massacre of boys / killing youth*.

In thousands of years of evolution, mankind has witnessed of multiple internal disputes inside each society, and external, related to the domination between states and neighbors. The dispute solving required the involvement of trained /skilled persons (strategists) who had the capacity to predict which might be the following action of the enemy, which can be in offense or defense.

The emergence of CoGs as strategic and operational elements of the war has been noted since ancient times by strategists like Sun Tzu and Sun Bin and later by Machiavelli, but one who had brought into the actually question was Clausewitz, who said that war, properly interpreted, is a rational instrument of politics, the end of the politics itself, but which cannot be treated separately from the policy itself. CoGs theory is now very interpreted and disputed, since it is considered both relevant and irrelevant, as part of operational planning.

The annihilation of the CoGs as a fundamental part of the war represents in the opinion of many a continuous planning process, execution, tracking and identifying of the constituent elements as the core business of the intelligence structures.

The characteristic elements, both real and abstract, are designed to be the source from which the armed forces derive their will to continue the fight.

This willing must be strongly supported by the available resources and capabilities, both for own forces and for the coalition to which States belong.

In the annihilation / neutralization process of CoGs the primary role lies to the operational planning team, and the decisive one to the commander. The commander's decision can turn an enemy's CoG in a source of power for future operations of own forces.

Harnessing this may be the moment of winning initiative. Stupefying and capturing enemy and its depot /warehouses can ensure the support for own forces offensive (eg. fuel for tanks and armored vehicles) especially when logistic structures cannot keep up the offensive rhythm (situation encountered in the Second World War).

The offensive approach was explained for the first time by Sun Tzu, and it relies heavily on intelligence forces in finding / identifying all CoGs, and on coordination and leading of forces to neutralize them. Hidden, conceal and deception military operations represent suitable actions to fulfill own missions without attracting enemy in battle.

Winning the war without fighting rises to the highest forms of military philosophy encountered especially in Chinese and Japanese philosophies.

Modern states, evolved - as Clausewitz called them, were engaged in open conflict, having numerous armies and large losses, left no room for ambiguity in the interpretation of the final results of the battles. The appearance may present a moment in time (several years) as a safe form of interpretation, but in terms of decades the option is useless and history has shown this.

Beating France by the German Empire in 1871 was not a final capitulation of France, even losing territories. Than the First World War was the first time retaliation slightly overshadowed by the US decision to waive certain reparations? Then, World War II represented the time to reverse the desire for revenge; Germany has defeated France for another five years. So we can say that without having a good and endorsed balance the war will reignite.

CoGs exploitation, expressed in quantities and perceptions, shows a very good knowledge of the phenomenon in general and particularly and other particular adjacent. Knowing the opponent's culture ensure correct interpretation of abstract CoGs, thereby avoiding the planning of some operations that can injure the pride and beliefs of conquered population, or which will be dominated.

Avoiding confrontations where there is no case requires a correct interpretation of the battle space, intelligence and planning activities which are dedicated to the implementation of operational plans designed on the basis of positive reasons.

Knowing the enemy's forces structure, layout, power struggle, reserves, ways of communication, naval and air support, artillery and anti-aircraft etc., ensure the preparation of plans that, first, we must fully protect our forces. Losses due to bad planning cannot be regenerated as we unfold attacks, and affects in a major way the offensive rhythm.

On the other hand trying to interrupt or diminish the links established at political-diplomatic level means, also, an important issue of war.

The deception's features regarding the establishment of alliances are listed by Sun Tzu, Clausewitz and Machiavelli. All pointed out the establishment or maintaining liaison with allies to ensure a dominant position or cover the role of political-military diplomacy to achieve the breakthrough in the political and diplomatic connections of the opponent.

In the history of the Romanian People there are many situations where leaders have applied this kind of tactics in order to be able to defeat the invaders.

A relevant example is King Dromichaete who was able to defeat the most powerful king of his time, the King of Macedonia, Asia Minor and Thrace, Lysimachus. Although Lysimachus benefited from the advantages of an impressive army (approx. 100,000 fighters) very well trained (using phalanx as the successful battle formation type) and equipped, could not defeat the Geto-Dacian army, due to combat tactics adopted by the Geto-Dacian were not complementary to the Macedonian forms of fight (they avoided direct combat with the whole army in the open field).

Early knowing of opponent plans is a major asset that can turn the fate of war. Another important element is the knowledge of opponent's using of tactics, techniques and procedures. Lysimachus very proud not accept the initial defeat, forcing his army to go through hostile territory, only to take the revenge.

Thus, Dromichaetes compelled Lysimachus to fight where, when and how he decided, using successful the characteristics of the own land due to very good knowledge of the battle space.

The CoG is important and decisive step in structuring the war. It represents a great capability, powerhouse and freedom of movement and has dominant characteristics.

All summed will ensure the reaching of final objectives or to achieve the final status of the political decision. Clausewitz said that *"war is a natural continuation of politics, and diplomacy, because of where diplomacy fails the war starts"*.

In 2011, the diplomatic talks inside the United Nations Security Council have solved only a half of Syrian problems, namely the problem of chemical weapons, although there was a consensus among the five members.

Regarding the situation of political system change, the two sides have not reached a consensus, for which was triggered an internal war, which later has expanded in several states around Syrian borders.

Regarding the conflict in Ukraine, the warfare opened here represents also a result of failed diplomacy. The CoGs are numerous, some of them clear, others diffuse, real and abstract at the same time. New Ukraine has to face with new problems which interesting are coming from the past history of the USSR, when numerous Soviet leaders have struggled to uproot the Ukrainian people (eg. 1932-1933 Ukrainian famine - Holodomor), which have not been forgotten and cannot be forgotten. Usually, these abstract CoGs figure out an impetus to combat power across that acquired through training, unleashes huge energies, otherwise unseen in other circumstances.

Disputes between military blocs are the most destructive since it involves multiple forces and capabilities. Maintaining confusion and effervescence provides the framework for failed diplomacy and conflict beginning. The situation in eastern Ukraine is held in tension, as the participants follow different purposes. One is to maintain the authority over the Donetsk and Lugansk regions which are the most industrialized in Ukraine, and other is to increase the military spending, and testing new capabilities developed in recent years.

Regarding the morality of war, Howard Michael Eliot and Peter Paret, who analyzed in detail the work of Clausewitz, consider that elements of morality are and should be the most important in the war. Morality, as history is on the side of defender. If the defender lost the war morality facts will be presented by winners.

2. THE EXPERIENCE OF MODERN WAR

Modern war benefits from all values acquired during past conflicts.

The war culture is vast and diverse, with different understandings and concerns.

Although globally are accepted numerous strategists and thinkers, great military states have adopted only few philosophies, usually internal (Russia, USA, China, Israel, etc.), which resonate with their policies, objectives and aims.

Maintaining large armies, heavily equipped and benefiting from new technologies allow to promote offensive policies against some states trying to get out of the sphere of influence or derail from the Community's ideology.

The threat of use of force under its various capabilities represents the same typology used in other historical periods, with the difference that the means /capabilities used are more refined.

In terms of capabilities there is serious concern for the development of new ones or to adjust old ones in connection with researches conducted into military and civilian environments.

Applications are continually updated and simulated exercises are increasingly take place of the real ones due to lower costs. However, digitization and unfailing role of computer in the future military actions provide an instantaneous exchange of information between commanders and soldiers.

Knowing the three-dimensional battle space, the structure and position of the enemy forces and TTPs provide a rapid adjustment of battle to gain the initiative.

Applying classical theories to not engage the enemy where it is strong and to be ready to bypass the heavily defended areas during the offensive, provides enough space for specialized troops to fight against this soldiers (e.g. fighting in the village). Application of preemptive action and their policies to ensure freedom of movement when the situation cannot be a subject of dispute for international political structures established globally.

In recent years modern war is much more diversified, provides much greater freedom of movement and ultimately could be planned as a military operation that, if it is covered by a UN resolution becomes also moral.

Also, the means of action have diversified greatly in the last 50 years. Modern war is essentially an economic war, and affects the critical infrastructure of isolated state, and the population that most often does not speak for the political decision.

Russian actions in Chechnya in two wars were not received with sympathy neither the troops (some of them refused to fight against their own population) nor civilians, especially neighbors of Chechen people.

The difference of ideology, from the political one to the religious one causes other divisions that are often misinterpreted through ignorance or intentionally. The ideology has been and will be the engine of political and military disputes through cultivating nationalist and chauvinistic ideas among own population. Growing up in a toxic environment provides the necessary ideological formation of a hostile population, fundamentally interested in preserving their values.

3. CONCLUSION

Modern war will continue to respond to all political demands, as the last step of diplomacy. Military doctrines will meet their interests and group growing up within alliances to meet common interests. Nations will continue to arm themselves, activity which has started with a great aplomb in 2015, after 25 years of decreasing importance of military cause. The emergence of some leaders who want to change international treaties and customs arrangements will lead to a repositioning of forces around the globe, causing mutations in areas with high impact and elusive to all states (control of the seas and oceans and space). The past 70 years have brought a dramatic change in the level of developing armaments. A global conflict can have unforeseen effects through using all capabilities, classical and nuclear, which can lead to the disappearance / extinction of what today provides the source of food or /and life. In this way the operational level will become very active, and training of troops must ensure the level of security desired. Cooperation and dialogue are the only tools that can preserve a lasting peace in the interest of all, if someone's planned goals and objectives does not disturb the very existence of partners. The study of peace and war must continue, because nobody will solve the problem of peace balance or the beginning of war.

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THE ROLE OF THE FIRST INSTRUCTOR IN CULTIVATING THE AVIATION SAFETY CONCEPT

Oliver CIUICĂ, Eduard MIHAI

„Henri Coandă” Air Force Academy, Braşov, Romania

Abstract: *When we are talking about flight safety is mandatory to understand the objectives and the principles of this concept. From the beginning, when the instructor is teaching the first rules of flight or the basis of aviation rules, it is also necessary to act exactly like he delivers all the information. The first teacher will always be an example for all carrier of one airman. If he shows that sometimes it is possible to defy the rules and nothing happened, later, somehow, the chain will break.*

Keywords: *Flight safety. First instructor. Self example. Military aviation. Proactive attitude. Stages for the aviation safety.*

1 INTRODUCTION

History of aviation is hard to understand as a distinct discipline because specialized literature has presented the idea of flying under a variety of aspects, ever since the ancient times and up to now. The entire history of aviation reveals the sacrifices of human lives and the efforts put into the materialization of the man's dream of flying.

The military branch of aviation implies the existence of, in most of the cases, one pilot aboard the aircraft (one crew member), who has to execute all maneuvers, interpret the board data and information, do all the calculations for navigation and maintain radio connection with air traffic controllers. All these actions require the maximum of a pilot's capacity of analyzing and synthesizing so as to make the right decision and to solve non-routine situations en route.

The simple or unilateral use of information, abilities and competencies formed throughout training may lead to the failure of the received mission or, in some cases, to serious flight events.

2. SAFETY STEPS IN AVIATION

Safety refers to something potential, that might occur and that has as its own indicators the statistics of flight events and the inventory of potential risk factors.

The risk for an accident to emerge depends on the complexity of the system and on the unpredictable character of the rapports between its constituent elements.

And since the level of complexity may hardly be diminished, an increase in safety may only appear with the intelligent effort of reducing the amount of uncertainty that governs the functioning of a system.

In a few words, in the branch of aviation, a branch extremely receptive to the most sensitive changes caused by the technological-scientific revolution, aviation, in general, and the military aviation, in particular, imposes not only the knowledge in depth of technology, its mastery, but also the specific issues related to the training of the flying personnel.

Accidents represent one of the fundamental challenges of aviation of all times.

The complexity of aircraft and of flight itself, the multitude of factors that intervene in the process of organizing, preparing and carrying out of a flight are permanent sources for flight undesired events, some of which may be serious and others may be less serious.

A flight event stands for something real and it represents a situation in which one or more uncertainty factors manifested their effect without being able to be annihilated by regular prevention measures.

The researches in the aeronautical field have led to the identification of three stages of development for the aviation safety: [4]

2.1 Technological period – the beginning of the 1900's and up to 1960's.

During this period there appears the air transportation that reduces the durations of travels and increases the number of passengers. It is still now that deficiencies related to safety had been initially identified with the technical factor and with the failure of technological development.

As a result, a concentration of efforts was channeled toward the investigation and repairing of technical faults discovered in the making process or during exploitation. Starting with the years of 1950's, technological innovations have led to a gradual decrease in the frequency of air accidents, whereas efforts for increasing safety have been re-dimensioned so as to impose and maintain certain standards in production and exploitation.

The technical factor – as we are going to refer to it from now on, is still the source for a series of causes generating insecurity and which emerge from its every component.

Based on statistics with regard to air accidents and catastrophes, the technical factor holds an important percentage in flight events production. Most technical malfunctions are detected on the ground, before any serious event occurrence.

Yet, when these malfunctions take place in flight, the situation becomes critical.

2.2 The period of human factor – the beginning of the 1970's up to the mid 1990's.

The incidence of air accidents is considerably reduced due to the introduction of new, advanced technologies and to the intensification of safety measures throughout the running of air activities. Air transport has thus become the safest and the most efficient way of travelling fast and comfortably and the scientists' concern has begun to be channeled towards including the topic of Human Factor within their specialized studies, including the man-machine interface. This concern has led to a different analysis of investigation methods from the existent one.

In spite of the increasing consumption of resources existent in the process of reducing errors in the field of aviation, human performances continued to be analyzed as one of the recurrent factors among those that result in producing accidents.

Thus, the science of human factor approaches the individual in itself, without considering the operating and organizational contexts in which the individual carries out his activity.

This is a totally erroneous approach, as it has been proven by current studies, because it has not been taken into account the fact that the individual operates within a complex environment, sometimes a hostile one, such as is the case of the military background, but not only this one, which allows for a multitude of factors to potentially modify the human behavior, reactions and actions. The human factor is the element that characterizes the representation in an external environment of the human body behavior.

This implies physiological and psychological aspects of the individual, but also his interaction with the other human beings, with the machine/ aircraft and the equipment in use, with the operating background, respectively, with the environment in which the individual performs his flight activity.[2]

At the origin of most of the flight accident imputable to the human factor is a mistaken action, an error. These appear on a background of tiredness, recklessness, insufficient preparation, stress, over-evaluation of own capacities, insufficient hours of training etc. Rarely does a catastrophe hold a single reason.

Most of the times, there is a major reason, to which one or more other secondary reasons are added. For example, a critical situation initially emerging as a result of a technical failure may be worsened by a wrong action that is able to make the situation more severe.[5]

2.3 The organizational period – from the mid 1990's until present.

Throughout the organizational period, safety has begun to be regarded through the system in order to also take into account the organizational factor as well, and not only the human and the technological factors.

As a result, the notion of “Organizational accident” has been introduced, taking into consideration the impact of the organization culture and its policies, for the purpose of increasing control over risks.

Thus, traditional methods of increasing the level of safety have been improved with a new, proactive perspective, in accordance with the current realities.

This new approach is based on a continuous collection and analysis of data and information regarding the organization as a whole, using both proactive methods and reactive ones to monitor risks and eliminate syncope in safety assurance.

The new vision leads to the permanent implementation and improvement of safety management and its purpose is to make the activity within organization more efficient.

In other words, there was a proposal for the exclusion of the tendency of blaming it all on the “human error”, emphasis being laid upon latent causes, upon accidents antecessors, which, identified in due time and corrected, would have significantly increased the chances to prevent the occurrence of an aviation event.

3. NOWADAYS SAFETY

Proving the existence of the three stages of aviation safety draws an alarm signal in case of military organizations that possess aircraft, and which are still tributary to the technology and training used by the former Soviet bloc.

The current tendencies and the necessity of aligning to the North Atlantic alliance have imposed the implementation of a new safety system in this field.

This system may be easily implemented throughout the period of initial training of future pilots.

But in order to do this, there is need for models within the structures of instruction from aviation schools for young pilots; positive examples on the instructors’ side, on the technical staff, air traffic controllers and on all people involved in the whole training process, planning, coordination and assessment of the flight activity, both theoretically and practically.

If for the old system of training the identification and punishment of guilty people after an air event was essential, whereas assuming responsibility and accepting some unjustified risks in air activities were praised and even prized – even if, in accordance with those times regulations, lack of discipline was severely punished – the current system rejects firmly such manifestations and encourages the factors involved in the flight activity to place the safety of resources first (human and material) and, implicitly, the entire organization, through the implementation of a set of lessons learned. These lessons learned emerge from the necessity of a permanent improvement of the training process management within the organization and they are based on past, undesired events, which underline some dysfunctionalities of the system.

Educating conscious discipline represents one of the basic problems in training pilots and it has powerful effects on avoiding flight events. It is the people who train future pilots’ duty to implement correct decisions, through their own good example. Often, incorrect decisions or the frequent and premeditated breaking of rules represent the lack of good pedagogy of training, lack of positive examples or even tolerance, from the organization, of risky actions that may affect flight safety.

The easiness of implementing the own example consists of strictly abiding, by an instructor, part of an aviation organization, by the Aviators Model Code of Conduct:[1]

GENERAL RESPONSIBILITIES OF AVIATORS

Pilots should:

- a. make safety the highest priority,
- b. seek excellence in airmanship,
- c. develop and exercise good judgment and sound principles of aeronautical decision-making,
- d. recognize and manage risks effectively, and use sound principles of risk management,
- e. maintain situational awareness, and adhere to prudent operating practices and personal operating parameters (e.g., minimums),
- f. aspire to professionalism,
- g. act with responsibility and courtesy, and
- h. adhere to applicable laws and regulations.

The instructor (flight instructor, the mechanic or the air traffic controller) needs to provide the clearest and the most complete instructions both during the theoretical training and during the practical training (in flight, within the maintenance workshop or in front of the command panel of the air traffic control). He has to encourage his trainee to learn as much as possible, including making him learn individually, so as to achieve mastery in his profession.

Instructors are also the first and the most important actors in what concerns the improvement of the results of the aircraft constructing industry, due to their careful training of pilots who use the technology made for them by the technical staff and air engineers.

The flight safety (aviation safety) is the supreme element of the training. Therefore, norms and regulations in this field hold the role of promoting and maintaining safety while diminishing to the maximum the conditions and circumstances in which both human and material damage occur. But even the strict alignment to these rules may be insufficient to guarantee the safety of air activities. Therefore, it is very important for instructors to have a proactive attitude regarding the adding and modification of rules, in agreement with the newly identified threats or with the new requirements issued in the light of optimizing the level of safety for the entire activity.

4. CONCLUSION

The manner in which the instructor applies the safety rules and makes correct decisions concerning the maintenance or assumption of the accepted level of risk has a long-term effect on the trainee under his supervision/training. In general, trainees consider their instructor to be a model, whose behavior trainees tend to imitate consciously or unconsciously.

Thus, one of the best methods to develop and maintain the safety concept within an organization, belonging to any area of expertise, is that of providing a self example.

ACKNOWLEDGMENT

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MODERN TECHNOLOGIES WITH MILITARY APPLICATIONS: THE OPTOELECTRONICS CONCEALMENT IN THE MODERN BATTLEFIELD

Lucian Ștefan COZMA

National Defense University, Bucharest, Romania

Abstract: With the ever increasing importance of the vertical component in modern warfare, in the context of the technical and scientific revolution (and accordingly, the revolution in military affairs) have emerged and consecrated the improved means of concealing designed for the flying machines, which use the technique of holography or optoelectronics technologies that enable the minimizing or even the cancellation of aircraft surface interaction with the light beams. Along with these optoelectronics technologies they have also been developed the MHD (magneto hydrodynamic) technologies which allowed not only to improve the performances of speed and altitude, but also to reduce the shock wave (sonic boom) and the radar footprint.

Keywords: stealth / infiltration / electronic countermeasures / magneto hydrodynamic.

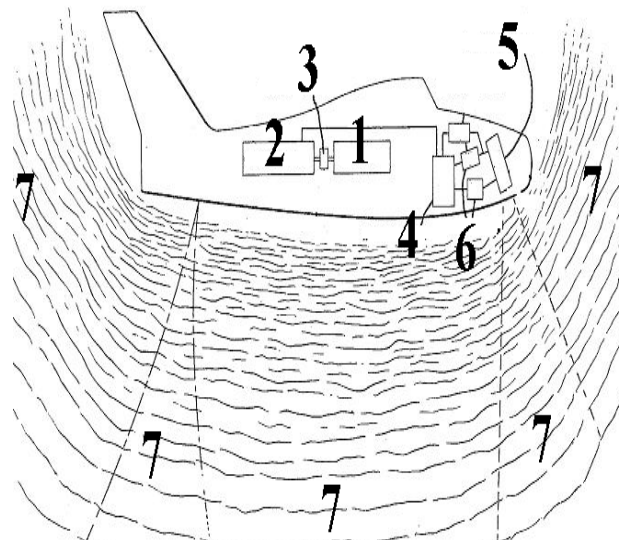
Once published the first informations on *stealth*¹ technique (in the early 90th) it has become increasingly clear that one of the preferred directions of development of the modern aircraft technology will be the related to ensuring the aircraft invisibility against the action of the enemy detection equipment. Therefore, the military aircraft for strategic bombardment have gained the tendency to be primarily *infiltration flying machines*.

1. INTRODUCTION

In the context of the contemporary technological developments, the military aerospace vehicles designed for strategic actions can be better protected against radars using their own MHD/electrokinetic sustentation and propulsion system. Such an aerospace MHD/electrokinetic vehicle could be protected with an active concealment system which uses a shell of electrons and ionized particles.

1 *Stealth* refers to the so-called LO technology (low observable) based on the use of active or passive countermeasures for the protection of combat personnel and combat equipment by turning them into objects difficult to observe by the equipment enemy type radar or infrared, thermal imagers, sonar or other methods of detection.

We remind on this occasion that, according to historian Valeriu Avram, the origin of this idea would belong to the Romanian inventor Vasile Dimitrescu, during World War I, around that time when the theoretical basis of geophysical weapons were made by Constantin Văideanu. According to information released by the historian V. Avram, the inventor Dimitrescu predicted (during 1910-1914) the using of the electromagnetic radiations for the detection (the radar of today) of aircraft but he also would have designed a protection mean consisting in an electron and ionized gas (air) cloud which was supposed to surround the aircraft.



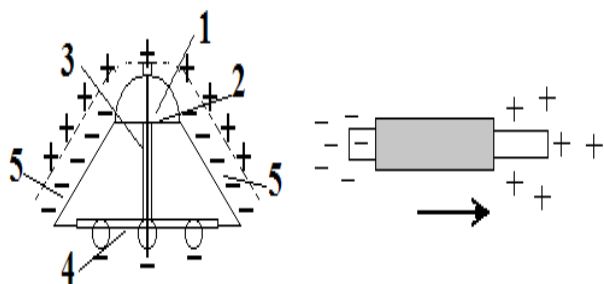


Fig. 1 Above, the aircraft with anti-radar protection using electron beams, according the patent US3127608: 1- the engine; 2- electric generator (motor-driven); 2- transmission mechanism between the motor and the electric generator; 4- modulator; 5- particle accelerator; 6- klystron; 7- layers of charged particles formed around the aircraft. On left, the general scheme of an aerospace electrokinetic vehicle and the Tesla coil application in the field of aerospace propulsion: 1- Tesla coils; 2- alternator; 3- Tesla transformer; 4- electrostatic generator; 5- vacuum. On the right, an example of Biefeld-Brown effect² application by the appearance of forces between the asymmetric electrodes during the action of high potential supply: the force is exerted from the cathode to the anode.

2 Thomas Townsend Brown (1905-1985) was an American physicist and the author of some experiments achieved by applying high voltage to the electrically conductive and dielectric materials. In 1921, during some experiences he highlighted the phenomenon of an occurrence of forces which were applied to a certain direction when using the capacitors with asymmetric armatures, supplied at high voltage, this phenomenon would be later called *the Biefeld-Brown effect*. This name refers to Dr. Paul Alfred Biefeld (1867-1943) who was a German-American engineer, astronomer and professor with whom Brown claimed to have made the experiments mentioned above. After 1930, T. T. Brown entered in the United States Navy and realized researches in fields such as the electromagnetism, gravity, spectroscopy etc. It is known for the correlation which he tried to do between electromagnetism and gravity but also for its many patents on electrokinetic propulsion systems.

As at the end of XIXth Century the inventor and scientist Nikola Tesla had already developed the high frequency and high voltage generators, almost simultaneously occurred in his mind the possibility of using the electricity for the aerospace sustentation and propulsion systems³.

Unfortunately, when Tesla has stated⁴ about these conclusions of his research, he was derided and considered eccentric or mad.

Even much before that time, Tesla predicted the using of the electromagnetic waves for the remote control⁵ of the aircraft.

However, in the coming decades (between the world wars) all the research undertaken by other scientists and inventors, generally arrived at the same results as Tesla... From this perspective it should be mentioned a series of pioneers of the electrokinetic propulsion technology, such as : Th.T. Brown (1905-1985), Agnew Bahnson (1886-1966), Hector Serrano, Alexander DeSeversky (1894-1974), Henry Dudley, Robert Baker, Henry Wallace (these latter two, made among others, certain researches on creating the artificial gravitational waves) etc. To achieve an electrokinetic aerospace vehicle is required the boarding of a generator capable of providing high power, but also of working at high voltages. In the interwar period like the present moment, only⁶

3 Nikola Tesla, *New York Herald Tribune*, the article *Tesla's New Monarch of Machines*, 15.10.1911.

4 Nikola Tesla talked about an envisaged work entitled *Dynamic Theory of Gravity* in his discourses from 10. 07. 1937 and 12. 05. 1938; this work was never real achieved or published but his statements were recorded.

5 The patent US 613809 granted in 1898 to Nikola Tesla for „*Method of and Apparatus for Controlling Mechanism of Moving Vessels or Vehicles*”.

6 When the author makes this statement, he refers not only to the technological capacity but also the relationship between power and total weight of the device or between the voltage and total weight, because if the device has a too big weight (or dimensions), it could not be airborne.

the Tesla systems (the so-called *Tesla coils*⁷) were capable of such performances. Note that Tesla has developed this technology since the late of XIXth Century and during interwar period certain advanced experiments were conducted (especially by the Germans) using this technology.

2. THE TECHNOLOGY OF INVISIBLE PLANES

As it is well known today, the radar⁸ is an apparatus which sends and receives electromagnetic waves, usually focused within a cone, through which it make the bombardment of the atmosphere with radio emissions of a given frequency, therefore if it is an aircraft within that region of the atmosphere, it should reflect the electromagnetic waves such as to be received by the radar device.

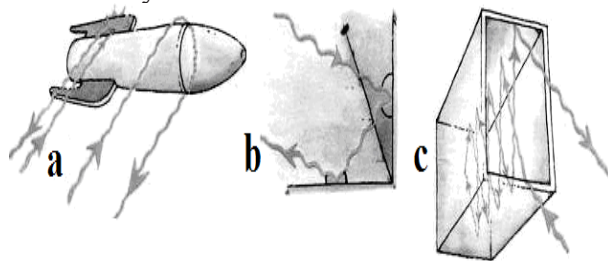


Fig. 2 The ways of reflection of the radar waves into the surface of the flying machines⁹.

For a better understanding of these technologies, we'll briefly present some aspects of the physical phenomena involved in the formation of optical imaging and radar image of an aircraft, and obviously, how we can partially or completely blurred these images. An aircraft capable of being invisible for radar but even optically (invisible to the human eye and to the usual photo/video cameras equipment) would be *an almost perfect infiltration vehicle*.

7 The patent US512340 granted in 1894, the same technology of the subsequent patent US593138 from 1897, but the main idea started since 1891.

8 The name comes from the acronym Ra.D.A.R. (**R**adio **D**etection and **R**anging).

9 Fig. 2, 3 and 4, after the drawings published in *Science et Vie* nov. 1987, pp. 58-62.

Some of the technologies that could be applied in this regard have been already tested by the USA since the onset '50s and '90s, and already there were released some information about the radar invisible (*stealth*) aircraft designed both for reconnaissance and strategic bombardment. The aircraft capable of silent flying are also those designed by Henri Coanda, by applying the improved variants of the silent nozzles invented by him, for example the patent US2173549 for a muffler for jet engines, or a silent nozzle for jet engines (for which he was granted with the patent US2173550), and also the patent US2187342 for another type of silent nozzle, the US2907357 and US2920448 for an accelerator capable to achieve the propagation with high speed of a fluid jet but also in terms of quietness, the patent US2990103 for an improved nozzle and finally the US3685614 for a muffler are just a few examples. Coandă technology is generally simple and effective, reducing the thermal footprint and ensuring a quiet operation.

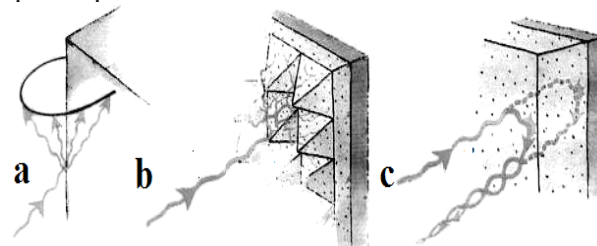


Figure 3 Posibile structures on the aircraft surface, designed for absorption of the radar waves.

If the air-depression technology (Henri Coanda) or the vacuum-propulsion¹⁰ technology (Rudolf Liciar) would be properly hybridized with the MHD and/or electrokinetic technology, we can say that we are facing the technologies that may already allow the creation of some military flying machines (for reconnaissance and bombardment, also jet fighters - who may face an enemy that he even cannot see!?!) who can fly without being noticed by the usual radars, without being seen by the human eyes or the usual photo/video equipment, but without making noise.

10 Lucian Ștefan Cozma, *The vacuum-propulsion technology- concept and applications*, in the Air Forces Academy Review no. 3/2014, pp. 43-52.

Such flying machines may fly whenever above any country, without anyone to see nor the presence neither the activity they perform.

As it can be seen in the Fig. 2 the interaction between the aircraft surfaces and the electromagnetic radiation is such that the images of radio waves are well reflected, in particular by the sharp surfaces but also by the round ones (Fig. 2a) which have the advantage to disperse to some extent the electromagnetic radiation; reflected also by the edges (fig. 2b) and by the various cavities (resonant) or chambers (holes, slots etc.) located on the surface of the aircraft (fig. 2c). Such interactions result in the formation of the back scatter beam of the electromagnetic radiation, finally captured by the radar.

To make the signal picked up by the radar to decrease even until its disappearance, it was taken the measure of rounding the edges in order to break the wave (Fig. 3a), but also to make an special arrangement on the surface of the aircraft using certain geometric shapes capable to break completely the radar waves (Fig. 3b), or even by achieving walls which have a sandwich structure (Fig. 3c) and capable to absorb the radio waves.

Most often, however, these methods are used in combined form, plus special anti-radar paints and the applying other types of exterior anti-radar treatments which are able to significantly reduce the radar foot-print.

Over time, at these technologies has been added the technology of holography, which allowed that the aircraft surface could become almost invisible optically (by holographic camouflage techniques or capturing the environmental images and projecting them on textile screens¹¹), not only invisible just for radars.

Based on the general analysis of the contemporary technological level, we can say that at present these technologies are not only developed but even properly improved, compared to models which have already been released in the early XXIth Century.

The work of researchers has revealed in time and a number of unexpected ways and means that could contribute decisively to achieving the almost perfect stealth flying machines. Among them, Dr. Robert Birge, who moreover has some of the most prestigious results, internationally recognized in the field of technologies for aircraft invisibility.

Otherwise, R. Birge obtained a number of patents and from his public work we could cite for instance the patent US6461594 for *photo chromatic materials that absorb radiation*, or the patent WO9621228 for *an optical memory device*, also the patent US5253198 for *a three-dimensional optical memory*. Finally, during his research, R. Birge discovered at a time that it can be used in the stealth technique a number of molecular derivatives of the chromophore 11-cis which is within the retina of the human eye. Note that a *chromophore* is a group of atoms which once introduced in the molecule of an organic substance, they color this substance, like a microscopic pigment. One of these molecular derivatives which was been called the ATRSBS (*All-Trans-Retinal Schiff Base-Salf*) is obtained artificially, representing a molecular chain longer than that of the natural retinal rhodopsin, but having similar photo chromatic properties. It is worth mentioning at the same time that the rhodopsin from the human retina is concentrated within a cell membrane which is a part of the retinal cells (the retina is a nerve membrane sensible to light and located in the backside of the eye, which is made up of several layers of specialized cells, which form the visual image of the eye) and this rhodopsin is in fact the overall albumin present in the retina of the eye tissue.

The rhodopsin is normally closed within the cell membrane of the retina and it has the faculty to absorb the light reacting photo chromic to its action, i.e. translating the chromatic message of the light.

11 Takumi Yoshida, Sho Kamuro, Kouta Minamizawa, Hideaki Nii and Susumu Tachi, *RePro3D: Full-parallax 3D Display for Superimposing 3D Images onto the Real World using Retro-reflective Projection Technology*, The journal of the Institute of Image Information and Television Engineers, Vol.66, No. 4-2012, pp. 1-7

In the rhodopsin operates a derivative of the vitamin A, i.e. the retinal compound 11-cis, able to isomerization (*the isomerism* is the property of some substances with the same chemical composition, to have different properties and characteristics because of the different positions of the atoms into the molecule; the substances that have this property are called *isomers*, while *the isomerization* is the property of a substance to be transformed into an isomer). The chain of specialized protein molecules it is wrapped in seven parallel loops (helicoidal) as shown in the Fig. 4; in obscurity (the absence of the light) the retina rests while the atoms of hydrogen and carbon are arranged on the same side of the protein chain, while under the action of the light, if it is a light radiation with a wavelength between 300 and 600 nanometers (approximately the visible spectrum), this compound retinal protein is isomerized, that changes the shape arrangement of its atoms in the protein chain, gaining also completely different characteristics, namely the two hydrogen atoms are separated and therefore the protein chain had the tends to go up, as shown in fig. 4b.

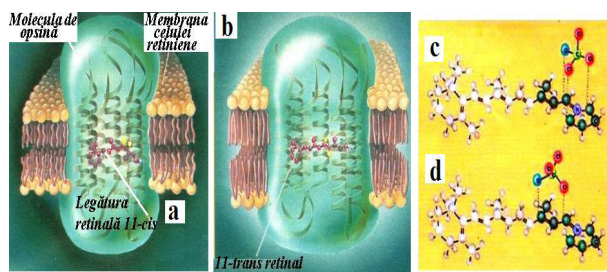


Fig. 4 On the left side, the molecule of rhodopsin in the retina of the human eye is artificially modified to be used in the actual stealth (optical invisibility) technology of the modern aircraft. In the center, the change of the rhodopsin molecule that has yielded a photo chromic material designed to absorb the light rather than to reflect/refract it.

By absorbing the impact photons and not reflecting the incident light, it is achieved an body which is invisible to the human eye. On right, the natural molecular chain of rhodopsin (c) and the modified one (d).

Therefore, the 11-cis retinal needs only a small input of energy to pass from the *cis* form (with hydrogen atoms within the molecule) into the form *trans* (with atoms of one side and the other of the molecule). These two forms are some real light traps.., because they absorb the photons without any heat dissipation into the environment. This is exactly the property that is wished for the surface of an aircraft that would be optically invisible, not only invisible for the radar. The molecule that dr. R. Birge extracted and studied, can be artificially reproduced, even with improving its photochromatic properties, for this reason he added a supplementary cycle in the chain, therefore the artificial molecule became longer than the natural one (Fig. 4d). To stabilize it, R. Birge added a perchlorate ion which he arranged above the molecule in question and the ion was connected to the molecule through the weak electrostatic bonds. The result was that the completely stabilized molecule shall be capable of absorbing the light without reflecting it, without refraction, without producing and dissipation of heat. This process occurs as shown in Fig. 4d, by ion movement between the two groups of atoms in the chain, without mention about any isomerization because the position of the atoms remains the same, only the perchlorate ion from outside the molecule is moving, improving in this way the phenomenon of photons absorption and the full light capture. To understand how an object could become invisible, we must first study some general information on the structure and functioning of the human eye.

Regarding the known radar waves, they are usually in the range of centimeters so it could be absorbed by the molecule above mentioned; however, the civilian and military researchers were and currently are able to link to each other the retinal molecules with other molecular compounds capable to absorb the electromagnetic radiations from the radar spectrum. Accordingly, we should specify that any image, therefore the visibility of a certain object is formed through the light emission of the light sources or by reflection and refraction of light, according to the refractive index of each substance and of the propagation medium.

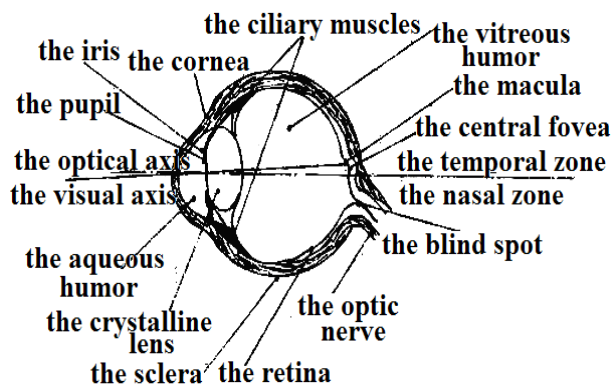


Fig. 5 The structure of the human eye.

Therefore, the human eye (fig. 5) as well the photo/video camera receives a photon beam that is reflected/refracted by the body which is exposed to light; if the same body will not be anymore the lighted area of any source of light nor it has its own light, then it will no longer be seen, therefore it become invisible... It is known long ago that the professor of anatomy Werner Spalteholz¹² from the Institute of Anatomy at the University of Leipzig has done interesting research on the skin of animals, trying to achieve invisibility of the skin, which he started from trying to make a transparent substance, that it can be easy traversed by light and thus the substance becomes difficult to see for the human eye. For this, he took the experimental substance and processed it such that it became white, then he washed and treated it with the methyl ether of salicylic acid, which has a high refractive index.

By introducing the treated object into a vessel with methyl ether, it becomes almost transparent. Such experiments have inspired the famous science-fiction writer H. G. Wells, who published in 1897 a famous science fiction novel on the subject, entitled *The Invisible Man*¹³.

12 Werner Spalteholz (1861-1940) was a German professor and anatomist from the University of Leipzig. He made and published (in 1895) the atlas of human anatomy, a very detailed work for that time.

13 H. G. Wells, *The Invisible Man*, published first time as a serial story in *Pearson's Weekly*, 1897.

However, Wells was wrong interpreting the experiments of transparency as solutions for invisibility... Transparency is one thing and the invisibility is quite another thing! Not to mention that if *Griffin* (the invisible man, the hero of the Wells's book) should had been transparent..., he would be completely blind because the light would not have stopped on his retina and therefore he could see nothing of what was around him. For an object to be invisible is necessary either to absorb completely the light and let no longer any photon to leave its surface, in which case it cannot be observed, or it to absorb partially the light but to have a refractive index equal to that of ambient or which does not differ from that of the environment (air) with more than 0.05. Eventually it was kept the idea to absorb completely the light and also the idea to form a virtual image that could deceive the visual perception of the observer, in this case being applied, for example, the technique of holography.

Finally, there are also the method of using the nanomaterials based on liquid crystals which are made as thin films and work like a flexible monitor screen, which coated the surface of the stealth body in an attempt to make it virtually transparent within the medium through which it moves.

Until now, the most advanced methods of invisibility (optical, not radar) are based on completely capturing of the light without any heat dissipation and deflecting the photons so that the light beam will bypass the shielded object.

There was thus obtained a *stealth* flying machine which is imperceptible to the human eye and to photo/video cameras, also to the thermal visors and infrared tracking heads. But it could be observed by certain means which can translate the light signals from the infrared and ultraviolet register, and which might observe the body of the stealth aircraft as a kind of black spot, ie a screen in the way of IR and UV emissions which come from the environment to the camera lens.

Of course, the principle would be able to be applied to clothes to achieve such a total photons (light) capture.

Against these technologies there are objectors who say that if there is a body that absorbs the light it would be observed as a dark region, a black zone. The author does not subscribe to this theory because we must not confuse the regions of shadow with those regions that absorb the light, therefore the regions which not reflect and have a very small refractive index, as it is that of air. But on this occasion it would be appropriate to remember briefly the terms of *reflection* and *refraction*: the *reflection* is the phenomenon that occurs at the surface separating two optical media characterized by different refractive indices and which manifests by turning the light back into the environment where it originated; the *refraction* is a phenomenon that occurs in the separation surface between the two transparent optical media but which have different refractive indices and may be observed to a certain degree the penetration of light from the medium of origin in the second optical medium.

As we can see, the refraction theory concerns two transparent optical media, in which a good part of the light passes from the emitter medium in the target medium. A classic example is that of air and water refraction happening on the water surface, where some of the light that passes through the air will enter in the liquid mass and transparent/translucent of water. Hence, the water absorbs some of the light, according to its different refractive index (a bigger one) than the very small refractive index of the air. If the photon-absorber surface of the *stealth* flying machine fully absorbs the light it is like there would be no difference between the air medium and the body of the aircraft, so it behaves as if the refractive index would be equal to that of air.

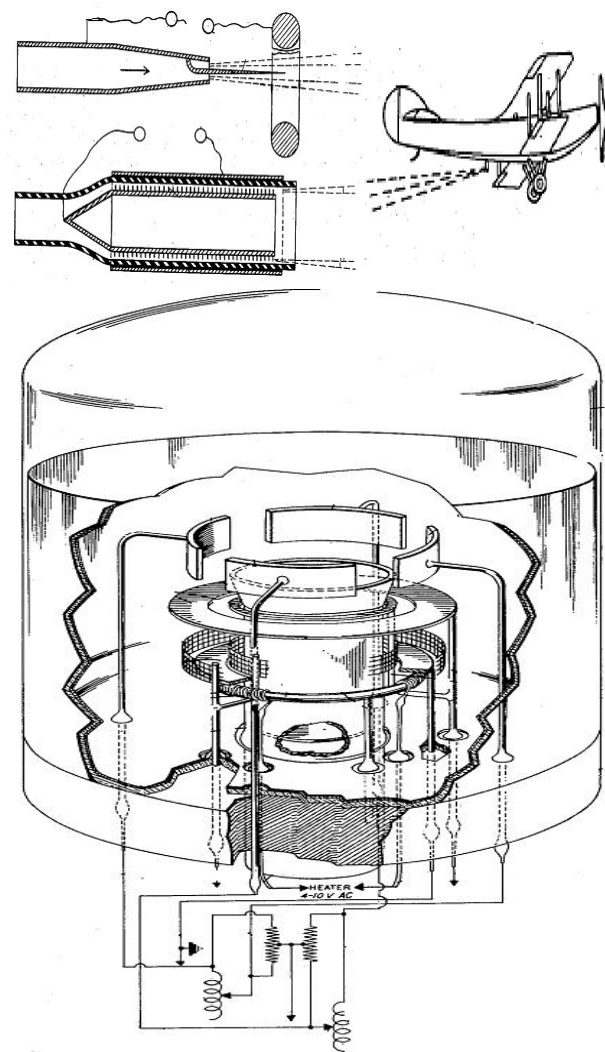
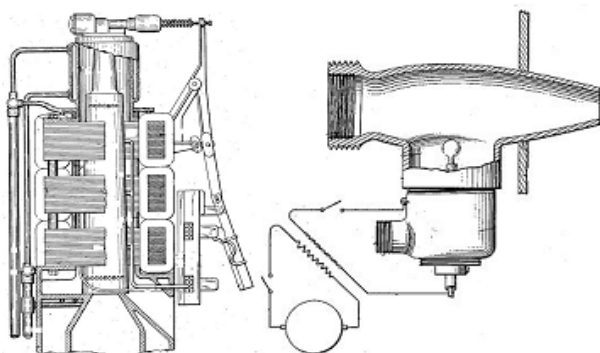


Fig. 6 The installation of spray the electrically charged vapors, according the patent US1530468 (above) and a similar device according the patent US1854475. On left, the airborne installation designed to make the electrification of fluid particles and their fine spray into the atmosphere, according the patent US1928963. On the right, a device for creating an electronic cloud for protection against radar emission and against the electronic aggression made with high or low frequency emissions, according to the patent US7203882.

Finally, we mention the fact that they have been also invented devices (for electronic counter measures) that can degrade the recording magnetic films audio/video, so these films can not record images or sound from the protected device.

The invisible aircraft could be used in modern atypical and unconventional (non-NBC) confrontations for the following types of missions:

1- the scattering in the atmosphere of certain micro particles in order to achieve mirrors for the electromagnetic radiation, these mirrors are in turn used to reflect the special radio emissions, such as for example the special secured transmissions, or the radio beams of the electromagnetic aggressions which can work at very high or very low frequencies;

2- the collecting of the micro particles clouds used for the above-mentioned mirrors and also to delete any traces they would leave the atmosphere;

3- the infiltration missions into enemy territory, also reconnaissance missions and the aerial surveillance of certain perimeters;

4- the realization of complex aerial relays into the radio-electronic confrontation including the electromagnetic aggressions; to be really effective such a scheme, it must have at least three main relays along with the secondary relays.

In addition to these main relay it is necessary the intervention of a variable number of auxiliary relays or other devices, including aircraft designed to create in the atmosphere mirrors for the electromagnetic radiation. In turn these flying machines must be protected against the enemy interception, which means that it must be undetectable radar and optical. In short terms, *invisible*. Aircraft image is captured nor by radar, neither by human eye or even by the optical and optoelectronics devices (for thermal or infrared images), so that it can evolve unimpeded in the enemy airspace.

To achieve such mirrors in order to reflect the electromagnetic radiation there have been invented installations which are able to electrify liquid substances in order to spray them under the form of mist or clouds. Such artificially fog or clouds could be highly electrically conductive and would have good reflective properties for the electromagnetic radiation.

They are most often used installations which work with a mixture which consists of air, water and aerosols.

In rare situations there are adopted special working agents, such as micro spheres of cesium hydrate, of lithium, sodium etc.

In fact, the technology of these installations is based on that used by the civilian installations which produce the artificial fog (widely used in show business and cinema) or used for dissipation of the natural fog.

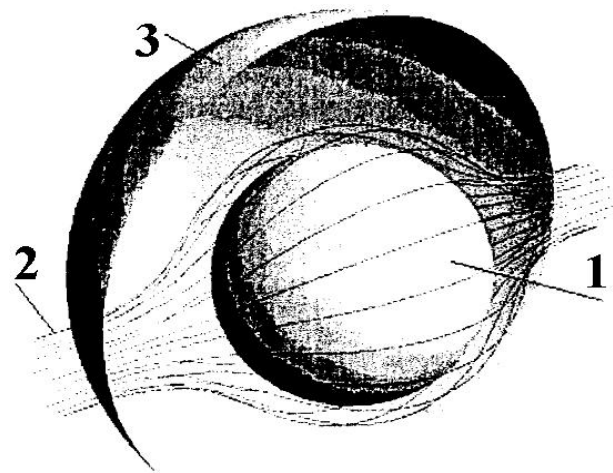


Fig. 7 An object optically concealed: 1- the body under optoelectronics concealment; 2- the light source; 3- the shield formed by the electromagnetic field which deflects the light, that practically bypassing the concealed object. According to the patent US2008024792 granted in 2008 to J. Pendry.

Such installations can be airborne embarked by planes or on aerial platforms held by special balloons (based on modern technologies and built with composite materials which can resist to extreme temperatures, from fibers and fabrics based on nanotechnology, possibly equipped with magneto hydrodynamic or electrodynamic layers which play a role in the field of lifting/propulsion etc.), they serve not only in electronic confrontation but also in the case of the geophysical aggression, for instance by spreading the substances that can alter the ozone layer, by spraying cryogenic liquid (these by detente can absorb a lot of heat, causing the brutal cooling of the underlying layers of air, close to the ground) or other forms of physico-chemical intervention.

The use of automated or manned aerospace vehicles in order to achieve support actions for the electronic weapons systems, raised the additional issue of their camouflage or concealment, so that their presence and action to be completely invisible: *the stealth technology*.

As mentioned before, such means of aerial warfare designed to achieve the electrically charged clouds or mist, in turn are adequately protected so as not to be detected by the enemy radars and be seen neither by the naked eye nor by the photo/video cameras. For anti radar protection purposes and often to avoid the use of the electromagnetic fields (which give a specific footprint which can be detected under certain conditions) it is used the method to create near the protected device a cloud of electrons. As we mentioned before, this method (according assoc. prof. dr. Valeriu Avram) was invented by a romanian in the early XXth Century, on the eve of World War I, namely Vasile Dimitrescu, apparently the author of the first project (and patent) regarding the aircraft invisibility using surrounding clouds of electrified particles which can interact with the electromagnetic waves, including the light, in order to conceal the aircraft. Much later, however, after the year 2000, under the auspices of DARPA¹⁴ (the same agency that controls the HAARP program) the British physicist and inventor John Pendry was to make the first unclassified in order to achieve the invisibility of objects by using in special schemes the high frequency electromagnetic radiation. In the patent US2008024792, John Pendry determined a method of achieving the invisibility of objects using a very high frequency electromagnetic field, which manages to deflect the light radiation. It is known that an image is formed by the interaction of the objects with the light radiation and also the birth of certain phenomena of interaction such the reflection and refraction of light.

14 *DARPA* is the acronym of the name *Defense Advanced Research Projects Agency*, an agency from the US Defence Department, founded in 1958 and responsible with the research-development activities in the field of frontier technologies.

This, of course, not if that objects are the sources of light, but only for the objects which have not their own light.

J. Pendry simply used the idea of achieving such electromagnetic interactions in order to obtain *the bypassing of the body by the light beams*. Well, at Pendry it is applied exactly the opposite of the method (mentioned before) proposed by Robert Birge (the light absorption), namely the body surface not even interact with the light but must be completely bypassed by the photons. There are advantages and disadvantages:

- the case the light absorption method is used, this absorption must be done completely, so very close to a yield of 100%, but this value cannot be reached, the organic photon-absorber material being expensive and fragile under the action of the aggressive atmospheric factors; moreover, under the continuous action of light, this material degrades slowly, which is why despite the invisibility is preferred the nighttime launch of the vehicles treated with that photon-absorber layers; therefore the properly periodically recovery is required for the treatment of the surface in order to cover the traces of degradation which occurred;
- the use of the treatment substances or photon-absorber materials (fabrics, nano-organic fibers) still has the advantage of technical simplicity, because it doesn't need for any kind of device, the method operating permanently as long as the material has not been damaged;
- the use of the light beams deflecting method has the advantage of allowing the maximum efficiency of optical concealment and the equipment does not degrade over time through the simple contact with the corrosive physico-chemical agents from the environment, as was the case of photon-absorber substances;
- it doesn't need permanent maintenance and rehabilitation and does not involve an expensive technology;
- its work is optional and it can be connected or disconnected as needed, while the photon-absorbing substances work permanently and have a quite fast decay;
- however, it has the disadvantages of requiring relatively complex auxiliary devices (high frequency sources) and an energy consumption quite important;

-another disadvantage is that by creating an electromagnetic field around the vehicle, that could be identified other than optically, because its electromagnetic field could betray its existence and its position in space;
-moreover, an important disadvantage is that during the operation of installation which electrify and spray the fluid in the environment for the ionized cloud formation, the concealment device should be stopped because of its electromagnetic field can interact with the ionized fluid generated by the installations of the same vehicle.

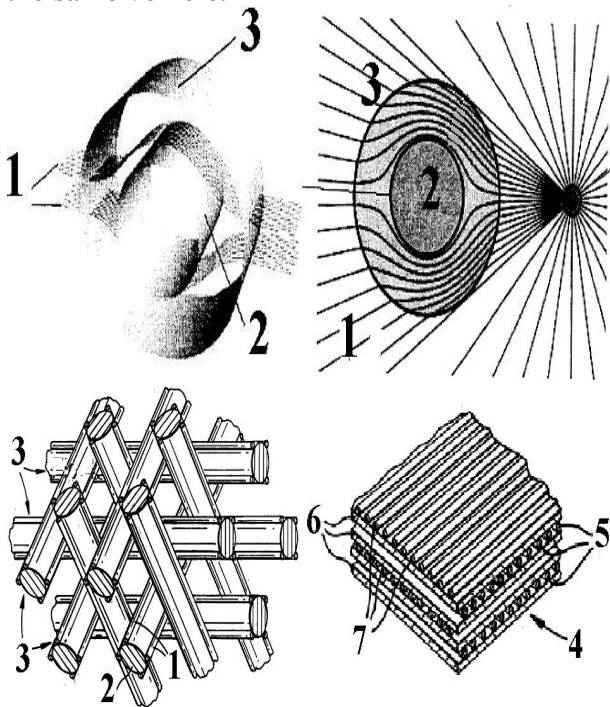


Fig. 8 Other schematic drawings (above) on the optical concealment of objects using the electromagnetic field: 1- radiation of light; 2- the concealed body; 3- the electromagnetic shield.

The patent GB2433842 (1995) granted to John Pendry on fabrics composed of fibers made of electrically conductive material (center-right) and of dielectric: 1- the electrically conductive fibers; 2- the dielectric fibers (eg glass fibers); 3- the composite fiber (the dielectric in center and the conductive fibers on the outside, four each dielectric fiber); the anti-photoelectric cell (right): 4- sandwich structure consisting of wire with diam. 20 micron made from copper plated with gold and spaced at 5 mm from the plates 6 and separated from the polymeric fibers 5 which have a diameter of 3 mm, similar to the fibers 7, which, however, are located at right angles to 6.

To achieve the layers used for the invisibility, Pendry has established certain structures of conductors and dielectrics, forming micro-fabrics that act as conductors supplied at high-frequencies. Pendry established to the so-called *anti-photoelectric cell* which unlike the photocell that is made to interact with the light in order to transform its energy into electricity (which is correlated to a magnetic field), acts contrary: the electrical conductors reject the light using the action of an high frequency electromagnetic field. Such a cell is made of several layers each of which is composed of electrically conductive micro-fibers arranged at some distance between them. The layers are separated by dielectric material. Such cell has the dimensions 5 x 5 x 6 mm and is supplied at a frequency between 2 and 18 GHz.

But this idea is not entirely new... In 1971, an inventor named *Sven Goran Johansson* proposed to use a so-called *honeycomb shell* which actually represented a network of electric micro-wire separated by dielectric and supplied at the frequency between of 2 and 20 Gigahertz. The patent GB1314624 was granted by S. G. Johansson in 1973 and the system has been applied perhaps since the mid-70s.

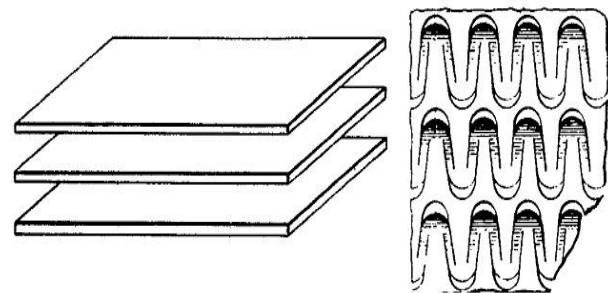


Fig. 9 The sandwich anti-radar casing proposed by the patent GB1314624 in 1973.

It had previously been mentioned a number of general issues regarding the means of optoelectronics countermeasures designed to achieve the invisibility of objects.

Thus we can get an idea about the technologies that are probably currently used by the armed forces of the major military and economic powers.

Those aircrafts with special characteristics may evolve even at low altitudes without being seen or heard, even without being seen by the radars.

There are perhaps vehicles that can appear and disappear. Meanwhile, within the media is often maintained the story of aliens who visit the Earth, but with no real purpose.

Without the intention to refute the idea of the extraterrestrial civilizations existence in this universe, the author just wants to draw attention to the disinformation campaign that uses the UFO story just as a cover for a series of activities that really have not the slightest connection with other civilizations than the human civilization.

During the atypical and/or hybrid confrontations as well as in the special character warfare, perhaps the special aerospace vehicles are often used. With the official withdrawal of the hypersonic apparatus type SR-71 Blackbird (in 1999) made by Lockheed Martin, and also the American Space Shuttle retirement (in 2011), it becomes increasingly obvious the need to complete the empty seats by introducing into production and service of some new and far more improved flying machines.

The aerospace vehicles are flying machines capable of take off and landing with their own means and that can fly both within the earth's atmosphere at all its levels, and within peri-terrestrial outer space, therefore having eventually the capability of insertion on the low circum-terrestrial orbit.

Such aerospace vehicle are therefore able to achieve high flight speeds, but also they are not too large nor have an huge mass like a classic rocket-launcher or spacecraft. Therefore, these vehicles shall be designed in order to have a very low aerodynamic drag and even to use the environmental energy¹⁵ for lifting and propulsion.

However, such an aircraft must be properly equipped for navigation in the radar invisibility conditions and even for the optical invisibility and silent flying.

15 Viorel Sălăgean, *The high speeds aerodynamics*, Military Academy Publishing, Bucharest, 1987, pp. 342-345.

We therefore keep our attention on a few categories of such flying machines, which are probably used in special, atypical, hybrid actions:

- the aircrafts for relatively short range reconnaissance missions, manned or unmanned, designed for espionage flights or for offensive combat missions (the high altitude interception, bombardment etc.);

- the hypersonic long range reconnaissance aircrafts used also for the strategic warfare, such as the intercontinental bombardment missions; usually they are unmanned aircraft which are subject to high levels of acceleration force (g) which are inadmissible for human personnel;

- the magneto hydrodynamic aerospace and electrokinetic vehicles that can be manned and are a very adaptable, virtually able to execute any mission under any kind of speed and altitude; Note that the category of special aerospace vehicles also includes the following types of flying machines:

- the flying vehicles based on the technology of vacuum propulsion¹⁶/electrokinetic invented since the interwar period and made since 1943-1944; they are generally unmanned, small, usually designed for reconnaissance but also for combat missions, under certain conditions;

- the hybrid aircraft, autonomous or airborne, or launched by a carrier, they are often designed for missions achieved at high speed and high altitude; usually they have combat payloads and are not reusable;

- the flying vehicles based on the air depression lifting and propulsion (*the Coanda effect*¹⁷, applied according the Coanda's patents) which cover a wide range of sizes and scope of applications;

16 According to the patent RO24293 from 1933, granted to Rudolf Liciar.

17 According to Lucian Miclăuș, *Coanda effect is an aero- and hydrodynamic phenomenon highlighted by the Romanian scientist Henri Coanda and manifested by the tendency of a fluid jet to attach at a convex wall which is in its proximity*, Aviation Glossary, Marineasa Publishing House, Timișoara, 2010, p. 83.

- the flying vehicles designed for hypersonic flight and the partially using of the shockwave energy, created by the interaction of the vehicle with the upper atmosphere; it is about the particularly case of *waverider*¹⁸ type of flying machines, ie vehicles for high-speed flight in the upper atmosphere, that use the energy of the shock waves formed around the vehicle in the hypersonic flight regime, these shock waves can be used to give lift and propulsion¹⁹ for the vehicle.

18 The *WaveRider* is that type of hypersonic vehicle designed to use the shock wave formed around its fuselage

19 Viorel Sălăgean, *The high speeds aerodynamics*, Military Academy Publishing, Bucharest, 1987, pp. 346-350.

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THE DECISIONAL PROCESS AND THE LIABILITY FACTOR IN THE KNOWLEDGE-BASED SOCIETY

Anca BÎRSAN

„Carol I” National Defense University, Bucharest, Romania

Abstract: *In the modern organization any worker is a „liability factor” if, in virtue of his/her status or of his/her knowledge, he/she is responsible of something that substantially affects the organization’s capacity to work properly and to achieve any results. For every little thing that the worker does, he/she has to take decisions and not just fulfil orders. He/ she can be rejected, relegated or fired but as long as he/she works, the purposes and standards must be accomplished. In the following article, we will focus on the realities of the liability factor, the effectiveness engagement and the elements of the decisional process. By doing so we will approach and develop every step of the decisional process and we will all understand that the knowledge-based work is not defined in quantitative terms, but in its results.*

Key words: *decisional process, liability factor, effectiveness, manager, knowledge-based work*

1. INTRODUCTION

In the modern organization any worker is a “liability factor” if, in virtue of his/her status or of his/her knowledge, he/she is responsible of something that substantially affects the organization’s capacity to work properly and to achieve any results. It can be the capacity of a business to make a new product or to obtain a bigger rank on the market. It can be the capacity of a hospital to take care of its patients and so on. The worker must take decisions; he cannot just simply fulfil orders.

He/she must take responsibility for everything that he/she does, supposing that, in virtue of his/her knowledge is better prepared than anyone else to take the right decisions. He/ she can be rejected, relegated or fired but as long as he/she works, the purposes and standards must be accomplished.

Most managers are liability factors, but in the modern society, most workers become liability factors too because the society needs “managers” and “individual professionalists” in the positions that imply responsibility, the ability to decide and authority.

On the other hand there are many managers who are not liability factors. In other words, many people have a higher position than others but do not significantly influence the organization’s capacity to work properly. Literally speaking, they are “supervisors”.

They are “managers” only because they coordinate other people’s work, but they do not take responsibility, nor they exercise their authority regarding the direction, content and the quality of the work and its realization methods.

Despite this, their work’s efficacy and quality may be evaluated by using the instruments that we created for measuring the human work efficiency.

From the opposite point of view there may be a worker who can be a liability factor no matter if he/she is or is not the leader. For example, in a company the one in charge with the market research may lead two hundred employees while his competitor from another company leads just one secretary.

Of course, two hundred people can accomplish a bigger amount of work than just one person but this does not mean that they contribute more to the firm’s activity.

The knowledge-based work is not defined in quantitative terms, but in its results. Having two hundred people studying the market may bring an increase of understanding, imagination and quality which can ensure the company’s growth and success. In this case, two hundred people do not represent any hindrance.

There are still chances that the manager is overwhelmed by the people’s problems with which they come to work.

He/she may be so concerned to “lead” the people so that he/she will not have the necessary time to study the market. This leads to the manager not noticing the important changes that had occurred on the market, the critical consequence being the bankruptcy of the company.

We called “liability factors” the knowledge-based workers, managers who, in virtue of status or in virtue of knowledge, are expected to influence the efficiency of the entire company. They do not represent a majority between the knowledge-based workers. In the field of knowledge-based work, like in any other field, there is routine and unqualified work.

They represent though a bigger part of the knowledge-based workforce than the facts that the organizational scheme shows. We now know that the manager who is situated below the hierarchical ladder can do the exactly same work as the one made by the president of the company.

Consequently, any person who takes decisions does the same kind of work that the president of the company does. The sphere of action may be very limited, but that person is a liability factor even though his /her status or name does not appear in the organizational scheme, or in the phone book. Regardless of being the chief or the beginner, the person must be efficient.

2. THE REALITIES OF THE LIABILITY FACTOR

The realities that the liability is facing with forces him to be efficient, on one hand, and on the other hand makes it hard for him to be efficient. In fact, if liability factors do not work hard to be efficient, the realities of their work will baffle all their efforts. To understand the aspects of this matter we need to shortly analyze the realities that the worker is facing with, by referring to the situation from outside the company. A doctor does not have, generally speaking, any problem concerning efficiency. The contribution that the doctor is expected to have is clear.

What is important and what is not important depends on the patient’s injuries. Every little thing that causes pain to the patient determines the doctor’s priorities. The purpose, the objective is well known from the beginning: the patient’s recovery. Doctors are not recognized by their capacity to organize their work. A few of them though have problems concerning efficiency.

The liability factor from a company is facing a very different situation. The factor faces major realities. It cannot influence in any way these realities. Each of these realities pressures the liability factor and pushes it to the loss of efficiency.

The available time for the liability factor is tends to belong to the others. If it is to give a definition referring to the activities that the liability factor does, we might say that he is a prisoner of the company.

Liability factors are forced to “function” further on if they do not take action so that they change the reality. If liability factors will not take action, they will definitely lose strength by operating. The liability factor needs contributions and results that will allow him to deal with the most important matters.

Another aspect that determines the liability factor’s inefficiency is the fact that it is a part of the organization.

This means that the liability factor is efficient only when other people harness its own contribution. Knowledge-based workers rarely synchronize between them because they have their own abilities, concerns.

Finally, the liability factor is found inside the organization. Inside the organization results do not exist. All the results are found outside. This outward, which is the real reality, is far outside the control of the ones that are inside. In the best case, the results are determined by the ones from the inside and by the ones from the outside too.

For the liability factor the most noticeable aspect is represented by the facts that happen inside the organization. For the factor, the “inside” has a direct character. Relationships, contacts, problems, challenges, whispers affect the factor from every point of view.

If the factor will not make any effort to gain access to the external reality, he/she will become more and more headed to the "inside".

As the factor goes up in the organization's hierarchy, his/ her attention will be attracted by the problems and challenges from the "inside".

The release of computer, the release of high technology, the release of systems that process data quickly, precisely led to the attainment of a significant quantity of quantifiable information that had been impossible to achieve until now.

Despite this, we can only quantify what happens "inside" the organization- the charges, the manufacture's value and the statistics .

This is not due to the fact that the computer's potentials overcome our capacity to pick up information related to the external facts.

If this would be the only alarming aspect for us, we would only have to put more effort regarding statistics- the computer itself could help us overcome this technical limit. In fact, the problem is that the most significant events from the "outside" often have a qualitative character and cannot be quantified.

The events are not " a fact" yet because a fact is an event that somebody has defined, has classified and has endowed with elegance. Firstly, to make quantification, we need to have a concept.

For the beginning we need to draw out from a countless mass of phenomenon a concrete aspect that can be defined, and finally, counted.

The events that are really important are not the trends which happen "outside" but the changes that the trends bear.

The changes determine the success or the failure of a company. Despite this, these changes must be perceived; they cannot be counted , defined and classified.

In conclusion, these realities, which the liability factor is facing with, cannot change.

These are essential conditions for the factors existence. Therefore he/she must assume that he/she will be inefficient if he/she will not put considerable effort in learning to be efficient.

3. THE EFFECTIVENESS ENGAGEMENT

The growth of effectiveness may be the only field where we can hope for the increase of the professional level, the achievement level and the satisfaction level of the liability factor.

Books that approach the matter of the manager's improvement, for example, take into account a "man of all times" when talking about "tomorrow's manager". We were told that a senior manager should have the attributes of an analyst. He/she should know how to work with people. He/she should understand the organization, should be good at math, should have artistic ideas and should have creative imagination. It seems that the manager should be a universal genius and universal geniuses have always been uncommon.

We must learn to "build" the organization in such a way that any person who holds an advantage in some field can harness that advantage. Despite this we cannot expect to achieve the results that we want from the liability factor by raising the skills standards. It might be a great idea to enlarge the field of competence through the instruments with which the liability factors work. A sudden jump regarding the growth of skills is not appropriate.

The same thing applies more or less to knowledge. No matter how much we need people with better knowledge, the required effort for the achievement of a major improvement may be bigger than any possible benefit.

Less ambitious training programs for managers aim for the achievement of "top knowledge" in many fields like: accountancy, marketing, economic analysis, behavioral sciences (Psychology) and natural sciences, from physics to biology and geology. We definitely need people who understand the dynamics of modern technology, the complexity of modern economy.

Each of these represents a vast field, maybe too vast even for people who do not deal with anything else. Scientists often tend to specialize on narrow sections of these fields and they do not pretend that they have more knowledge in that field than any other employee.

In this case we may talk about something completely different from the universal expert, who is unlikely to show up like a universal genius. Instead of trying to find that person, we should learn to “use” better the people that are well prepared in each of these fields.

This implies the growth of effectiveness. If we cannot increase the existing quantity from a resource, we must increase the efficiency of its use. Effectiveness is the only instrument that is able to determine the resources that are represented by ability and knowledge to produce superior results in terms of quality and quantity.

Efficiency deserves to have priority because of the needs that the organization has. It deserves to receive even a bigger attention, as it is an instrument that belongs to the liability factor.

What all these liability factors have in common are the practices that determine the effectiveness of what they have and of what they are. These practices are the same, no matter if the liability factor works in a company or in a governmental agency, as a manager of a hospital or as a rector of a university.

Efficiency is, in other words, a multitude of practices. Practices are simple, but the right application of practices is always a very hard thing to do.

Therefore, there is no reason why a person that has all the attributes cannot achieve capacity to exercise these practices.

It is possible that the person will not attain perfection; for this he/she may need special qualities, attributes. In case of efficiency, the necessary thing is competence, and essentially, the 5 practices (5 mental practices) that must be learned to become a liability factor are:

Effective liability factors know how their time is wasted. They are concerned with the organization of that small part of their time, which they can control. They concentrate on the external contribution. They adapt their efforts to results, and not to the activity that must be delivered. They begin by asking themselves “what results are expected of me?”

These people are fond of their qualities. They do not start things that they cannot do.

Effective liability factors focus on some important areas where efficiency will produce considerable results. They try to establish priorities and to stay faithful to the decisions made concerning priorities. They know that they do not have another option but to put priorities on the first place. The alternative is not accomplishing anything. Finally, these people take efficient decisions. They know that is a problem of the system-it is about performing the right steps in the right order. They know that an efficient decision is always a wisdom based on “adverse opinions”, and not based on “consensus on layout”. They also know that quickly making more decisions means making wrong decisions. Few but solid decisions are required. A right strategy is required.

4. THE ELEMENTS OF THE DECISIONAL PROCESS

Taking decisions is just one of the duties of a liability factor. This takes a small amount of time. What defines the liability factor is the fact that from him/her are expected decisions that have a great effect on the entire organization, on the activity and on the results of the organization.

Efficient liability factors know when a decision must be based on a principle and when a decision must be made considering the substance of the issue. They know that the most difficult decision is the one to choose between the right compromise and the wrong one. They learned to difference. Liability factors know the longest step in this process is not the making of the decision but the application of the decision.

The most important features of decisions are neither their newness, nor their controversial nature but the:

- The understanding of the fact that the problem has a general character and that it can be solved only through a decision that consecrates a rule, a principle;

- The recognition of what is “right” – the solution that will fully satisfy the specificities before paying attention to compromises and to concessions necessary for the decision to be accepted;

- The “feedback” which assays the validity and efficiency of the decisions in relation to the current course of events.

The events that are truly unique are uncommon though. Every time that one appears we must ask ourselves: is this an exception or is just the first manifestation of a new kind of events?”

All the events beside the ones that are truly unique require a general solution. They claim the application of a rule, of a policy, of a principle. Once a proper principle is found, all the manifestations of the same general situation may be treated in a pragmatic manner, more precisely by adapting the rule to the concrete circumstances of the problem. Despite this, the events that are truly unique must be approached separately. There are no rules for tremendous cases. If the event is truly unique, the expert decisional factor suspects the fact that it announces a new basic problem. The factor also suspects that what appears to be unique will eventually prove to have been just the first manifestation of a new generic situation.

That also explains why efficient decisional factors always try to provide a solution to the highest level possible. Efficient liability factors do not make many decisions. The reason is not that making decisions takes too much time-in fact, a decision, which is based on principles, does not take more time than the one based on utility.

Another important part of the decisional process is the making of some clear specificity regarding the aspects that the decision must achieve. What are the aims that the decision must propose to itself? What are the conditions which the decision must satisfy? In science, they are known as “boundary conditions”. To be efficient, a decision must satisfy these boundary conditions. It must be appropriate to the purpose.

The more precisely the boundary conditions are established, the better the chances are that the decision could be truly efficient. On the other way round, any shortcoming regarding the establishment of these boundary conditions causes the inefficiency of the decision, no matter how bright the shortcoming may seem.

“What is the minimum for solving this problem?” is the way in which boundary conditions are studied. “Can our needs be satisfied by giving up the autonomy of the heads of division?” – this is the question that Alfred P. Sloan seemed to have asked himself when he took leadership of General Motors in 1922. The answer was negative. The boundary conditions of his problem claim power and responsibility from the ones that are in leadership positions. They were as necessary as cohesion and control. Boundary conditions claimed a solution to a problem of structure.

The turning of the decision in action is another important element of the decisional process. If the observation of the boundary conditions is the most difficult step in this process, the turning of the decision in action is the step that requires the most time.

In conclusion, a decision must contain a feedback because it assures a continuous control of the expectations underlying the decision. To have a feedback, systematic information is required.

5. THE DECISION-MAKING PROCESS

The decision-making process is about choosing some means of action out of many other possible means in order to achieve an aim.

The decisional process can be defined as, an ensemble of activities which a person/more persons develop, the aim being the choosing of a version that fulfils the value system of the person/persons [1].

This process involves going through several distinct steps:

- General briefing – the phase when all the problems that occur in the organization are analyzed. The purpose is the recognition of the causes that lead to a situation and also the recognition of the consequences. Usually it includes: detecting the problem and framing the problem in a typology;

- Conceiving – the phase when means of action are established for solving the problem;

- Choosing a criteria for a selection - the criteria describes the degree of acceptability of a solution;

- Giving means of action(alternatives);

- Establishing the result of the means of action;

- Choosing- the most important phase of the decision-making process when all the results from the previous stages are materialized. During this phase we look for the best action to be taken.

- Heuristic searching – decision rules that manage the way to solve problems. (Euristikos = art of discovering);

- Deployment- the actual starting of the chosen action

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THE IMPLICATIONS OF TERRORISM IN A WORLD OF INFORMATION AND TECHNOLOGY

Sînziana-Florina IANCU

„Carol I” National Defense University, Bucharest

Abstract: *Terrorism represents one of the most significant threats to the current security environment on a global level. It is a form of violence against humans, against their actions, against evolution. It simply creates chaos, anarchy, fear, and vulnerability. It is a form of trying to obtain the control through oppression and terror. This form of aggression rapidly expanded and brought methods through which states would become vulnerable. Terrorism has multiple motivations, most of them being forms of vindictive hatred towards values and actions that may be different from those belonging to terrorists. The phenomenon of terrorism is actually similar to a snowball, which, once formed and stirred up, it becomes larger and larger, thus, stopping it can only mean destruction and suffering on both sides. This issue has been long discussed that, currently, debating on this subject might be seen simply as a cliché. However, the reason for which terrorist actions are being continuously investigated and analyzed is the permanent change of techniques, tactics and procedures used by terrorists in order to create the element of surprise. An important aspect in this regard is for the national and international security and information structures to obtain and use information that might weaken or reveal the enemy, like the enemy's protective measures, the enemy's awareness on the situation and potential danger, potential logistical and/or human security breaches, enemy's weapons and technology etc ..*

Keywords: *terrorism, security, vulnerability, control, information, enemy, danger, technology.*

1. INTRODUCTION

In the planning and execution of terrorist actions, insurgents objectives usually regard attacking the symbols of a nation or of the world, with great media impact.

There are many times when they choose crowded locations, so the psychological effect on the population is huge.

In this way, their actions will not only create panic and terror among population, but also an increased wave of distrust in state security institutions.

If at first, the violent actions went out of demonstrations and protests caused by the dissatisfaction of minorities and were limited, local and focused on institutions, nowadays this kind of actions has become widespread being caused by rebels' frustrations and discontents, directed not only towards institutions and their representatives, but also towards masses.

Jan Eichler[1] listed some of the views of world leaders regarding motives of contemporary terrorism, like the hatred towards Western values and desire of revenge against the involvement of Western states in the Islamic world.

Indeed, most recent terrorist attacks were publicly claimed by Muslims terrorists in response to the so-called aggressive and hostile attitude and involvement of the Western nations. Islam, however, is projecting itself as a “religion of peace”, although the image created by the media was that of a fanatic extremism, identified with terrorism.

This is, in fact, also Corina Nicoleta Comsa's opinion, which supports the fact that Islam have denied any other organizing and structuring of their own culture and civilization, because they are very good keepers of traditions and their religion[2].

Terrorism can be divided into several categories, some of which are listed by Mircea Muresan: terrorism response, pathogenic terrorism, fissure terrorism, punitive terrorism, ethno-nationalist terrorism and cyber terrorism[3]. Thereligiousonemayalso be added. From a historical point of view, terrorism has emerged in antiquity as a political attack, considered the first of terrorist practices, and over time has marked the evolution and history of great empires[4].

According to Aurelian Ratiu, terrorism is “an apparently chaotic and random system of asymmetric swift actions”[5]. He believes that there are three similar aspects in defining terrorism, as threat or violence, state or non-state elements and political, economic or religious purpose[6]. He also mentions an approach to defining terrorism of two Dutch researchers, Albert Jongman and Alex Schmid, from Leiden University, who collected a total of 109 academic and official definitions of the concept of “terrorism” and analyzed its main elements. They had concluded that the element of violence was present in 83.5% of the definitions, political goal in 65% and 51% emphasized the element of fear and terror induction; only 21% mentioned the fact that the targets were not previously chosen and only 17.5% contained civilians or non-combatants victims[7].

2. INFORMATION AND TECHNOLOGY – INSTRUMENTS OF TERRORISM

In a world of information, terrorists have learned how to make use of information in a favorable manner. In this context, media broadcasts information on the existence and severity of terrorism, thus giving great importance to the phenomenon, which can lead not only to an easier way of finding new followers (ISIS case), but also to the recognition of the disastrous effects of terrorist activity; in this manner, insurgents achieve one of the most important goals: publicity and creating panic and fear among the population, leading to the loss of safety feeling and distrust in state’s institutions, and, finally, leading to the destabilization of the nation.

Thus, on 10.13.2002[8], the Russian Council (Upper House of Parliament) approved the amendment to limit freedom of expression of the media on anti-terrorist operations carried out by state structures. In this way, measures of combating terrorism which are to be taken by the state won’t be analyzed or criticized by media; consequently, the developing of any anti-terrorism maneuver will remain hidden within all aspects (participating forces, location, tactics, details of the attack etc.).

Perhaps, limiting advertising terrorism, even at an indirect level, is, indeed, one of the solutions that could discourage insurgents; this way, their protest and manifestations, will not have the result of a public revenge, even if it will produce other undesirable effects. Quite often, the magnitude of an attack is not given just by the number of victims and the severity of the consequences, but actually by the involvement of media. Media impact is perhaps most important for terrorists, especially when vindictive actions are intended to be directed to national or international symbols to demonstrate their strength and effectiveness. The most useful method of using the information for terrorists remains media.

In a world of technology, Internet shouldn’t be ignored either. Even on the contrary, it can be a tool as powerful in activating, spreading and using of information that would promote terrorists.

Using Internet, they are looking for new members to recruit, to post footage of their insurgent actions in order to intimidate the targets, they justify their actions and claims or they make public certain requests and complaints. Moreover, some terrorist organizations have begun establishing their own Internet forums, web sites, blogs, they have access to television stations, all this in order to spread their influence and to gain recognition. According to Gigi Giurcani’s opinions, so far, there were posted numerous files that contained actions against “NATO troops deployed in Iraq and Afghanistan, the schedule from the secret training camps, interpretation sessions of the precepts from the Qur’an, the stating of religious verdicts –“fatwa”, procedures of conversion to Islam, conversion calls to Jihad[9], kidnapping and beheadings of Western hostages.”[10].

The emergence of numerous organizations labeled by the West as “terrorist” ones was a reaction to the attempt of imposing Western democracy in cultures different from what is considered to be “modern” and “normal”.

For instance, author of “Islam”, Anne-Marie Delcambre, stated that in the Islam region, “every Muslim is obliged to deal with his other co-nationals, in order to determine them to do good things and prevent them from doing harm, and he is responsible for his co-nationals in the religious aspect, because the members of the community are like the fingers of the hand: if just one is sick, the others suffer.

Westernization arouses fear, because it leads to a new defining of the man, a man without family connection, free and autonomous.

For a Muslim, the status of being faithful means obtaining membership into the community.

There are no human rights, only duties of the believer who must respect the rights of God.”[11]

In this sense, those who chose to be warriors of “Jihad” / “Holy War” (“mujahedeens”) are convinced that they do it for the good and defense of their own culture and spirituality and for the preservation of specific Muslim traditions.

The main objective of the spiritual significance of “Holy War” lies in trying to extend the Islam, to protect it from the involvement and the offensive actions of the so-called “infidels” and to convert the non-believers to Islam. Fighters who do not survive after fighting the “Holy War” become “Shaheed” (the Muslim terminology for “martyr”) and get to see the Prophet, along with being offered the 72 virgins so that they relish forever.

Following wars triggered by the involvement of Western states in the Muslim territories such as Iraq and Afghanistan, terrorists tried to turn the situation to their advantage. Hence, during the chaos effect of wars, rebels had the necessary motivation to start terrorist actions through large scale attacks and they have also created “safe havens” and training bases, also obtaining the civilian population support, in some cases.

In the process of rapidly spreading scourge of terrorism have initially contributed the ignorance of the great powers and state institutions, too much self trust of the representatives of the great powers and, least but not last, the wars that were lead in the name of democracy. According to Stan Petrescu, terrorism is “an asymmetric threat, acting in the shadows, making use of the means, methods and processes of the intelligence activity complementary to violent direct action”[12].

He also thinks that “the proliferation of terrorism was favored by the manufacture and use of conventional explosives, chemical weapons, viruses, computers and nuclear and biological weapons” and the “possible introduction of terrorism on the Internet will attract the necessity of establishing < cyber policemen >”[13].

Unfortunately, this kind of weapons, especially those that imply explosive manufacture and computer viruses, can be easily obtained or created. In a world that is driven by computers and technology, computer programs that may harm IT systems can become quite dangerous.

3. CONCLUSIONS

The existence of terrorism in an era which is based on information creates the premises of a world threatened by chaos and anarchy. However, intelligence services, protective structures and also the international community can make a difference in the fight against terrorism, by using information against those who practice it.

Terrorism is based on actions that have the objective of creating negative effects to the target who is in opposition to the beliefs and terrorist mentality. In committing terrorist acts, terrorists use the information they have access to, the technology they possess or that they can buy, the level of vigilance of the target and their training knowledge in planning and conducting hostile actions.

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THE INFLUENCE OF FOREIGN CAPITAL'S M&A ON THE HOST COUNTRY'S ECONOMIC SECURITY

DONGMING ZHOU, LAN SHI, GANG WANG

Military Economics Academy, Wuhan, China

***Abstract:** In the 1990th, a wave of the fifth merger present in developed countries and gradually spread to developing countries. In this wave of merger, the quantity and proportion of foreign capital mergers and acquisitions have dramatically increased, and are becoming the main way of foreign direct investment. Experience shows that foreign capital mergers and acquisitions have become one of the most important factors which affect the economic security of the host country. Therefore, it is positive and reality to summarize the foreign capital mergers and acquisitions on the host country's economic security the influences of foreign capital mergers and acquisitions on the host country's economic security, determine whether foreign acquisitions threaten the economic security of the host country, and reasonably put forward policy recommendations.*

***Keywords:** Foreign Capital M&A, Host Country, Economic Security*

1. INTRODUCTION

In the 1990th, M&A has become the main way of international direct investment and played an important role in the development of the economic globalization.

The experience of foreign capital M&A shows that M&A has a positive significance for the host country to introduce foreign capital and advanced technology.

However, M&A means that the host country industries transfer control to the foreign investors and lost the ability on the economic development regulation.

Therefore, how to correctly understand and master the foreign capital M&A is becoming an important topic for the host country.

In the aspects of M&A impact on economy to host country security, Michael Brecher & Frank P. Harvey(2002) [1] study how the economic globalization affect national economic security; Yasheng Huang(2003) [2] summarized the reason of M&A endanger national economic security; Alope Ghosh(2006) [3] considered that foreign investment made contribution to economic growth and structure upgrading.

2. THE THEORETICAL MODEL OF ESTIMATION ON WHETHER M&A WILL ENDANGER THE HOST COUNTRY ECONOMIC SECURITY

In econometrics, generally use the Logit Model to estimate analysis when the dependent variable is a qualitative variable.

This paper takes the foreign capital M&A affect the host country economic security as the dependent variable, with the amount of M&A, the bilateral relations is good or bad, the status of industry in M&A, the proportion of stock rights in enterprises, whether there is interest groups involved as independent variables, to determine whether the foreign capital M&A affect the host country economic security.

When the foreign capital M&A affect the host country economic security ($Y = 1$), the expression of the Logit Model is:

$$P_i = E(Y = 1 | X_i) = \frac{e^{Z_i}}{1 + e^{Z_i}} \quad (1)$$

where $Z_i = a + b_1 X_i$.

Logit Model (1) is the cumulative distribution function, change with independent variables from $-\infty$ to $+\infty$, foreign capital M&A affect the probability of the host country economic security changes from 0 to 1.

Based on the Logit Model (1), foreign capital M&A does not affect the probability of the host country economic security as follows:

$$1 - P_i = \frac{1}{1 + e^{Z_i}} \quad (2)$$

Based on the Logit Model (1) and (2), foreign capital M&A affect the probability of the host country economic security as follows:

$$\frac{P_i}{1 - P_i} = e^{Z_i} \quad (3)$$

Taking natural logarithms on Logit Model (3), we have

$$L_i = a + b_1 X_i \quad (4)$$

Analysis of the Logit Model (4) can draw some conclusions as follows:

Firstly, there is linear correlation between

L_i and X_i .

Secondly, when L_i is positive number, with the increase of the independent variables X_i , the dependent variable close to 1, that means the probability of the host country economic security to be endangered is increasing.

When L_i is negative number, with the increase of the independent variables X_i , the dependent variable close to 0, that means the probability of the host country economic security to be endangered is reducing.

Thirdly, the change in L_i is decided by the slope β_1 of independent variable X_i .

In the estimation, rewrite Model (4) into the regression model as follows:

$$L_i = a + b_1 X_i + m \quad (5)$$

In the application of Model (5), the number of independent variables is extended from one to five according to the actual situation: acquiring money total (AMT), the relationship between the acquisition of states (RLT), the acquisition of the property industry (IDT), the acquisition of corporate equity ratio (SHR), interest group is involved or not (INT).

Thus, further rewritten Model (5) as follows:

$$L_i = \alpha + \beta_1(AMT_i) + \beta_2(RLT_i) + \beta_3(IDT_i) + \beta_4(SHR_i) + \beta_5(INT_i) + \mu_i \quad (6)$$

3. DATA SELECTION AND DESCRIPTION

The assumption is that there is a random sample with n observations. The probability of

$Y_i = 1$ or $Y_i = 0$ is indicated by $f_i(Y_i)$. So the joint probability of Y is that:

$$f(Y_1, Y_2, L, Y_n) = \prod_1^n P_i^{Y_i} (1 - P_i)^{1 - Y_i} \quad (7)$$

Taking natural logarithms on Logit Model (7), we obtain

$$\begin{aligned} \ln f(Y_1, Y_2, L, Y_n) &= \\ &= \sum_1^n \left[Y_i \ln \left(\frac{P_i}{1 - P_i} \right) \right] + \sum_1^n \ln (1 - P_i) = \quad (8) \\ &= \sum_1^n Y_i (\alpha + \beta_1 X_i) - \sum_1^n \ln (1 + e^{\alpha + \beta_1 X_i}) \end{aligned}$$

In Logit Model (8), due to the independent variable X_i is known, when α and β_1 are known, it can be estimated in Logit Model (1). The results are shown as follows:

| | β | Std. Error | Z-Statistic | Prob. |
|----------|---------|------------|-------------|--------|
| α | -9.2747 | 6.6161 | 1.4018 | 0.1610 |
| Ln(AMT) | 1.4891 | 1.0758 | -1.3843 | 0.1663 |
| RLT | 1.1242 | 7.1877 | 1.5640 | 0.1178 |
| IDT | 0.8743 | 0.7120 | -1.2280 | 0.2195 |
| SHR | 1.1028 | 7.7514 | -1.4228 | 0.1548 |
| INT | 5.3420 | 3.8103 | 1.4103 | 0.8020 |

$$R^2=0.7121 \quad LR(5)=29.5179$$

In Logit Model, the change of probability in an event is indicated by $\beta_i(1 - P_i)$. However, in the process of calculation, all the variables in the analysis are needed to be considered.

For example, When others variables remain unchanged, IDT is increasing 1 unit, the average value of Logit Model (1) is increasing 0.8743 unit.

At the same time, because the value is positive number, indicating that there is positive correlation between them.

We can also take the anti log of all slope coefficients. The results have more realistic significance. For example, the anti log of IDT is $e^{0.8743}$, it is about 2.3971, that means when the other conditions are fixed, the probability of the host country economic security to be endangered by M&A the key enterprise is 2.3971 times more than the general enterprise.

We can estimate the probability of the host country economic security to be endangered by M&A by using Logit Model. For example, assuming that: the number of $\ln(\text{AMT})$ is 4.0758, the number of RLT is 1, the number of IDT is 4, the number of SHR is 1, the number of INT is 1. The estimated value of Logit Model (6) is 0.8178. Through Logit Model (1), the probability of the host country economic security is 0.6935. That means it may affect the host country economic security very likely.

4. THE INFLUENCE OF FOREIGN CAPITAL'S M&A ON THE HOST COUNTRY'S ECONOMIC SECURITY

4.1 The Positive Influence

4.1.1. Foreign capital M&A improves the host country's economic benefit

The foreign capital M&A can be understood as the organic combination between the host country and the investors. Making the resource to be the best configuration in the global scope. All of these become the strong social economic effect. The foreign capital M&A not only brings tangible resources, such as capital, but also brings intangible resources, such as advanced R&D technology, organization and management skills, promoting the technological progress of the host country. At the same time, the foreign capital M&A emerging industrial development, invigorating the stock assets, promoting the upgrading of the industrial structure, increasing employment, stimulating the export.

4.1.2. Foreign capital M&A promotes the host country into international cooperation

In the process of integration into the world economic system, the host country will encounter a realistic contradiction: not only

enjoys wide international economic cooperation benefits, but also pursues reasonable economic goals.

In order to solve this contradiction, we must adopt multi-level and multi-channel cooperation, make the establishment of mutual trust between countries in order to adapt to the development of international relations. Therefore, the host country economic security depends on economic cooperation between countries.

4.1.3. Foreign capital M&A offers to host more learning opportunities

Foreign capital M&A lets the host country has close relationship, the host country can develop the market with established brands, factories, channels, thus saving a lot of time cost. The transfer of advanced technology saves a lot of R&D funds for the host country. More importantly, the formation of new enterprise competitiveness through inter enterprise staff mobility, collision of ideas and values.

4.2 The Negative Influence

4.2.1. Foreign capital M&A affects the host country's ability of innovation

Foreign capital M&A weakened the host country's control force of industry technology. For example, XCMG is China's largest construction machinery development and manufacturing enterprises, XuGong Machinery Group is R&D core division of XCMG, at the end of 2005, the U. S. Carlyle Group purchased XuGong Group Construction Machinery Co., Ltd. with nearly US \$400 million, these foreign capital M&A had shaken the foundation of China's industry.

4.2.2. Foreign capital M&A inhibited the national brand and private economic growth

The national industry has played a huge role in development of the national economy. The competition in the market will be in a passive position if a country does not have its own national brand. For example, previously, due to Chinese enterprises lack of brand awareness, foreign enterprises replace the brand and technology with its own, leading to a lot of Chinese national brand and private economy disappeared in the market.

4.2.3. Foreign capital M&A endangered the development of the host country industry

Generally Foreign capital M&A choose the leading enterprises in order to obtain high profits, it caused serious monopoly in the host country. China's Ministry of Commerce "2004 Multi-National Corporation in China

reports" shows that Multi-National Corporation products have accounted for more than 1/3 of the market share in China.

At the same time, even in some industries, the scale of foreign capital M&A is not large but in control of important key development areas or departments, that limits the host country industry seriously

5. SUGGESTIONS OF IMPROVING THE FOREIGN CAPITAL M&A POLICY TO MAINTAIN THE HOST COUNTRY'S ECONOMIC SECURITY

The foreign capital M&A is an effective way to integrate global resources system and improve the efficiency of production, not only conducive to the development of the merging side, but also be propitious for the host country to get rid of long-term mismanagement, the lag of the development, to achieve rapid, healthy and stable development.

5.1 To establish the effective legal regulations and supervision system. Develop a specific set of laws on foreign capital M&A can prevent the emergence of monopoly and maintain the effective competition in the market system, that is the fundamental safeguard the economic security of the host country. However, up to now, there is almost no legal system in several countries to develop a specialized legislation of foreign capital M&A, there is lack of integrity or lack of implementation in legal provisions have been made, especially, the lack of a basic law in command of foreign capital M&A. Therefore, to develop the foreign capital M&A laws and regulations, to conduct a comprehensive, thorough specification on the problem of national economic security of foreign capital M&A involving as soon as possible.

5.2 To design strict and efficient review procedures and access policy. USA practices well in designing the country's economic security review system of foreign capital M&A program. America established special foreign capital M&A Review Committee, members from the ministry of state security, the State Administration for Industry and commerce, the SASAC, the National Defense Commission, the Ministry of Finance and other multi sector. The review procedure is divided into declaration, reporting, review, investigation and decision. When other host country design economic security, not only learn from the

existed international advanced experience, but also retain their own characteristics and be combined with the actual situation, for foreign capital M&A bring win-win results for each other

5.3 To establish the reasonable standard for review and review mechanism. The standard of review mainly involves the two factors: the definition of national economic security and threat to the safety of national economy. In different countries and different historical period, the definitions of national economic security are various. In addition, it is difficult to accurate definition of the national economic security. If the definition is too broad, it may lead to foreign capital loss, prevent the introduction of foreign capital M&A, if the definition is too narrow, the review is easy to fall into a passive, unfavorable to the protection of national security.

5.4 To encourage scientific research and innovation ability of health system. Innovation is the source of economic development and ensure to achieve long-term competitive advantage. The host country should actively promote independent research and development from various aspects, to form the independent innovation system. The government should set up R&D center and promote independent innovation through cultivating the independent brand way comprehensive, revenue from the aspects such as the formulation of relevant policies. Make full use of the global opportunities to form the core technology ability has its own characteristics.

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A STUDY ON THE IMPROVEMENT MEASURES OF THE ELEMENTS IN MILITARY ACCOUNTING STATEMENT ON THE ACCRUAL BASIS OF ACCOUNTING

JIAJIAN YU, LEI ZHOU

Military Economics Academy, 430035 Wuhan, China

Abstract: It is vital to the reform on the governmental accounting policy in China that is to introduce the accrual basis of accounting step by step, and stage by stage. In addition, to introduce the accrual basis into military accounting by a “progressive” means is the next step of the reform activity in this filed. And this will have a great effect on the recognitions of the elements concerning the military accounting statements on the current cash basis. This paper precisely sets forth the characteristics of defining issue of the accrual basis. Meanwhile, the author also analyzes both the methods of how to introducing this basis in order to modify the current military accounting system, as well as the proposals to perfect and improve the elements in the military accounting statements.

Keywords: accrual basis, military accounting, accounting statement elements

The elements of accounting statement constitute the financial statements. They are also plays a critical role among all the elementary items of the financial statements. Thus, reasonably introducing the accrual basis into military accounting system must greatly affect on the current accounting procedures which are based on the cash basis. And the first-run of the reform on the current system is the modification and improvement of the statement elements and its recognitions.

1. THE BACKGROUND OF THE SELECTION OF THE ACCRUAL BASIS

To introduce the accrual basis into present military accounting system, is due to the comparison between the two accounting bases – accrual basis and cash basis. As the result, the former one is much better than the latter one. And this necessary selection is also determined by the changing military accounting environment.

1.1 The difference between the cash and the accrual basis. Accounting basis, also called Basic Accounting Report or Basis of Accounting, is an effect on the decision about when to settle the transaction for the purpose of editing the accounting report. It consists of both cash and accrual bases.

But actually, these two bases are only the two poles of the entire system. There are still many diversifications between them.

These diversifications can be divided into two aspects mainly. One is the modification of the cash basis, or we call it the modified cash basis; on the other side is the modification of the accrual basis, that is to say, the modified accrual basis.

The cash basis, or cash basis of accounting, means to settle down the accounting transactions only after the cash revenue and expense. It is an accounting result which is primarily to measure the balance between the revenue and expense of the cash during a certain period made by the accounting subject. It is generally considered as having the merits of simple, brief and concrete feedback of the cash flow. However, it is not able to record some big accounting activities that have really happened but left nothing with cash in and out. The accrual basis, or accrual basis of accounting, considers rather the aspect on financial effects during the procedure of the financial transactions than the condition concerning that whether the cash has already received or paid. The subject of the measurement of accrual basis is a kind of gap or financial achievement between the economic profit and consumption in a certain period. The criterion to judge whether it indeed happened is that the transaction has actually occurred. Comparing to the cash basis, this accounting basis is superior to both range and depth of reporting the military accounting data, as well as the military financial management and decision-making.

These advantages are mainly manifested in four aspects: The first one is to totally report the fulfillment of accountability. The second aspect is to provide a report about the information of the comprehensive financial operation process, result and its efficiency. And the third advantage of the accrual basis is to serve on settling down a long-term decision. The last one is to improve the quality and efficiency of operation in every working unit and department.

1.2 The main reasons on introducing the accrual accounting into current military financial system. The main function of current military budget accounting is to enhance the macroeconomic management and budget management service of the military finance. That is to say, the accounting basis must be consistent with the budget, which is the main reason leading to the current cash basis application in the military budgeting. However, this kind of accounting focuses on the receipt and payment of funds rather than enough attention on accounting for large stock of assets.

As we mentioned previously, the accrual accounting is quite superior to the cash basis. On the accrual basis, the military accounting statement of the property distribution and performance will be more actual, comprehensive and credible. That will be an essential for the accountant to assess the military accountability and do the decision making. Therefore, according to the above all, the accrual basis could be introduced into the military accounting system and become one leading role of it. However, we should be clear about the current situation that the financial management, the capabilities of accountants and the entire accounting information system still need an improvement. Actually, the western countries have spent decades of years through the establishment of the accrual basis to its application in the real governmental accounting.

And in a sense, under the circumstances that the reform of government accounting in China has just started, as well as the military financial information system of PLA and its related regulations are not perfect. It would be imprudent and aggressive that we try to introduce the accrual basis and use it as the basis for the military accounting report in a large scale. And it is difficult to achieve the expectation. The author believes that the reform of military accounting system should begin with a modified cash basis.

Then, we can gradually introduce a modified accrual basis into the reformed system later and the accrual basis at last when the condition is perfect. Therefore, the "progressive" way of introducing accrual basis is the further direction of the reform of military accounting.

2. THE ELEMENTS OF MILITARY ACCOUNTING STATEMENTS ON THE ACCRUAL BASIS

Elements of military accounting statements, also known as the military accounting elements are the basic classification of the objectives of the military accounting based on the economic content. They are also considered as the basic components of military accounting statements. Relying on the current accounting, these elements are divided into four categories. They are assets, liabilities, net assets and the balance. Nevertheless, this classification is based on the cash basis, which is a little bit rough. Especially on the aspect of the incomplete records of the accounting contents and information, there would be a series of confused information transmission when we meet the problems caused by the emerge of the revenue and the expense as well as the omit of the balance.

Consequently, in order to clearly recognize the assets structure of each department and its subordinate relationship, effectively control the expense, accurately record the budget and other funds on practical using, and to feasibly master the expenditure and balance situation, we can divide the elements of military accounting statements as assets, liabilities, net assets, revenue, expense and balance - six categories.

2.1 The separation of the revenue and expense elements. Concerning the practical consideration of the capital operation, we take the first step of reform to separate the combined elements in traditional accounting into two items. In the general situation, even though the budget funds are earmarked for the special use, it still sets a limitation on the items of the reimbursement for the expense to a great extent. However, the military expenses are not all from the budget. Furthermore, the practical using of military funds is not entirely depending on the budgetary provisions. Consequently, combining the revenue and expense items together in military accounting actually would not only cut down the categories of the accounting, but also weakened the basic function of the accounting.

Due to the restriction caused by the budget, in the military accounting statements, many items of expense can be only passively merged into some corresponding items as the record of payments. This situation directly challenges the authenticity and the importance of the military accounting information. Also, the information contained in the statements of military accounting is neither effectively nor sufficient for decision-making on the future budget. Despite of that, this kind of accounting system would neither play as an effective role in the military financial management at all. To improve the functions of the military accounting, we shall clarify that the receivable is right, and the payment is responsibility. Both of them happened at the same time, there would be a real accrual basis which is a true record of financial transactions based on the objective facts. And that is the way for us to collect the original data from the occurred transactions, then to provide reliable accounting information with evidences. Hence, the elements as income, expenses and costs should not be mixed. We need to clearly separate them respectively.

2.2 Correction: expense element modified into cost element. The existing military accounting expense is defined as costs and losses of every unit, including expenditure in the budget, expenditure out of the budget, and the expenditure on the dues of Party activities. This concept is vague to some extent.

For an economic unit, according to the benefit period its expense can be divided into revenue expenditure and capital expenditure. The revenue expenditure refers to the expenditure happened in the current accounting period, which forms the current consumption, and cannot bring about any increase of the potential service. Thus, we should recognize it as expense. On the other hand, the capital expenditure refers to the expenditure that happened during or more than one year of the accounting period, which has formed a potential service already. It should be recognized as assets. On the accrual basis, cost is a more accurate reflection index of the current cost.

The cost element is that the reduction in economic profits during the accounting period. It is reported as the decrease of the net assets from the outflow, loss or liability of the total assets. Then, the record of cost can report to the accountants the value of the economic resources which are consumed and changed into the military productions.

Therefore, expanding the range of the cost element in military accounting will be able to include the cost that is originally incapable to record on the cash basis into a specific type of military output, so as to provide a more comprehensive, and more accurate information on the whole military output.

However, please note this: the expenses should be confirmed when they are going to happen and can be measured. If the increase in assets or the decrease in liabilities is related to the decline of the future economic profits, which can be measured reliably, it shall be record as the cost in the financial statements.

According to the economic connotations, these costs can be mainly divided into eight items: personnel cost, the cost of using the physical assets (such as depreciation expense), rent, leasing cost, the fee on routine maintenance and operation, interest, the expense related to the financial assets, and other losses.

2.3 Adding the balance element. On the accrual basis, how to find the performance or efficiency of the military operation in a certain accounting period is measured on the ratio of revenue and expense.

Then, the measuring result of the ratio will be reported by the establishment of an element called "balance". The relationship among the three elements is represented by a dynamic accounting equation: "Revenue - Cost = Balance".

The setting of the "balance" is in order to evaluate the military operation performance. However, due to the non-profitable characteristic of the Army, profits or benefits produced by some military operations may not be accurately assessed by money in many cases.

Because of that, this result of ratio is just a reference aiming at measuring the military economic profit. And for a comprehensive assessment of this part, we still have to depend on the disclosure of all types of non financial information in the notes of the accounting statements and the related statistical data.

3. THE IMPROVEMENT OF THE ACCOUNTING ELEMENT ON THE ACCRUAL BASIS

It is premised on the clear classification of the elements in the military accounting statements that there should be a necessary modification and improvement on the current traditional elements.

It will create a practical accounting system based on the internal principles of the accrual basis, in order to report and supervise the use of the resources and to record more systematical, creditable and accurate information about the accountabilities.

3.1 The improvement of the asset element.

Asset is defined as an economic resource which can be measured by money and formed by a physical object owned or controlled by the military accounting subject from the past transactions or reasons. It includes property, appropriation, and account receivable, etc.[1] This definition specifies the time, space and nature of the asset. But, constrained by the cash basis, the range recognitions of the assets is still relatively narrow. On the accrual basis, we need to enlarge the recognitions of the range about military asset elements and classify them in categories scientifically for this reason.

As long as it meets the definition of the military asset elements, any measurable military asset can be enrolled in the accounting statements as the asset elements. On the other hand, those immeasurable assets could be record as the non-currency information attached to the statements.

In addition to the monetary assets, physical assets and debts assets owned by the Army, the other assets like weapons, projects in construction, intangible assets and land for military use can be included as the military assets and record in the accounting statements [1]. Meanwhile, there should be a clear classification on the asset elements. The standard of the time to supplement the cost is entirely due to the potential ability that how long these military assets could provide for the future service.

According to the particularity of military assets, we should focus on the liquidity of them. Furthermore, to be more scientifically, the military assets we are talking about here can be divided into four categories considering two aspects - the liquidity (or the available consuming time) and the physical one. These four categories are financial asset, real asset, intangible asset and other capital asset.

Among them, the financial asset can be subdivided into monetary asset, accounts receivable and advanced payment, securities investment and other financial assets. And the real asset is subdivided into inventories, fixed asset, project in construction, equipment asset, etc.

Besides, the intangible asset refers to an identifiable non money-like asset which bought by the Army at a high price (such as the patented technologies from abroad and the domestic research achievements and so on), and has a potential ability in order to serve the Army in the future. For instance, the achievement of the researches on the military equipment which belongs to the equipment asset should be record as the intangible asset. The other capital assets mainly refer to the free land and mineral resources, etc. allotted by the state for the Army for free use.

3.2 The improvement of the liability element. In military accounting system, liability refers to those monetary debts of every working unit that could be paid or served by assets or the final budget, including the appropriation from the superior, the funds should be turned over, and the suspense credits and so on.

In a sense, there is also a scope limitation for the liability elements on the accrual basis. So, it's necessary for us to improve definition, recognitions and classification of the liability elements in the military accounting.

The first strategy is to redefine the liability elements. Being similar to the asset elements, we should redefine the time and character factors of it again. For the time factor, the liability element represents the current responsibilities that the Army should or has already taken. Budget, is a key to settle down which is the current responsibilities. The budget revenue is a form of the legal responsibilities permitted by the legislation institutions of the state to a certain degree. Its presence objectively limits the range of the responsibilities that the Army should take on. On the other hand, according to its character, these responsibilities must be fulfilled in the future by cost necessary resources. Therefore, we can recognize it as the future risk of the military finance that causes the military resources flowing out without fail. In view of this situation, the military liability element can be defined as: the debt in military accounting system is a current responsibility taken by the accounting subject and formed by some reasons or operations in the past. This responsibility will cost some military resources in the future.

The second step is to enlarge the range recognitions of the liability element. This range recognitions must meet two conditions: Firstly, it should correspond to the definition above; then, it should be accountable reliably.

At present, the liabilities record in the military accounting statements are all the current internal ones. In fact, the Army is taking the obligation to pay for the military social security fund, to deal with the various uncertain emergency incidents and to pay back the loans for the military basic unit construction offered by the financial institutions. Due to the cash basis principles, current military accounting just accounts the current direct explicit liabilities by cash, which leads to the result of a narrow range concerning the military liability accounting. In addition, a number of direct recessive and contingent liabilities still don't fall under the military accounting.

Because of these reasons, the Army could not make sure about their responsibilities of the liability that they should bear to pay. That is to say, the current situation is that it covers the real information of the balance sheet from the user of information in the military accounting statements, even would mislead them and cause some wrong decisions related to the military financial part. On accrual basis, the liabilities should not only reflect the internal flowing liabilities of the Army mainly directing at the accounts, but also record the short- and long-term loans as the direct explicit liabilities. According to this principle, both of the social security fund, paid and taken as the direct recessive liabilities by the Army in the future, and the contingent liabilities which are responsibilities on dealing with all kinds of unexpected emergencies, etc. should be included in the recognitions of the range of liability. If it cannot be reliably measured actually, such as the contingent liabilities, we could appropriately disclose them in the notes of the accounting statements.

The third strategy is the classification of the liability element. According to the recognitions of the debt range we talked previously, we can classify these elements into two types based on their time-limitation of payment: the current liability and the long-term liability. Currently, the items like the incoming budget, temporary collection and the payment funds included in the military accounting principles belong to the current liability. On this basis, the short-term loan owing to the financial institutions, the money paid for the suppliers, the advance payment for the constructor, and the accrued expenses should also be included in the current liability category and are listed in the balance sheet.

For the long-term loan, borrowing from the financial institutions and the expected liabilities [2] as the one to pay for the social security funds after several years can be record in the balance sheet as the long-term liability category. And if there were the liabilities in the long-term item are due within one year, it could be listed in the current liability category of that year as "will be due within one year long-term liability" item.

3.3 The improvement of the net asset.

The net asset is the balance of assets minus liabilities. The relationship of the net asset, the asset and the liability can be shown as the static accounting equation - "asset - liability = net asset". Therefore, the recognitions and measurement of the net asset depend on the recognitions and measurement of the asset and liability. The International Federation of Accountants (IFAC) Public Sector Committee considers that the governmental net asset mainly comes from three aspects: the first aspect is the unused financial resources in accordance with the budget, contract agreement definition; the second aspect is the funds which the government purchased by using the current financial resources through the budget arrangements or by accepting long-term asset donations; and the third aspect is the accumulation of the operating results after years [3]. According to this standpoint, except the "special fund", the rest contained in the net asset of the military accounting principles of PLA conform to the net asset. For the "special fund", from the accounting content, it includes the "insurance fund", "housing finance" and "other funds". Due to its main source is money collection and transaction, donations and interest income, the "other funds" should belong to the net asset. However, both the "insurance fund" and "housing fund" belong to the social security funds, which are the military obligations in the future that meet the recognitions criterion of liability, and should be included in the that element. We have talked about it in the liability part above.

3.4 The improvement of the revenue element. In the military accounting principles, the revenue refers to the legal non-repayment funds, including the budget funds, the extra budgetary funds and the Party expenses. Similarly, because of the limits of the cash basis, the recognitions of the revenue element should meet the two basic characteristics: time limit within the current year and can be measured by currency.

Therefore, on the accrual basis, we need take some measures to improve the following elements of revenue:

Firstly, modify the connotation of the revenue element. The IFAC Public Sector Committee considers that the revenue on the accrual basis is an increased economic interest during a certain accounting period. It is in the form of an increased net asset caused by either the inflows or gains of assets or decrease in liability without the similar items related to the investment by the owners [3]. It also pointed out that this definition can apply to the government departments. According to this standpoint, the author thinks that on the accrual basis the revenue element can be defined like this: the revenue of military accounting subject refers to the total inflow of the economic interests of it in a certain accounting period. Its form is much similar as the one we have just referred to, an increased net assets caused by either the inflows or gains of assets or decrease in liabilities, however, without the direct investment by the net asset owners.

Secondly, define the recognitions conditions of the revenue element. The recognitions conditions of the revenue element, firstly must meet the definition of the revenue. Then it should be obtained and can be measured reliably. And the so-called “be obtained”, refers to any forecast economic benefits relating to the revenue will flow into the main body; the so-called “be measured”, refers to the increase of the economic profits caused by the revenue can be measured reliably. Due to the criterion of the recognitions connected with the asset and liability, the revenue only can be recognized under the conditions that are the possible increasing of asset or reducing of liability, which can be reliably measured.

Thirdly, classify the revenue elements. Based on the sources of the revenue, it can be divided into three categories: budget income, extra budgetary funds income and other financial income. This classification is basically in tune with the one in the current military accounting system.

4. CONCLUSIONS

The reform of the military accounting should start with the revised cash basis; then moves to the modified accrual basis when conditions permit.

Before the introduction of accrual basis into the military accounting, there must be some changes of the accounting statement elements. To be specific, firstly, the intangible assets should be enlisted into the elements; moreover, the real assets ought to be categorized into aspects as inventories, fixed assets, projects in construction, and equipment assets, etc. Next, the range recognitions of the liability element should be enlarged; and furthermore, these elements can be classified into two types based on their time-limitation of payment: the current liability and the long-term liability. Finally, the elements as income, expenses and costs should be separated. We need to redefine the income element in order to cover the balance element as a new concept.

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THE RELATIONSHIP BETWEEN MILITARY EXPENDITURES AND ECONOMIC GROWTH - A CASE STUDY OF THE UNITED STATES, RUSSIA, JAPAN, INDIA AND CHINA

JINGXI MA, YIWEN JIANG, XIAOYONG XIAO

Military Economics Academy, 430035 Wuhan, China

Abstract: *This paper presents an exploration of the realistic relationship between national economic growth and military expenditures in 5 major states: the United States, Russia, Japan, India and China. Using statistical and case study methodologies, it examines how each country's military expenditure responded to increases in output levels and rates of growth over the period 1988~2013, proposes plausible explanations for the relationship in each country. If the experience holds true, economic growth in these countries will spur them to increase their rate of military expenditure growth and, as a result, their military capabilities. As we show, however, each country is unique, and strong economic growth by no means implies automatic expansion of military spending or capabilities.*

Keywords: *military expenditure, national output, rate of military expenditure growth, two stage least square procedure*

1. INTRODUCTION

By increasing their military expenditures, states with rapidly informational economies have the potential to develop significant military capabilities. Whether or not they choose to do so is of considerable policy relevance to other countries. In this paper, we look at the relationship between military expenditures and economic growth in four state - China, Russia, Japan, India - each of which have been experiencing rapid economic growth and holding the balance in Asia. In addition, the research contains the United States as another object of study because it has an un-neglected influence on Asian Affairs.

In statistical terms, for any given country during any given year in the sample period, the best predictor of military expenditures is the level of military expenditures in the previous year. The statistical evidence does not support generalizations about a positive relationship between output levels or output growth and military expenditures.

Further, other measures we use to proxy for other factors that might influence military decision makers - such as the number of military personnel in rival states - also do not appear to be consistently related to changes in military expenditures over time.

As a result, the states in our sample seem to have made the military expenditure decisions in response to the changes in political and economic circumstances that are not adequately captured by the statistical model by the historical data, a case study approach may provide a more believable explanations for the increases in military expenditures that took place in each country. Therefore, to answer the second question, we conduct historical case studies of the five countries, sorting our 1988~2013 sample into four time periods: 1988~1991 (the collapse of the Soviet Union); 1992~1997 (the financial crisis in Asia); 1998~2007 (American subprime mortgage crisis); and 2007~2013. Furthermore, we propose there alternative hypotheses to explain the changes of military expenditures of each country. The first of our alternative, the "ambition" hypothesis, assume that states experiencing economic growth develop an ambitious foreign policy which motivates them to increase the share of resource devoted to military expenditure. The second of our alternative, the "fear" hypothesis, posits that states increase their military spending when they perceive the enhanced threats to their security from other states. The last one, the "legitimacy" hypothesis, argue that governments develop an aggressive foreign policy and increase their military spending to achieve the support from the public when the political legitimacy is faced with domestic threats.

Of the three, only the ambition hypothesis does suggest that economic growth is the sufficient condition for the increasing of the share of their national resources devoted to military spending.

2. REVIEW OF THE LITERATURE

The major strand of the literature on the statistical relationship between military expenditures and economic growth comes from the field of development economics, where an abundance of studies have attempted to determine the influence of defense expenditures on economic development. Given the conventional view, government expenditures on national defense carry a opportunity cost, and lead to lower national output and slower rates of output growth. The theory assumes that the resource is utilized for the preparation for war and only used for war, and could be better for the welfare and economy development if put into other fields. Particularly, it assumes that it is of the first handicap for economic growth that the valuable human capital devote to military rather than civilian research and development. As a result, the assumption popular in researchers is that it is adversary that the military expenditures devote to the economic growth.

However, the empirical evidence on the relationship between economic growth and economic expenditures is widely divergent from the theory. In the statistical analysis of 44 developing countries, Benoit (1973) [1] found no evidence that military spending has a negative effect on economic growth. In fact, he pointed out that the country with high burden of defense expenditures usually had the fastest growth rate, and, by contrary, the one with low burden often had the slowest growth rate. More recently, a study by Biswas & Ram (1986) [2] looked at 58 developing countries from 1960th to 1970th, used "Feder-Ram" model and concluded that the military spending made a prominent influence on the economic growth.

A second and much smaller strand of the literature explicitly approve the impact of economic growth on military expenditures. Using the data from 1965 to 1987, Looney (1994) [4] constructed a system of equations that allow for the relative influence of resource availability, trade patterns, indigenous arms production, and other political and strategic, as well as economic variables. The model shows that economic production has a conspicuous positive influence on defense spending.

The third strand of the literature uses purely statistical analysis as well, to determine the relationship between military expenditures and growth.

Smith (1989) [7] models the relationship by an iterative approach, sets up alternatives and uses a series of specification tests to determine which best fit the data. Smith found, in an examination of British military expenditures post-1945, that military spending is a positive function of economic performance and the relative price of military and civilian goods, as well as security variables based on threat appreciation and military alliances. Beyond that, Smith found the model's applicability also fit data for France.

Chowdhury (1991) [3] took tests of the direction of statistical causality between military expenditures and growth. The result suggests that the relationship between military expenditures and economic growth cannot be generalized across countries. Moreover, there is slightly more evidence to suggest, where a relationship does seem to exist, that increases in military spending are likely to cause declines of economic growth, while increases in economic growth seem to lead to increases in military expenditures.¹

Last, a fourth strand of the literature is dominated by an originative model of arm race developed by Richardson (1960) [6]. Studied with mathematics and statistics, Richardson assumes that the insecurity is created by the rival's military stock and the increases of military spending would happen in response to the increases of military stock of rival. Based on above, Richardson establishes simultaneous linear reaction functions to describe the change of both military stocks. Another recent model of this type is Looney (1990) [5], in which the causal factors behind the arms races in the Middle East are studied.

¹ The result of the study is susceptible to the problems associated with Granger's (1969) causality estimation, namely the potential bias of the estimators because of inappropriate lag estimation, and the problems associated with errors in the source data, which Johansen (1988) discusses. Granger (1988) also points out that if military spending is adjusted highly to keep output at determined target levels given exogenous shocks, there may be no observable correlation.

Looney identifies the sequence of steps that contribute to each bilateral arms race, using a Hsiao test to different pairs of countries.² He identifies four possible cases:

1. Defense (A) causes defense (B)
2. Defense (B) causes defense (A)
3. Joint causality between (A) and (B)
4. No relationship.

One of the most interesting of Looney's findings is that country A may affect arms expenditures in country B even when country B does not affect country A. Another interesting finding is that the defense spending of an ally can cause the same increase as the defense expenditure of an adversary, with an even shorter lag.

Unfortunately, the variables included in the Looney's model are limited to defense expenditures, so that such factors as resource availability or economic growth are ignored.

Arms race models that incorporate economic aspects in their formulation are more interesting for our purposes. The model presented by Wolfson and Shabahang (1991) [9], for example, addresses the question, "What patterns of economic development will cause an acceleration of an arms race and increase the dangers of war?" Wolfson and Shabahang construct a model of international economic-military equilibrium and then subject it to destabilizing economic growth patterns.

Tested against the experience of the Anglo-German arms race prior to World War I, their model confirms the widely held belief that rapid growth, a high level of savings, and rapid technological progress in Germany prior to World War I prompted Britain to devote increased resources to defense right up until the two countries declared war on each other in 1914.

An important lesson from the statistical literature on the military expenditures-growth relationship is that it is difficult to generalize empirically across countries.

A number of country - and time - specific variables can influence how much a country decides to spend on military.

Further, problems of data availability and measurement contribute to the difficulty of identifying generic patterns, particularly where developing countries are concerned. Therefore some of the empirical differences between models may be simply explained by differences in researchers' choice of time period, country grouping, data averaging methodology, and lever of data aggregation.

² A description of the test can be found in Hsiao (1979).

In addition, although some models involve some political variables of government regime and social structure types, other politico-economic, socio-cultural, and historical characteristics may impact the relationship between military expenditures and economic growth and are more difficult to capture. For example, for some countries, the ability to provide a credible national defense may substitute for the procurement of other social needs as the root of national legitimacy, while for others a history of external conflicts stemming from geostrategic, ideological, religious, ethnic, or other considerations may contribute to the priority on military which is very hard to measure in statistical models.

Ideally, we would like to have been able to include the various economic, politico-economic, and sociocultural explanatory variables that theory suggests belong in a formal empirical model of the determinants of potential great power defense spending. For simplicity's sake, we ask instead two much simpler questions. First, how much of the variation on national military expenditures over time seem to be explained by movements in national output? Second, what is the direction of influence? Our results and the caveats that attend them are expanded in the next section.

3. TRENDS IN ECONOMIC OUTPUT AND MILITARY EXPENDITURES FOR FIVE POWERS

The empirical analysis is commenced with a simple comparison of tendencies for every potential great power from 1988 to 2013.

Simple graphs depict how such historical events as the collapse of the Soviet Union and the financial crisis in Asia influenced movements in defense spending and economic output.

They also provide an original test of the universality of the military expenditures-growth relationship without being subject to the data requirements of a more formal statistical analysis.

Statistical analysis is a useful method to control some of the other factors that may influence the domestic resource allocation to the military. Particularly, the system of regressions allows for the possibility that increases in state A's military expenditures, or in the size of its military stock, might influence the decision of state B how much to spend.

We emphasize, nevertheless, that our analysis here simply involves that whether the relationship illustrated in the graphs appear robust when other variables are included. In addition, we focus on the sign rather than the magnitude of particular parameters because of the accuracy and precision of the data.

Our data consist of annual measures of military expenditures, military personnel, national output, and government expenditures for each country, excluded disturbance from price inflation and currency exchange rates for making comparison beyond countries. The measures of real national output growth are achieved by taking the difference of the ratio of current real output and lagged real output and 1. The sample period is 1988 to 2013 because of the availability of an extended and reasonably representative time series, and its practical significance of the research on the period. The data adopted in our analysis is mainly from SIPRI³(2013) [8] to establish the scientifically, validity and coherence, included GDP, military expenditure, military personnel and government expenditure. The SIPRI data are presented in constant price US\$ in 2011, according to calendar year, except the U.S. according to financial year. Referred to the measures of national output for all states, the data are from SIPRI and it considered an inflation-adjusted output measure: a real Gross Domestic Product (GDP) series based on the average market exchange rates. The other data below from SIPRI are in the same way. In fact, SIPRI only provides military expenditure and their share of GDP; therefore, we achieved the GDP as the product of them. SIPRI also provides military expenditure per capita and the share of government spending, so we achieved the data of government expenditure in the similar way. However, for some specific reasons, the relevant data for China in 1988 and for Russia in 1991 is unavailable. And specifically, the data for Japan does not include military pensions.

In particular for China, besides the data from SIPRI, we adopted the data of military expenditure and GDP from SIPRI and Chinese Officials respectively in the statistical analysis to explore the answer to the questions. For the data from Chinese Officials, we use the same method and index from SIPRI to avoid the disturbance of price inflation and keep the coherence of data.

3.1 Cross-National Trends. Fig. 3.1,

3 For specific information on the sources and methods for SIPRI data, see http://www.sipri.org/research/armaments/milex/resultoutput/sources_methods.

3.2, and 3.3 illustrate the tendencies in real national output, real military expenditures and the shares of military expenditures in national output for the five states in our data sample. (All figures choose the data from SIPRI for China and the same below.) To make cross-national comparisons, we employ real output and military expenditures series that have taken a conversion to 2011 dollars except the data for 2013.

In 1988, the U.S. economy was nearly as large as the sum of the other states' economy, and twice as large as that of the most developed state in Asia, Japan (Fig. 3.1). By 2013, strong China output growth with the U.S. decelerated output growth had shrunk the differentials, but only slightly: The U.S. was twice as large as China and more than 7 times as large as India. Japan and Russia was approximately the same size as themselves. Japan has enjoyed an increase, while Russia has suffered a decline.

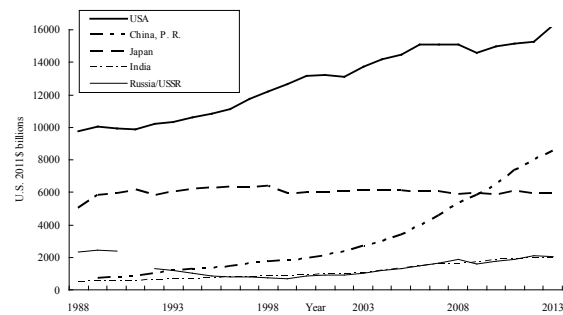


Fig. 3.1 Real Output 1988-2013, Five Powers

As depicted in Fig. 3.2, American and Russian real military expenditures have declined from 1988, especially to Russian. The American, however, began to observably increase again from “9•11” and peaked in 2010, then declined generally with the end of the war in Iraq and Afghanistan. By 2013, the United States was almost twice as large as the sum of the other states. The others mainly sustained under \$100 billion, except China attained to \$170 billion.

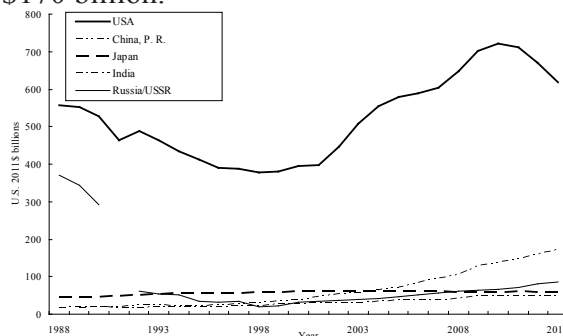


Fig. 3.2 Real Military Expenditures 1988-2013, Five Powers

As Fig. 3.3 illustrates, on average, the American and Russian devoted considerable more of their national output to a powerful military than the others. But after the collapse of the Soviet Union, Russian military expenditures as a share of output decreased dramatically, and all states sustained under 5 percent on the whole. The American has fallen from 5.7 percent to 3.8 percent.

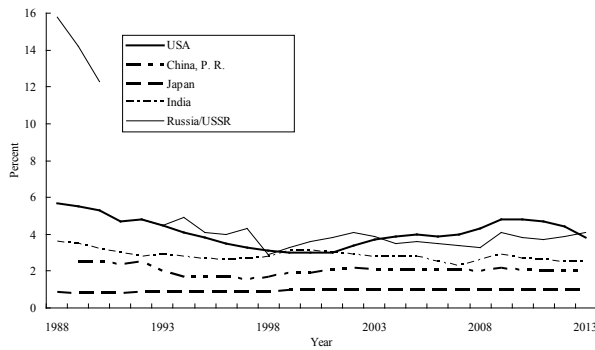


Fig. 3.3 Military Expenditures as a Share of Output 1988-2013, Five Powers

3.2 Individual State Tendency. China.

As shown in Fig. 3.4 (left axis), Chinese real output has risen steadily since 1988, climbing from less than \$750 billion in 1989 to more than \$8500 billion in 2013, as measured in 2011 dollars. Chinese economy kept increasing and accelerated faster and faster. With economic growth, Chinese military expenditures rose strongly over the same period: from \$18.3 to \$171.4 billion. As shown in the figure, the growth rates of output and military expenditures were on the same levels generally.

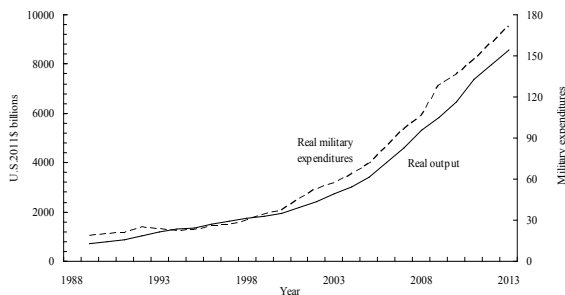


Fig. 3.4 Chinese Real output Versus Real Military Expenditures

Fig. 3.5 allows us to compare tendencies in Chinese real output (left axis) and military expenditures as a share of output (right axis) during the 1988-2013 period. As shown in the figure, military expenditures ratio began to decline from 1989 to 1996, and from then on restored to grow.

On the whole, by 2013, the share has maintained between 2 to 2.5 percent. Compared with the output growth, it is not difficult to perceive the growth of Chinese defense spending.

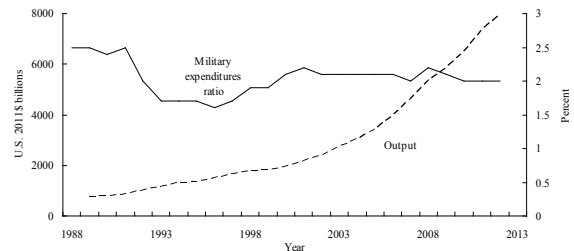


Fig. 3.5 Chinese Real Output Versus Military Expenditures-to-Output Ratio

Fig. 3.6 illustrates Chinese military expenditures to CGE ratio. Between 1989 and 2013 the share of Chinese CGE devoted to the defense also remained fairly constant and tended to make a drop-off, averaging approximately 10 percent.

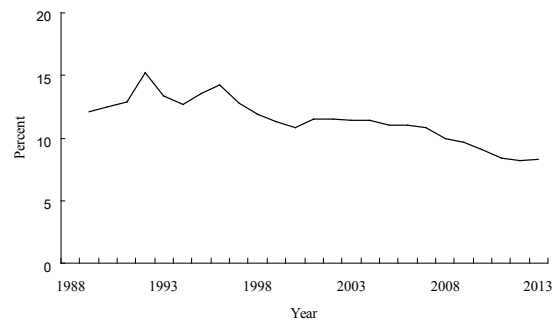


Fig. 3.6 Chinese Military Expenditures as a Share of Central Government Expenditure (CGE)

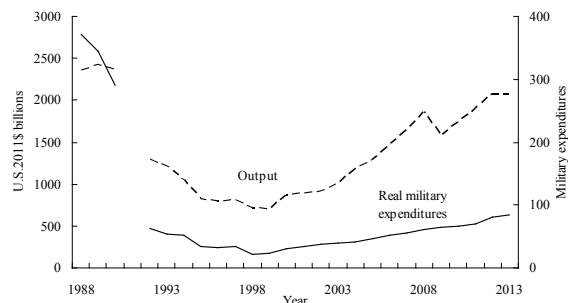


Fig. 3.7 Russian Real Output Versus Real Military Expenditures

Russia. Fig. 3.7 presents a comparison of Russian real output and military expenditures during the 1988-2013 periods. The collapse of the Soviet Union saw a dramatic drop-off in Russian output.

The military expenditures were declined sequentially. No particular trend in either series is discernible in the chaotic economic conditions of 1991. Suffered from the recession until 1999, Russian economy, as well as military expenditures, restored and began to grow. While involved in the 2007 American subprime mortgage crisis and decreased in 2007, the Russian kept growing again in 2008.

As shown in Fig. 3.8, the collapse of the Soviet Union also brought an apparent crash to the military expenditures ratio. Military expenditure shares plummeted from 12.3 to 4.8 percent, however, sustaining on the level of 4 percent.

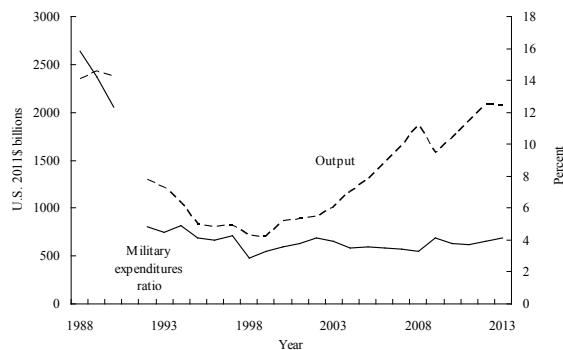


Fig. 3.8 Russian Real Output Versus Military Expenditures-to-Output Ratio

Because of the invalidity, the data of Russian military expenditures as a share of CGE from 1988 to 1997 is absent. From 1998, the share of Russian CGE devoted to the military was growing fast and peaked in 2001. After this, the share declined gradually. By 2013, however, the share of Russian CGE was more than half as large as that in 1998.

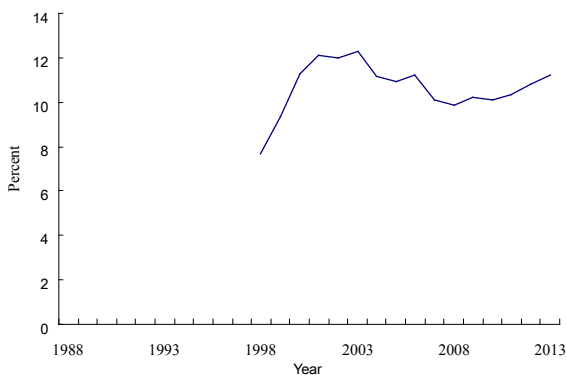


Fig. 3.9 Russian Military Expenditures as a Share of Central Government Expenditure

Japan. As indicated by Fig. 3.10, Japanese real output did not increase notably, for Japan had been developed in 1988. Influenced by the real estate bubble in 1991 and the financial crisis in Asia in 1997, Japanese economy shows two distinct declines respectively. Henceforth, Japanese economy has been in a relatively steady condition. In contrast with output, military expenditures had been increasing substantially between 1988 and 1995, while the condition of Japanese economy was not hopeful. From 1996 to 2013, both output and military expenditures have not changed significantly.

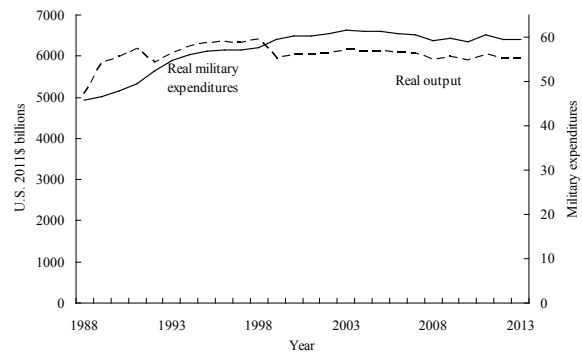


Fig. 3.10 Japanese Real output Versus Real Military Expenditures

As shown in Fig. 3.11, the change characteristic of Japanese military expenditures ratio is opposite to the change characteristic of its output. When output increased, military expenditures ratio was in stability or decline. However, when output decreased, military expenditures ratio began to grow, to keep the military expenditures stable on purpose.

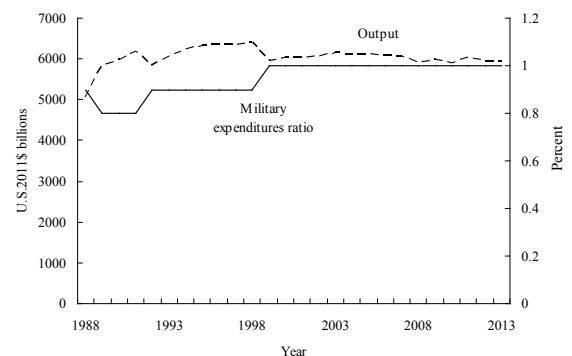


Fig. 3.11 Japanese Real Output Versus Military Expenditures-to-Output Ratio

Fig. 3.12 illustrates the Japanese military expenditures to CGE ratio.

Although the share of Japanese government resources devoted to defense slid gradually, the size of Japanese military expenditures did not shrink, for the reason that the government expanded the CGE year after year. As shown in the figure, between 1988 and 2013, as the share of CGE, military expenditures slid from 2.8 to 2.4 percent but its volatility was not high these past few years.

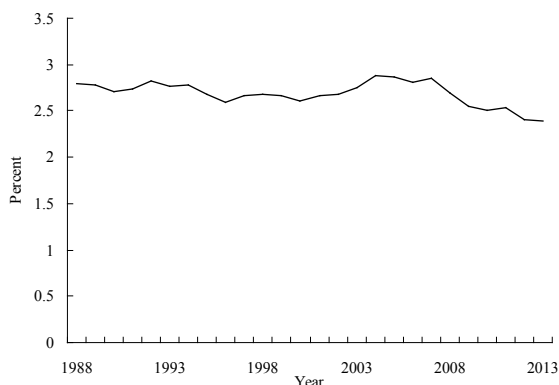


Fig. 3.12 Japanese Military Expenditures as a Share of Central Government Expenditure

India. Fig. 3.13 shows a steadily rising trend over the full sample period, while the growth rate is fluctuating. Accompanied with the output development, Indian military expenditures are expanding constantly. From 1988 to 2013, Indian economy rose from less than \$500 billion to near \$2000 billion, more than four times as large as that in 1988. The military expenditures boomed from \$17.88 to \$49.09 billion, more than twice as large as that in 1988.

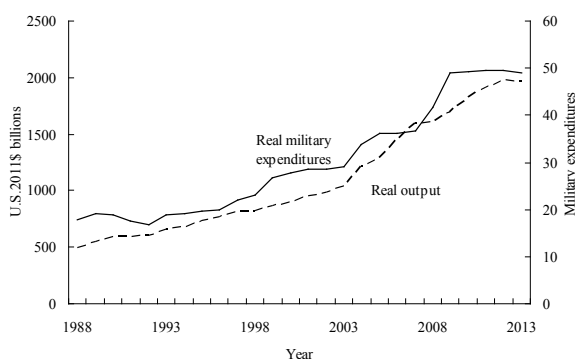


Fig. 3.13 Indian Real Output Versus Real Military Expenditures

As shown in Fig. 3.14, Indian military expenditures as a share of GDP were stable with a slight decline.

However, because of the Indian prospering economy, the size of Indian military expenditures was without any shriveling. And it is not difficult to find that Indian government attempted to maintain the ratio between 2.5 and 3 percent, a relatively stable level.

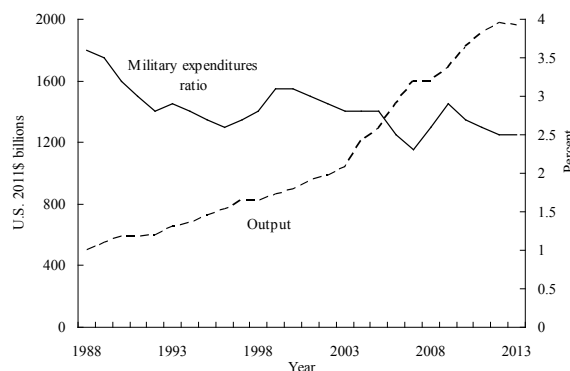


Fig. 3.14 Indian Real Output Versus Military Expenditures-to-Output Ratio

Fig. 3.15 presents a similar pattern. The share of Indian CGE devoted to defense ranged between 2.4 and 3 percent in the 1988-2013 periods, reaching a high of 2.89 percent in 2004. After that, the share was flat to down and reaching a low of 2.39 percent in 2013.

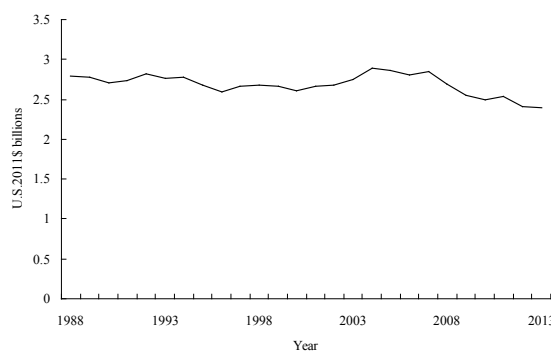


Fig. 3.15 Indian Military Expenditures as a Share of Central Government Expenditure

United States. While the U.S. economy continued to grow over the full sample period, there were two notable declines: the first was in 2002 - the first year after “9•11”; the second was in 2009, when Americans were suffering from the subprime mortgage crisis. Although American economy has undergone many crises in the 1988-2013 periods, it remained an increase trend.

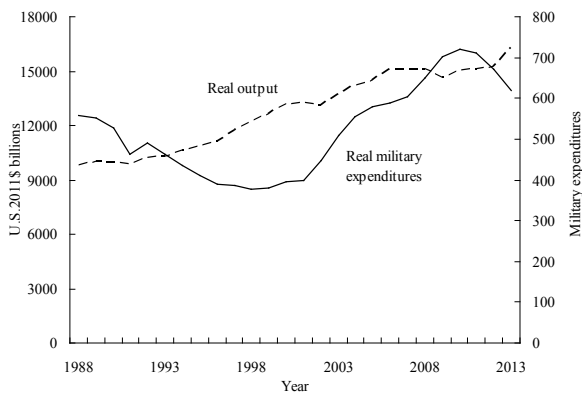


Fig. 3.16 U.S. Real output Versus Real Military Expenditures

Compared to output, the changes of American military expenditures could more explicitly illustrate the events happened in the sample period. The military expenditures were flat to down from 1988 and hit a low in 1991. Then the Gulf War broke out and the military spending rose again, peaked in 1992. The end of Kosovo War saw another decline of American military expenditures until 1998. After 2001, the “9•11” strike rendered its military spending surging and peaked again in 2010. Limited by the economy recession, the U.S. military spending has been in the down drift until 2013. Fig. 3.17 depicts a similar pattern. The changes of graphic of American military expenditures ratio resembled that of American military expenditures. Contrast with 5.7 percent in 1988, 3.8 percent in 2013 as the military expenditures ratio shows apparent decline after all.

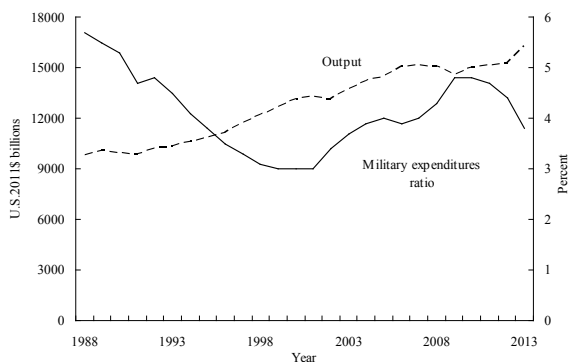


Fig. 3.17 U.S. Real Output Versus Military Expenditures-to-Output Ratio

Fig. 3.18 illustrated that the military expenditures represented more than one tenth of U.S. government resources. Despite the share of government spending devoted to defense tended to decline, it remained a high proportion.

In 1988, the ratio reached up to 15.99 percent and then slumped. By 2013, influenced by the weak economy, the ratio slid to 10 percent.

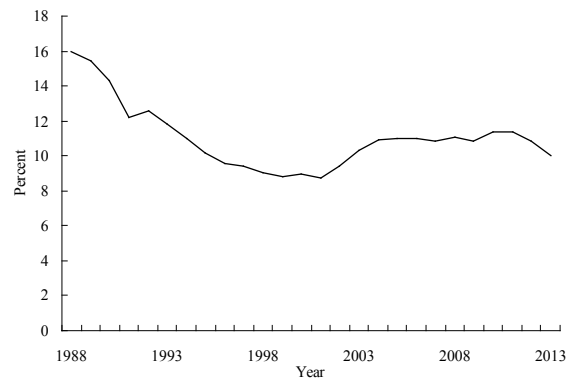


Fig. 3.18 U.S. Military Expenditures as a Share of Central Government Expenditure

4. STATISTICAL ANALYSIS OF MILITARY SPENDING AND ECONOMIC OUTPUT

The graphical analysis above illustrates that as the economies grew in peacetime, the five states in our sample did generally attempt to match the growth by increasing their military expenditures.

What graphical analysis cannot address us is whether such patterns should be cause for concern. In instance, a benign interpretation of a positive relationship between economic growth and military expenditures is that people believe they have more to protect when the state becomes wealthier.

In accordance with the interpretation, the increase of military expenditures caused by economic growth is defensive. A less reasonable interpretation is that greater wealth allows states to pursue aggressive foreign policy targets considered unapproachable before.

For example, if these foreign policy targets include territorial expansion at the expense of neighbors, rapid economic growth should be paid more attention by international community of states.

In the analysis that follows, we attempt to control for some of the factors other than expansions and contractions in the economy. These may have influenced the allocation of government resources toward the military in our five sample states. Furthermore, we allow for the possibility that changes in the growth rate of output might influence defense spending decisions.

Model. In this model, we examine how the respective dependent variables for each state are affected by changes in three explanatory variables: the level of real national output, the growth rate of real national output and the other states' real military expenditures. We allow for a simultaneous decision-making process and assumed that defense policymakers contemporaneously observe each other's defense spending decisions and respond accordingly. Lagged values of the dependent variable are also included in each equation in the belief that adjustments to military expenditures are influenced by the level (or share) of existing allocations. Such a method has an advantage in that it allows increases in spending by both friends and rivals to influence spending decisions. The null hypothesis is that changes in real economic output and real economic growth do not affect military spending decisions.

The system of simultaneous equations we estimate for the model is

$$M_{it} = C_i + M_{it-1} * B_{Mi} + \sum_j (OUTPUT_{it-j} * B_{Oij} + GROWTH_{it-j} * B_{Gij}) + \sum_{k \neq i} M_{kt} + U_{it},$$

where represents real military expenditures or expenditure shares respectively for China, Russia, Japan, India, and the United States.

The variables (constant terms), *OUTPUT* (national real output measures), *GROWTH* (national real output growth measures) all take the same form.

We assumed that the vector of disturbance terms, *U*, is correlated across states as well as across time periods⁴. This assumption derives from the fact that many external events (for instance, the “9•11” terrorist attacks) leading to unplanned military expenditures are likely to have affected all four of the states in our sample contemporaneously.

In this model, we consider two possible decision variables: real military expenditures and military expenditures as a share of output. The subscripts *i* and *k* are state indexes, *t* and *j* are time indexes; for the purposes of our estimation, *j* is set to 1.

4 That is, both $Cov(U_{it}, U_{it-1})$ and $Cov(U_{it}, U_{ik})$ are nonzero, implying that the structure of the time dependence is first-order auto regressive (AR(1)) and that disturbances are that disturbances are contemporaneously correlated across countries

We employ a two stage least square procedure using further lags of the explanatory variables as instruments for . This procedure does not require the absence of missing values in the data. The sign and significance of the parameter estimates for each state are reported in Table 3.1 through 3.5. The Table 3.1 to 3.5 make up the part 1, derived from the data by virtue of SIPRI, and the Table 3.6 to 3.10 make up the part 2, derived from the data by virtue of Chinese Officials.

Part 1. China. Table 4.1 presents the findings for China. The signs of the estimated parameters vary across model specifications, and no coefficient estimate is significant across both specifications. The lagged military expenditure variable appears to be positive and significant when the dependent variable is real military expenditures, but it becomes insignificant when the dependent variable is the military expenditures-to-output ratio. There is little support for a positive relationship between output and military expenditures. The sign of the coefficient estimate for lagged Chinese real output is not robust across model specifications, and neither it nor output growth is significant in either specification. Japanese military expenditures and the U.S. military expenditures variables are positive as predicted, while only when the dependent variable is the military expenditures-to-output ratio for Japanese military expenditures variable.

Table 4.1. China: Sign and Significance of Model Parameter Estimates

| China | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Constant | - | No | - | No |
| Lag Depend | + | Yes | + | No |
| Lag Output | + | No | - | No |
| Lag Growth | - | No | - | No |
| Jap. Military expenditures | + | No | + | Yes |
| U.S. military expenditures | + | No | + | No |
| Adjusted R ² | 0.96 | | 0.54 | |

Russia. The model does not do much better at explaining patterns in Russia, as shown in Table 4.2.

The Relationship Between Military Expenditures and Economic Growth - A Case Study of the United States, Russia, Japan, India And China

The explanatory power of the model is universally poor: none of the coefficients are statistically significant. However, Durbin-Watson statistic is quite high across both specifications, suggesting there is no auto correlation in the residuals.

Table 4.2. Russia: Sign and Significance of Model Parameter Estimates

| Russia | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Constant | - | No | - | No |
| Lag Depend | - | No | + | No |
| Lag Output | + | No | + | No |
| Lag Growth | - | No | - | No |
| U.S. military expenditures | - | No | - | No |
| Adjusted R ² | 0.73 | | -0.21 | |

India. For India, the model has much greater explanatory than that for Russia. As shown in Table 4.3, lagged military expenditures and U.S. military expenditures are positive and significant in the real military expenditures specification. Although statistically significant, the coefficient on real output is negative in the military expenditures-to-output ratio.

Table 4.3. India: Sign and Significance of Model Parameter Estimates

| India | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Constant | - | Yes | + | No |
| Lag Depend | + | Yes | - | No |
| Lag Output | + | No | - | Yes |
| Lag Growth | - | No | - | No |
| Chi. military expenditures | - | No | - | No |
| U.S. military expenditures | + | Yes | + | No |
| Adjusted R ² | 0.98 | | 0.22 | |

Table 4.4. Japan: Sign and Significance of Model Parameter Estimates

| Japan | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Constant | + | Yes | + | No |
| Lag Depend | + | Yes | + | Yes |
| Lag Output | - | Yes | + | No |
| Lag Growth | + | No | + | No |
| Chi. military expenditures | + | No | + | Yes |
| Adjusted R ² | 0.88 | | 0.82 | |

Japan. Japanese results from the model are presented in Table 4.4. Lagged military expenditures are now the best predictor of current military expenditures, with a robust and significant positive relationship. However, real output is negatively and positively related to Japanese military expenditures and the military expenditures-to-output ratio respectively. The Chinese military expenditures variable is positive as predicted.

Table 4.5. United States: Sign and Significance of Model Parameter Estimates

| United States | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Constant | - | No | - | No |
| Lag Depend | + | Yes | + | Yes |
| Lag Output | + | No | + | No |
| Lag Growth | - | No | + | No |
| Chi. military expenditures | + | No | + | Yes |
| Jap. military expenditures | + | No | - | No |
| Adjusted R ² | 0.65 | | 0.75 | |

United States: As shown in Table 4.5, past military expenditures once again provide most of the explanatory power for current military expenditures. Real output and real output growth, however, have no significant relation to either real military expenditures or the military expenditures ratio. In addition, Chinese military expenditures variable is positively related to U.S. military expenditures in the military expenditures-to-output ratio.

Part 2. China. As reported in Table 4.6, the model does a relatively poor job of explaining Japanese military expenditures. Past military expenditures are both positively related to current expenditures whether measured in real terms or as a ratio to national output, and significant measured in real output. But no other coefficient estimates are statistically significant. There is no evidence of higher-order serial correlation in the errors.

Table 4.6. China: Sign and Significance of Model Parameter Estimates

| China | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Variable | | | | |
| Constant | + | No | - | No |
| Lag Depend | + | Yes | + | No |
| Lag Output | - | No | - | No |
| Lag Growth | - | No | - | No |
| Jap. military expenditures | - | No | + | No |
| U.S. military expenditures | - | No | + | No |
| Adjusted R ² | 0.99 | | 0.76 | |

Russia. The regression results for Russia are presented in Table 4.7. The model is not good at explaining patterns in Russia. Coefficients appear to have no statistically significant relation to real military expenditures. This is consistent with the Part 1 results. U.S. military expenditures have no significant explanatory power as well.

Table 4.7. Russia: Sign and Significance of Model Parameter Estimates

| Russia | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Variable | | | | |
| Constant | - | No | - | No |
| Lag Depend | + | No | + | No |
| Lag Output | + | No | + | No |
| Lag Growth | - | No | + | No |
| U.S. military expenditures | - | No | - | No |
| Adjusted R ² | 0.81 | | -0.84 | |

India. Table 4.8 reports the results for India. In contrast to China, Japan, and the United States, movements in past military expenditures do not seem to explain current movements. In the military expenditures, real output is positive while real output growth is negative. Both of them are significant. As we anticipated, U.S. military expenditures variable is positive and significant in the military expenditures.

Table 4.8. India: Sign and Significance of Model Parameter Estimates

| India | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Variable | | | | |
| Constant | - | No | + | No |
| Lag Depend | + | No | + | No |
| Lag Output | + | Yes | - | No |
| Lag Growth | - | Yes | - | No |
| U.S. military expenditures | + | Yes | + | No |
| Adjusted R ² | 0.98 | | 0.41 | |

Japan. Table 4.9 presents the econometric findings for Japan. As shown, real military expenditures match the model much better than another specification. In real military expenditures, lagged military expenditures are significant and positive, while national real output is negative. The Chinese military expenditures, however, show significant and positive in the military expenditures-to-output ratio.

Table 4.9. Japan: Sign and Significance of Model Parameter Estimates

| Japan | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Variable | | | | |
| Constant | + | Yes | + | No |
| Lag Depend | + | Yes | + | No |
| Lag Output | - | Yes | - | No |
| Lag Growth | + | No | + | No |
| Chi. military expenditures | + | No | + | Yes |
| Adjusted R ² | 0.87 | | 0.72 | |

Table 4.10. United States: Sign and Significance of Model Parameter Estimates

| Variable | Dependent Variables Is: | | | |
|----------------------------|----------------------------|--------|-----------------------------|--------|
| | Real Military Expenditures | | Military Expenditures Ratio | |
| | Sign | Signif | Sign | Signif |
| Constant | - | No | - | No |
| Lag Depend | + | Yes | + | Yes |
| Lag Output | + | No | + | No |
| Lag Growth | - | No | + | No |
| Chi. military expenditures | + | No | + | Yes |
| Adjusted R ² | 0.83 | | 0.82 | |

United States. For the United States, similarly as Part 1, the United States of Part 2 continue to have a significant and positive relationship to lagged military expenditures, while real output and real output growth have no significant relation to either real military growth or the military expenditures ratio. However, Chinese military expenditures are positively and significant related to U.S. military expenditures in the real military expenditures ratio specification.

5. CONCLUSION

Overall, both our graphical and statistical analysis indicates that the relationship between military expenditures, economic output and economic output growth varies over time and across countries. Further, our statistical results are not robust to deferent model specifications. In terms of explanatory power, there is no consistent pattern across countries. For most states, the strongest predictor of current military expenditures is military expenditures in the immediate past, whether these expenditures are measured in levels or as a share of output. While it is un surprising that current military expenditures decisions are heavily influenced by decisions made in the past, this fact sheds little light on why decisions were made in the first place.

Our results indicate that the statistical evidence for a strong relationship between the five states military expenditures and national output during the 1988-2013 sample periods is less than overwhelming. Certainly no conclusive evidence as to the direction of causality between the two has been presented.

While it seems plausible that Japan might respond positively to increases in Chinese military spending, for example, it seems much less plausible that Russia actually reduced its military spending in response to U.S. spending increases.

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A SCHEME FOR LEGISLATING THE SIGNATURE PROCEDURE OF CHINA NATIONAL DEFENSE CONTRACTS

ZHENGQI FANG, LI DENG, LING YANG

Military Economics Academy, 430035 Wuhan, China

Abstract: *By taking the process of signing a national defense contract as the breakthrough point of this thesis, we propose a scheme for legislating the signature procedure of China national defense contracts, with suggestions on setting a standard for categorizing the signature procedures, building a procedure for disclosing information in advance, as well as on normalizing the criterion for selecting suppliers, for the purpose of embodying the principles of “fairness & efficiency, openness & impartiality and normalization” during signing such a contract..*

Keywords: *China national defense, Signature procedure, Legislation*

1. INTRODUCTION

China, like many other developing countries, does not have a specialized law on regulating national defense contracts by now. Ma Jianguo, a deputy to the National People's Congress, said in 2011 that “it is urgent to do further legislative works on national defense contracts in order to limit the contractual behaviors within legal system and maintain the military and economic order”[1]. The enactment of a law, however, is not accomplished overnight. We need constant practices and have to keep drawing lessons from these practices such that we enact a law with the principle of “fairness, impartiality and efficiency”. As for China, the army can normalize the procedural rules involved in signing a national defense contract as work-level regulations before the launch of an official law of defense contracts.

2. RELEVANT CONCEPTS

Definitions and explanations of legal terms are different in countries because of their different legal systems. To avoid confusion, the following part gives some concepts and scopes related to procedural rules and signature procedure of national defense contracts.

2.1 Procedural rules. Procedural rule is a very big concept, including not only litigation rules such as administrative litigation act, criminal procedure law and civil procedure act, but also non-litigation rules such as administrative procedure law, legislative procedural law, election regulation, parliamentary rules and trade rules.

Generally speaking, non-litigation rules are legal clauses for normalizing behaviors as well as stipulating procedures, links, manners, steps, time, places and documents of matters, and are widely contained in types of laws. In general, civil law countries focus more on litigation rules than non-litigation rules. As a matter of fact, non-litigation rules are rules that are efficient in preventing disputes. The procedure of signing a contract, for example, can be deemed as a non-litigation rule. If the signature procedure is not stipulated by law, then it is hard to make clear of contracting parties' behaviors, rights and duties. What' more, confusion may also happen to the imputation of liabilities and duties after a dispute appears, especially when the main contractor has a complex identity. The procedural rules should be especially written in laws for those defense contracts in which the state, army, enterprise and individual are involved at the same time to reduce disputes and improve efficiency. In this sense, signature procedure of China defense contracts should draw lessons from the procedural rules of Anglo-American law system so as to legislate the signature procedure.

2.2 Defense tender and defense contract.

Law of the People's Republic of China on Tenders and Bids prescribes that tenders include public tenders and invitational tenders. A public tender means that a tender, in the form of tender announcement, invites unspecified legal persons or other unspecified organizations to submit their bids. An invitational tender means that a tender, in the form of invitation for submission of bid, invites specified legal persons or other specified organizations to submit their bids, and the number of invited parties must be larger than three.

In the United Kingdom, *The Contract Law of National Defense and Public Security* does not stipulate the ways of tendering and bidding in detail, but categorizes the procedures of defense contracts, including negotiated procedure, special procedure, restricted procedure and competitive dialogue procedure.

This categorization not only figures out whether the invited tenders are specified persons, but also takes into consideration of some factors, for example, whether the information is disclosed in advance; whether the negotiation is miscellaneous, or whether the scheme by the party who wins the bidding needs to be modified or not.

In China, as mentioned above, the scope of defense contract types is larger than that of tender types. A contract can come out not only from a tendering but also from the procurement without tendering, for example the non-competitive defense contract.

In the United Kingdom, *The Contract Law of National Defense and Public Security* specifies the service contract, procurement contract and construction contract. For the defense contract and tender types, however, it doesn't tell the difference in their scopes. But as a matter of fact, it sets a special procedure for the four types of contract, and the special procedure is exactly prepared for unusual tenders and bids. This is similar in the two countries.

2.3 Procurement scope. As described by *The Government Procurement Law of the People's Republic of China*, "procurement" refers to activities conducted by means of contract for the acquirement of goods, construction or services for consideration, including but not limited to purchase, lease, entrustment and employment; "goods" refer to objects of every kind and form, including but not limited to raw and processed materials, fuel, equipment and products; "construction" refers to all construction projects, including construction, reconstruction, expansion, fitting up, demolition and repair and renovation of a building or structure, and; "services" refer to any object of government procurement other than goods and construction.

In documents issued by authorities of the Chinese army, procurements of military goods, constructions and services are all called as the military procurement.

The Contract Law of National Defense and Public Security of the United Kingdom specifies three types of contract — service contract, procurement contract and construction contract, corresponding to activities of purchasing goods, constructing projects and purchasing services, respectively.

For this reason, procurement here refers only to activities of purchasing goods, excluding constructions and services. It is worth mentioning that the financial leasing contract, in which the ownership of goods is assigned to the tenant, is also classified as a procurement contract.

3. A SCHEME FOR LEGISLATING THE SIGNATURE PROCEDURE OF CHINA NATIONAL DEFENSE CONTRACTS

3.1 Standard of signature procedure types, with the principle of "fairness and efficiency". Differences and uncertainties exist both before and during signing a national defense contract. Distinguishing these differences and uncertainties is the best way to improve efficiency with consideration on fairness. The problem of asymmetric information may exist in a national defense contract because of its particularity. According to the number of suppliers and whether the information is disclosed in advance or not, the signature procedure can be therefore classified into following types:

The first is public negotiated procedure, namely the staged tendering procedure: the stage of offer and the stage of acceptance before a contract has been formally signed (*China Contract Law* stipulates that there are two stages for making a contract: offer and acceptance). To make clear of rights and duties and to avoid disputes, requirements on time and behaviors of contractual parties are particularly important during the two stages.

Therefore, the public negotiated procedure together with principle of fairness should be taken to make a contract. When this procedure is adopted, the army should officially release the tendering information, such that eligible tenderers can be informed and have opportunity to participate in.

During the procedure, tenderers can express their requirements and declare what they can provide in stages. In this way the best tender can be screened out. This procedure is designed with a feature that the negotiation is carried forward in stages and in a continuous way. The tendering announcement and documents should be clear (on the number of stages, deadline and requirements). At every stage, a part of suppliers should be selected for next negotiation, or, excluded out of the negotiating table. In a word, the number of suppliers should be decreased progressively but should be larger than three at the last stage. This procedure is featured in public information, full competition and complete process.

Staging the negotiation is good to a national defense contract due to its complexity. In this process, the army can not only know very well about suppliers but also set requirements in different stages to make full competition between suppliers (for a supplier who needs to be financed, for instance, financial indicators, such as debt-to-assets ratio, cash flow and tax, can be set in the first stage; or for a case where high technical requirements are needed, admittance criterion or quality certification can be set in the first stage). Finally, the supplier who meets the army's requirements can be selected out. Further, the army can assert to modify the scheme submitted by the final supplier who wins the tendering.

The second is special negotiated procedure. "Special" here means asymmetric information for some reason. When this procedure is adopted, tendering information is released not to the public but to only one supplier. The procedure will be used only for special cases, in which, there is no tenderer takes parts in; or, only specific suppliers can participate for reasons of technology or intellectual property; or, the goods is directly purchased or rented from public market; or, the goods is designed and purchased for special purpose; or, the requirements or services are added by the army under the contract; or, the supplier won the tendering in a illegal way or failed to pass subsequent assessment(s) but there is no material alteration made to the contract (according to China Contract Law, material alteration means any change to the eight basic articles); or, the contract is new but its content is the same to the original contract signed with the same supplier five years ago, etc. For these special cases, there is no public announcements and information. This is an exception to the principle of fairness. However, these cases are inevitable existence. The procedure shows that the principle of efficiency is superior to the principle of fairness.

The third is restricted procedure. If the special negotiated procedure can be deemed as a special version of the public negotiated procedure, then the restricted procedure can be deemed as a simplified version of the public negotiated procedure. What it restricts is the stage of the negotiation. In other words, there is only one stage in negotiation: the stage of offer and acceptance. Of course, this procedure involves several suppliers. When the procedure is adopted, the number of suppliers is required to be no less than three. When there are too many suppliers, the army can restrict them by setting objective and non-discriminatory conditions to improve efficiency.

After receiving the offers from suppliers, the army shall invite them in form of written notification, with the deadline for acceptance, exceptions or emergencies. In a public negotiated procedure, the army can assert its requirements for many times and can screen suppliers to pick out the best. Unlike that, this procedure is to search offers at the very moment when the tendering information is released, and after receiving the offers it decides to select a supplier to make the contract or decides to enter in other procedures (when there are not enough suppliers or the suppliers cannot meet the financial requirements). In fact, this procedure is an embodiment of the principle of efficiency and is also a supplement to the public negotiated procedure.

The fourth is competitive dialogue procedure. This procedure will be used when the army considers that it is impossible to make a successful tendering by using the public negotiated procedure or restricted procedure. A competitive dialogue procedure is applicable to complex cases: the purchaser itself cannot ascertain the technical solution that satisfies requirements, or cannot determine the legal or financial supplementary items of the purchasing scheme. It is worth to note that the cost of this procedure is high for both the army and the supplier(s). Therefore, it is not suitable for low-priced tenders.

A competitive dialogue procedure will also involve several suppliers, who are invited, in the form of notification, to take part in the tendering. Basically, it is similar to a public negotiated procedure, but it has following differences: First, in a competitive dialogue procedure, purchasing requirements are gradually revealed during several rounds of dialogue to make clear of suppliers' response. A public negotiated procedure, however, is a process for suppliers to show their powers and strengths. That is to say, the competitive dialogue procedure is more applicable to contracts that have higher requirements and more complex conditions. Second, in a competitive dialogue procedure, suppliers can modify their schemes in accordance with the information provided by the army; while in a public negotiated procedure, it is the army who asserts to modify the scheme after the final supplier has been determined. In other words, suppliers, as competitors, would face more uncertainties and risks in a competitive dialogue procedure.

Third, content of the dialogue can be related not only to technologies, but also to financial or legal terms, such as price, cost, tax, risk control and assignment, warranty and the possibility of founding a companying for a special purpose.

What's more, because the competitive dialogue procedure is used for complex contracts, the army shall control the process of negotiation to improve efficiency. During the process of making a national defense contract, this procedure can release a signal of complexity, facilitate an in-depth understanding between the two parties, and provide an opportunity for the army to cut its cost. It is also good for confidential information (for example, the army can let the most competitive suppliers into the core and top confidential information at the final stage to lower the possibility of information disclosure). In addition, there is more than one supplier participating throughout the procedure, demonstrating the principle of "fairness and openness".

3.2 Building an information disclosure procedure to embody the principle of "fairness and openness". A national defense contract is a special contract with special content. During signing a defense contract, the possible information asymmetry is likely to become a factor that blocks full competition, cause corruption and increase the cost of the army. For this reason, it is very necessary and urgent to design a procedure for disclosing information. The information disclosure procedure can be set, in the form of work-level regulation, to make sure of normalization and openness.

First, the scope of disclosure. That is to say, information for what types of defense contract and for what cases must be disclosed in advance; and what are exceptions. For instance, information for a draft contract doesn't have to be disclosed in advance. But the procedures of tendering invitation and negotiation must be made clear of.

Second, the content of disclosure, for example, the date for signing the contract; and the standard for defining the types of goods or projects.

Third, the criterion for forms and rules of submitting and approving documents.

Of course, the time and content of the disclosed information are different for different signature procedures. What needs to be noted is that whether the information of purchasing pattern needs to be disclosed, and whether the behavior of such disclosure can be prosecuted or not. By now, the disclosure of the formation of purchasing pattern cannot be prosecuted in China.

This is because such a disclosure is to ask for opinions from the public by an administrative agency, and the disclosure is not an administrative behavior.

For this reason, suppliers have no rights to take prosecution, administrative reconsideration or proceedings against the disclosure and its content.

3.3 Normalizing the supplier inclusion criterion and Systematizing the selection standard. First, inclusion criterion. Inclusion criterion is to guarantee the quality of suppliers for the military procurement. It is also to reduce the transaction cost of the two parties and the contractual risks during making a national defense contract. At present, this criterion can be implemented by grading: preferred supplier, Secondary supplier...; preferred contractor, Secondary contractor...; preferred services provider, Secondary services provider..., etc. Such priority level is related to contracts' importance, complexity and value.

Second, exclusion criterion. This criterion may include factors such as the loss of credit, the worsening of financial conditions, the loss of technical advantages, and so on.

Third, incentive standard. This is also a common method in managements. It is to make a dynamic management on suppliers, with setting some indexes such as: credit, cost and period.[2] Those who actively achieve or even over fulfil their tasks should be awarded or promoted.

In short, a good system design is an efficient way to prevent disputes, reduce transaction cost and improve purchasing efficiency. At present, it is feasible and necessary to normalize the signature procedure of China national defense contracts.

4. CONCLUSION

The tentative conclusion that follows is that China need a scheme for legislating the signature procedure of national defense contracts. First, China need to standard of signature procedure types. Second, they need to build an information disclosure procedure to embody the principle of "fairness and openness". Third, they need to normalize the supplier inclusion criterion.

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THE NONLINEAR RELATIONSHIP BETWEEN DEFENSE EXPENDITURE AND ECONOMIC GROWTH IN CHINA - AN EMPIRICAL ANALYSIS BASED ON MS-AR MODEL

ZHONGHOU GUO, SIQI LIU, LIN JIN

Military Economics Academy, 430035 Wuhan, China

Abstract: *This paper, which was inspired by Laurent Ferrara, chooses the time series for national defense expense accounts for the central fiscal expenditure ratio during 1953-2010 as the empirical data and uses MS-AR model to carry out regime switching test. The research shows that: the Classification Schedule obtained by using the model agrees with the actual case in China very well, which indicates that the time series for national defense expense accounts for the central fiscal expenditure ratio was indeed influenced by a potential variable-the National Strategy; Since 1989, China's national defense policy is defensive and the national defense construction is subject to economic construction, and the defense expenditure would not have substantial increase as long as there is no serious threat to national sovereignty and security.*

Keywords: *Defense Expenditure, Economic Growth, National Strategy, Markov-Switching AR Model, Non-linear relationship.*

1. PREFACE AND LITERATURE REVIEW

It has been proved by the past experience that: if a country hasn't allocated sufficient resources for national defense, then its defense couldn't guarantee the nation's security; if redundant resources have been allocated, then the defense would influence this country's economic progress.

Within the present framework of building a harmonious society, how to maintain a balance between national defense construction and economic development is an issue of great significance, which is closely related to the national security and the future economic and social development.

Researchers home and abroad have carried out extensive and in-depth researches on this issue. According to the present literatures, their researches provide significantly different results. For example, Benoit(1978) [1], Atesoglu and Mueller(1990) [2] think there is exterior positive correlation between defense expense and national economic growth. Yakovlev(2007) [3] and Pieroni(2008) [4] conclude that there is exterior negative correlation between defense expense and national economic growth.

Biswas, Ram(1986) [5] hold the point that there is no definite or obvious exterior correlation between defense expense and national economic growth. Gerhard and Ludger(2004) [6] think that: for a specific country, there must exist a threshold standard for defense expenditure. When defense expenditure is below the standard, the increase of it is beneficial to economic development; if defense expenditure surpasses the standard, the increase of it will hinder economic development. Wang Wanjun and Chen Xiaohe (2011) [7] adopted the time series data of China during 1952-2008 and used non-linear threshold regression model in their research. They found there is threshold effect between China's defense expense and economic growth. When the ratio of defense expense accounts for GDP is below 3.434%, the increase of the ratio has distinctive negative effect on economic growth when the ratio is bigger than 3.434%, the increase of the ratio will noticeably boom economic growth.

For a long period of time, economists always deemed that the relation between defense sector and economic sector was linear, therefore, linear evaluation methods, such as Least Double Multiplication or VAR Model, were frequently used in analysis.

However, Kinsella(1990) [8] pointed out that: there might essentially existed a certain non-linear relation between economic growth and relevant military variables. And this point of view was proved by the research results of Hooker, Knetter(1997) [9], Stroup, Heckelman (2001) [10] and Jesus, Gerhard (2004) [11].

From the angle of regime switching, this paper studies the co-relevance of defense expense and economic development by using non-linear method. We think that: it is impossible for a country to adopt unalterable strategies in coordinating defense construction and economic development. When the national and the international environment are undergoing dramatic changes, the national strategy might change correspondingly. To be more specific, during a certain period of time, this country might give priority to economic development rather than defense construction; while during another period of time, priority might be given to defense construction instead of economic development. The focus of the national strategy is shifting between defense construction and economic development, and this type of non-linear relation could be caught by using Markov-Switching Vector Auto-regression Model which is abbreviated as MS-VAR. Markov-Switching Vector Auto-regression Model is deemed as one of the natural models representing the popularizing of non-linear-oriented traditional linear models. Laurent Ferrara(2003) [12] established VAR model by using four time series data: reciprocal of urban worker unemployment rate, production industrial index, employment advertisement index and construction expense index. Suppose economy cycle is a potential variable which is subordinated to the Three-regime Markov Chain Switching, then Markov-Switching Vector Auto-regression Model is established by combining VAR Model and Markov Regime switching model together. Smooth probability of three-regime switching is estimated by using MS(3)-VAR, thus researchers get the classification schedule of these three regimes. This schedule is quite similar to NBER' schedule of classifying economy cycle, which indicates that the chosen four macro time series are influenced by the switching of economy cycle.

This paper, which was inspired by Laurent Ferrara(2003) [12], chooses the time series for national defense expense accounts for the central fiscal expenditure ratio during 1953-2010 as the empirical data and uses MS-AR model to carry out regime switching test. The research shows that: during 1953-1967, the ratio of defense expense accounts for the central fiscal expenditure was small, and China gave priority to economic development rather than defense construction; while during 1968-1977, this ratio was high, and priority was given to defense construction instead of economic growth; and during 1978-2010, this ratio was small again, and priority was given to economic development instead of defense construction. The classification schedule acquired by using MS-AR Model agrees with the practical case of China quite well, which indicates that the time series for defense expense accounts for central fiscal expenditure ratio is indeed influenced by a certain potential variable, and this potential variable is national strategy. Meanwhile, from quantitative angle, the empirical result of this paper fully proves that the defense policy of China is defensive, and China's defense construction is subject to economic construction, and the defense expenditure would not have substantial increase as long as there is no serious threat to national sovereignty and security. Finally, in recent years, although China's defense expenditure has increased, the ratio of defense expense accounts for central fiscal expenditure is small. It testifies that recent increase of the defense expenditure is moderate and reasonable, and not excessive at all.

This paper has the following features:

(1) All of the present literatures demonstrate that defense expense growth of China in recent years is moderate and reasonable from qualitative perspective. While this paper uses calculation results to prove that defense expense growth is moderate and reasonable from quantitative perspective, which is more convincing.

(2) This paper illustrates the features of our country's defense policy with the calculation results from the model, which is a creative initiative.

The rest of this paper will include: part two is a narration of empirical model;

part three is about choosing variables and data description; part four is empirical analysis; part five is conclusion and policy signification.

2. INTRODUCTION TO EMPIRICAL MODEL

Markov-Switching Single Variable Auto-regression Model is a special case of Markov-Switching Vector Auto-regression Model. When the study object is composed of only one time series, MS-VAR model degenerates into MS-AR model. Despite the fact that MS-AR model is used from the beginning to the end of this paper, it is more scientific and general to introduce MS-VAR model which is relatively common as an empirical model.

According to traditional VAR model, the relationship between variables during sample period is invariable. However, in the real situation, the relationship between variables might change under the influence of multiple factors, such as exterior environment, the development of variables themselves, etc. And Markov-Switching Vector Auto-regression Model is widely adopted for it can better portray the non-linear dynamic relation of variables during sample period.

For K dimension VAR model which lags behind P order, there are two forms. One is the intercept type: y_0, y_1, \dots, y_{t-p} are fixed values,

$$y_t = v + A_1 y_{t-1} + \dots + A_p y_{t-p} + u_t \quad t = 1, \dots, T,$$

$$u_t \sim i.i.d.N(0, \Sigma).$$

The other is the adjusted average type:

$$y_t - \mu = A_1 (y_{t-1} - \mu) + \dots + A_p (y_{t-p} - \mu) + u_t$$

$u = \left(I_k - \sum_{j=1}^p A_j \right)^{-1} v$ is the Kx1 dimension average of y_t .

If time series is dominated by regime switching, then for observable time series vector y_t , its potential data generating process is depending on regime variable S_t .

In this study, it is supposed that $S_t = \{1, 2\}$, and meets with state probability transferring matrix

$$P = \begin{pmatrix} P_1 & P_2 \\ P_2 & P_1 \end{pmatrix} \quad P_1 + P_2 = P_2 + P_1 = 1.$$

When the average of MS-VAR model is depending on S_t , MSM-VAR model is obtained; when the intercept item of MS-VAR model is depending on S_t , MSI-VAR model is obtained; when the auto-regression coefficients of MS-VAR model is depending on S_t , MSA-VAR model is obtained; when error item of MS-VAR model is heteroscedasticity, MSH-VAR model is obtained; if the average of MS-VAR model is depending on S_t , and at the same time error item is heteroscedasticity, MSMH-VAR model is obtained; if the intercept item of MS-VAR model is depending on S_t , and at the same time error item is heteroscedasticity, MSIH-VAR model is obtained. MSMH(2)-VAR(1) model, which has double regimes, lags behind Order 1, and whose average depends on S_t , and whose error item is heteroscedasticity, can be written in the following form:

$$y_t - \mu(s_t) = A_1 (y_{t-1} - \mu(s_{t-1})) + u_t,$$

$$u_t \sim i.i.d.N(0, \Sigma(s_t)),$$

$$\text{when } S_t = 1,$$

$$\mu(s_t) = \mu_1;$$

$$\text{when } S_t = 2,$$

$$\mu(s_t) = \mu_2.$$

One-time change of the regime will immediately lead to a leap of process average, and the above formula could be changed into $y_t = \nu(s_t) + A_1 y_{t-1} + u_t$, $u_t \sim i.i.d.N(0, \Sigma(s_t))$, that is the MSMH(2)-VAR(1) model, which has double regimes, lags behind Order 1, and whose average depends on s_t , and whose error item is heteroscedasticity. With the change of average adjusted patterns and intercept form, different MS-VAR models have portrayed different dynamic adjusted patterns of the observable variables before and after regime switching.

MS-VAR model is the more generalized type of common VAR model. In the estimation result of MS-VAR, there is a LR linear test value. If this variable is significant, it indicates that adopting MS-VAR model in sample data is better than adopting common VAR model. If it is not significant, it indicates that common VAR model is better than MS-VAR model.

3. CHOICE OF VARIABLES AND DATA DESCRIPTION

3.1 Choice of variables and data description. If there is substantial change occurred to a country's defense strategy, the defense expenditure index could sensitively display this change. The defense expenditure accounts for central fiscal expense ratio is a universal index to measure defense expenditure burden.

In order to study whether the time series for defense expenditure accounts for central fiscal expense ratio is indeed influenced by national strategy, we choose the enforcement value of central fiscal expenditure and the enforcement value of defense expense during 1953-2010 as the empirical data. The source for the enforcement value of central fiscal expenditure is Statistic Yearbook of those years. Since Statistic Yearbook of 2012 has not been issued yet, the most recent data acquired is that of 2010. The enforcement value of defense expense is from the annual Defense Expense White Book of those years, and the enforcement value of 2010 defense expense is calculated from the relevant data contained in 2010 Defense Expense White Book.

Since the value of defense expense and the value of central fiscal expenditure are data of the same year, then the defense expense accounts for central fiscal expenditure ratio, which is acquired by dividing the annual defense expense with the annual central fiscal expenditure, has eliminated the influence of that year's inflation and could factually display the evolution of China's defense expense policy and national strategy.

3.2 Test of unit root. Before carrying out the empirical analysis, we first have unit root test on the time series for defense expense accounts for central fiscal expenditure ratio of various years by using ADF method. And the test result (which is listed in Table 1) indicates that the time series for defense expense accounts for central fiscal expenditure ratio is balanced.

Table 1. Unit root test on the time series for defense expense accounts for central fiscal expenditure ratio

| Variables | I(c,t,d) | ADF statistics | Criticize of t(5% significance level) | There is unit root or not |
|-----------|----------|----------------|---------------------------------------|---------------------------|
| Rate | (c,0,0) | -3.992825 | -2.913549 | I(0) |

Note: c is the item with intercept, t means there is time tendency, d is lagging item.

4. EMPIRICAL ANALYSIS

In order to analyze the dynamic influence of national strategy change on the defense expense accounts for central fiscal expenditure ratio, we carry out single variable MS-AR model regime switching test on this ratio time series.

According to Krolzig(1997) [13], when the regime has switched, if the evolution path of average value is abrupt, it is advised to use MSM model series. If the national strategy is changing with the change of international and domestic environment, then we have reasons to believe that: when the national strategy changes, the evolution path of the defense expense accounts for central fiscal expenditure ratio is likely to change abruptly. Thus we use MSM model series as analyzing model.

4.1 Selecting MS-AR explanatory model.

Krolzig(1997) [13] thinks that bottom-up Strategy should be followed rather than top-down Strategy in determining a process which is suitable for MS-AR model. Bottom-up Strategy starts with estimating MSM(M)-AR(P) or MSI(M)-AR(P) model which has less restrictions to find the most suitable explanatory model. Top-down Strategy starts with estimating MSMAH(M)-AR(P) or MSIAH(M)-AR(P) model which has more restrictions to find the most suitable explanatory model. If we follow top-down Strategy and first estimate MSMAH(M)-AR(P) or MSIAH(M)-AR(P) model, then we will run the risk of making likelihood function converge in local maxima. The reasons are as following: in estimating MS-AR model parameter, the principle followed in value calculation is finding a parameter which could maximize likelihood function in all. MSMAH(M)-AR(P) and MSIAH(M)-AR(P) model have distinctive and hyper-conventional statistical features which are quite different from that of MSM(M)-AR(P) and MSI(M)-AR(P) model. Moreover, these statistical features are hardly testable in theory. Therefore, it is especially important to choose initial value in estimating MSMAH(M)-AR(P) or MSIAH(M)-AR(P) model. Once computers have chosen inappropriate initial value, it will lead to likelihood function converge to local maxima.

Table 2. Determine P value in MSM(2)-AR(P)

| Model type | | Lagging order | | |
|------------|------|---|---|---|
| | | Order 0 | Order 1 | Order 2 |
| MSM(2)-AR | LogL | 100.1357 | 119.2971 | 119.8961 |
| | AIC | -3.2805 | -3.9753 | -4.0320 |
| | HQ | -3.2114 | -3.8918 | -3.9339 |
| | SC | -3.1029 | -3.7603 | -3.7788 |
| | LR | 20.6643 Chi(1)=[0.0000] ** Chi(3)=[0.0001] ** DAVIES=[0.0001] ** | 10.3480 Chi(1)=[0.0013] ** Chi(3)=[0.0158] * DAVIES=[0.0158] * | 6.0931 Chi(1)=[0.0136] * Chi(3)=[0.1072] DAVIES=[0.1072] |

Following bottom-up strategy, we first estimate MSM-AR model. Since theoretically, we deem there are two stages for national strategy: the stage in which economic development is subject to defense construction and the stage in which defense construction is subject to economic development. Therefore, we suppose M=2.

Next, we analyze lagging order P, and choose the optimal P value. The calculation result is listed in Table 2:

The LogL value of MSM(2)-AR(1) model is 119.2971, and the LogL value of MSM(2)-AR(2) model is 119.8961. $R = 2 \times (119.8961 - 119.2971) = 1.198$.

According to Krolzig(1997) it is known

that R obeys $\chi^2(1)$, since $\chi^2_{0.9}(1) = 3.8415$, under the condition that significance level is 5%, we do not accept the null hypothesis, and we think P=1 is more suitable. When M=2, P=1, let's calculate other types of MSM(M)-AR(P) model, and the results are displayed in Table 3:

Table 3. Choose suitable explanatory model

| Model types | | Lagging order | |
|-------------|------|---|---|
| | | Order 0 | Order 1 |
| MSM(2)-AR | LogL | 100.1357 | 119.2971 |
| | AIC | -3.2805 | -3.9753 |
| | HQ | -3.2114 | -3.8918 |
| | SC | -3.1029 | -3.7603 |
| | LR | 20.6643 Chi(1)=[0.0000] ** Chi(3)=[0.0001] ** DAVIES=[0.0001] ** | 10.3480 Chi(1)=[0.0013] ** Chi(3)=[0.0158] * DAVIES=[0.0158] * |
| MSMA(2)-AR | LogL | 100.1357 | 98.8254 |
| | AIC | -3.2805 | -3.2219 |
| | HQ | -3.2114 | -3.1244 |
| | SC | -3.1029 | -2.9710 |
| | LR | 20.6643 Chi(1)=[0.0000] ** Chi(3)=[0.0001] ** DAVIES=[0.0001] ** | -30.5954 Chi(2)=[1.0000] Chi(4)=[1.0000] DAVIES=[.NaN] |
| MSMH(2)-AR | LogL | 101.5480 | 119.5010 |
| | AIC | -3.2948 | -3.9474 |
| | HQ | -3.2117 | -3.8499 |
| | SC | -3.0816 | -3.6965 |
| | LR | 23.4889 Chi(2)=[0.0000] ** Chi(4)=[0.0001] ** DAVIES=[0.0002] ** | 10.7559 Chi(2)=[0.0046] ** Chi(4)=[0.0294] * DAVIES=[0.0543] |

| | | | |
|-------------|------|---|---|
| MSMAH(2)-AR | LogL | 101.5480 | 98.8254 |
| | AIC | -3.2948 | -3.1869 |
| | HQ | -3.2117 | -3.0754 |
| | SC | -3.0816 | -2.9001 |
| | LR | 23.4889 Chi(2)=[0.0000] ** Chi(4)=[0.0001] ** DAVIES=[0.0002] ** | -30.5954 Chi(3)=[1.0000] Chi(5)=[1.0000] DAVIES=[.NaN] |

Following the principle of maximizing LogL and minimizing AIC rule, HQ rule, SC rule, we make a choice between MSM(2)-AR(1) and MSMH(2)-AR(1). The LogL of MSM(2)-AR(1) is 119.2971, the LogL of MSMH(2)-AR(1) is 119.5010. $R = 2 \times (119.5010 - 119.2971) = 0.4078$.

According to Krolzig(1997) [4], it is known

that R obeys $\chi^2(1)$. Since $\chi_{0.9}^2(1) = 3.8415$, under the condition that significance level is 5%, we do not accept the null hypothesis, and think that MSM(2)-AR(1) is more suitable.

The LR test result of MSM(2)-AR(1) model shows that: LR linear test value is 119.2971, when the degree of freedom is 1 and 3, the significance level is 5% and 10% respectively, which indicates that non-linear model is better than linear model.

4.2 Smooth probability graph and regime switching period of MS-AR model.

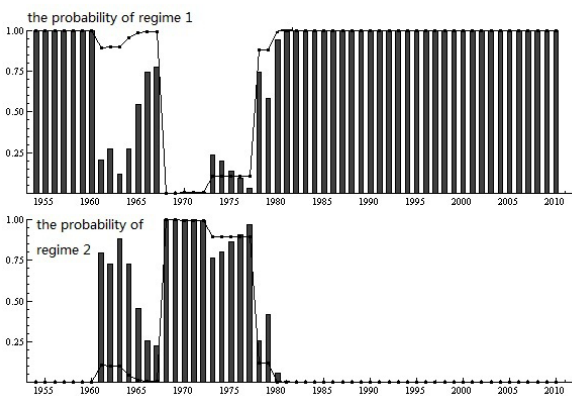


Fig. 1 Smooth probability graph and regime switching period classification

It could be observed from Fig. 1 that 1953-1967, 1978-2010 belongs to regime 1, and 1968-1977 belongs to regime 2.

4.3 Estimated coefficients of MS-AR model.

Table 4 displays the estimation coefficients of defense expense accounts for central fiscal expenditure ratio MS-AR model. Data from this table demonstrates that: the average value of defense expense accounts for central fiscal expenditure ratio in regime 1 and regime 2 are both significant on the level of 1%, besides, in regime 1, it is 0.2839, and in regime 2, it is 0.3781. We could deem that regime 1 reflects the period when defense expense ratio is low, and regime 2 reflects the period when defense expense ratio is high.

Table 4. MS-AR model estimation coefficients

| | ratio for defense expense accounts for central fiscal expenditure |
|---|---|
| Average value (period) of regime 1 | 0.2839*** |
| Average value (period) of regime 2 | 0.3781*** |
| ratio for defense expense accounts for central fiscal expenditure lags one order standard deviation | 0.494238*** |
| | 0.025068 |

note: ** means significance level is 5%,
*** means significance level is 1%

During 1953-1967 (regime 1), the defense expense accounts for central fiscal expenditure ratio was low, which is a period when priority was given to economic development rather than defense construction. The reasons are as following: during 1953-1956, China has fulfilled Three Major Alterations; in 1956, the 8th assembly of Chinese Communist Party made the resolution that “the major conflict within the nation is the conflict between people’s demand on the rapid development of economy as well as culture and the real situation that present economy and culture couldn’t meet the demand of people”. This assembly also brought forward the task of building a socialist country comprehensively; Mao Zedong, in his essay On Ten Major Types of Relationship, put forward the basic guiding idea that military should give way to economy, and enhancing defense power by boosting economy; in 1957, the Central Military Commission passed Resolution on Reducing the Size of Army, Improving its Quality, and decided to reduce the population of army to 2.4 million in 1958, which was the smallest since the People’s Republic of China was founded;

During 1958-1962, China implemented its second Five-year Plan in economic construction; 1963-1965 was the period for national economy adjustment.

During 1968-1977 (regime 2), the defense expense accounts for central fiscal expenditure ratio is high. This was a period when priority was given to defense construction instead of economic development. There are mainly three reasons: firstly, from 1966-1976 there was Culture Revolution. During this period, from 1967 to 1972 the People's Liberation Army of China adhered to the principle "three supporting and two armies" and maintained the social stability. The military had a great responsibility and defense expenditure increased. Secondly, Mao Zedong overestimated the seriousness of the international environment. From the middle of 1960s, with the breakup of China-Soviet Union relationship, China's security environment deteriorated, Mao Zedong deemed that World War was unavoidable and was around the corner. China started to implement development strategy which centered on war preparation. The whole country spared no effort to build "Three Battlefronts", and all the citizens were on alert and made preparations in case there was a war or famine. The army was also on high alert for a long time. Economic development gave way to defense construction, the size of army grew dramatically, and defense expenditure was huge. In 1969, the central government decided to establish national aerial defense leading panel and provincial or municipal aerial defense leading panel. Under the guidance of those organizations, there was a wide spread of digging bomb shelter among people. In 1972, the presentation of guideline slogan "dig deep hole, store large amount of grain, no hegemony" further boosted the hot tide of war preparation in China, which added the defense expense. Thirdly, local war directly increased defense expense. In 1969, there occurred Zhenbao Island self-defense battle. In 1974, there occurred Xisha island self-defense battle.

During 1978-2010 (regime 1), the defense expense accounts for central fiscal expenditure ratio is low, which was a period when priority was given to economic development rather than defense construction.

The reason is as following: in 1978, the Third Session of the Eleventh Central Committee of the Party determined that the focus of the party should be shifted to modernization construction of socialism. And this meeting is a starting point from which China entered a new era of renovation, opening to the outside and modernization construction of socialism.

The classification schedule obtained by using MS-AR model meets with the real case of China quite well, which indicates that time series for defense expense accounts for central fiscal expenditure ratio is indeed affected by a certain potential variable, and this variable is national strategy.

4.4 Regime switching probability matrix and status duration period of MS-AR model.

Table 5 displays regime switching probability matrix and status duration period of MS-AR. Data in the table indicates that both regimes have high stability.

Table 5. Regime switching probability matrix and status duration period of MS-AR

| | Regime 1 | Regime 2 | Sample number | frequency | Average duration period |
|----------|----------|----------|---------------|-----------|-------------------------|
| Regime 1 | 0.9760 | 0.0240 | 46.9 | 0.8872 | 41.58 |
| Regime 2 | 0.1891 | 0.8109 | 10.1 | 0.1128 | 5.29 |

If China is in a period when the defense expense accounts for central fiscal expenditure ratio is small, the lasting probability of regime 1 is 0.9760, the frequency for China stays in this period is 88.72%, and the average lasting period is about 42 years. If China is in a period when the defense expense accounts for central fiscal expenditure ratio is high, the lasting probability of regime 2 is 0.8109, the frequency for China stays in this period is 11.28%, and the average lasting period is about 5 years. The probability of China switching from regime 1 to regime 2 is 0.024, and the probability of China switching from regime 2 to regime 1 is 0.1891, the probability of switching between these two regimes has the feature of asymmetry. Observed from the perspective of average duration period, the period when the defense expense accounts for central fiscal expenditure ratio is high lasts only for 5 years, which is much shorter compared with the 43 years, during which the defense expense accounts for central fiscal expenditure ratio is small. Moreover, even during the period when the defense expense accounts for central fiscal expenditure ratio is high, Chinese government increased defense expenditure passively and defensively for the purpose of war preparation. Observed from the perspective of switching probability asymmetry, the probability of switching from regime 1 to regime 2 is low, which indicates that it is a normal state for China's defense expense accounts for only a small proportion in central fiscal expenditure, and there is hardly any substantial increase. Meanwhile, the chance for China shifting from the period when the defense expense accounts for central fiscal expenditure ratio is high to the period when the defense accounts for central fiscal expenditure ratio is small is eight times bigger than the chance of shifting from the latter to the former.

This means China is more likely to shift from the path of giving priority to defense construction to the road of focusing on economic development.

5.CONCLUSIONS & POLICY SUGGESTIONS

From the above study we know that: during 1953-1967, the ratio of defense expense accounts for central fiscal expenditure was low, and defense construction was subject to economic construction; during 1968-1977, the ratio of defense expense accounts for central fiscal expenditure was high, and priority was given to defense construction rather than economic construction; during 1978-2010, the ratio of defense expense accounts for central fiscal expenditure was low, and priority was given to economic construction instead of defense construction. And the classification schedule obtained by using MS-AR model meets with the real case of China quite well, which indicates that time series for defense expense accounts for central fiscal expenditure ratio is indeed affected by a certain potential variable, and this variable is national strategy. The period when the ratio of defense expense accounts for central fiscal expenditure is high lasts only for 5 years, which is much shorter compared with the 43 years, during which the ratio of defense expense accounts for central fiscal expenditure is low.

The probability for China shifting from the period when the ratio of defense expense accounts for central fiscal expenditure is low to the period when the ratio of defense accounts for central fiscal expenditure is high is quite slim. Meanwhile, the chance for China shifting from the period when the ratio of defense expense accounts for central fiscal expenditure is high to the period when the ratio of defense accounts for central fiscal expenditure is low is eight times bigger than the chance of shifting from the latter to the former. The analysis result of this paper shows that: in recent years, although our country's defense expenditure increased, China is still in the period when the ratio of defense expense accounts for central fiscal expenditure is small. Therefore, the recent increase of the defense expenditure is moderate and reasonable, and is not excessive. In addition, the empirical result of this paper fully illustrated that our country's defense policy is defensive. The defense construction of China is subject to economic construction, and the defense expenditure would not have substantial increase as long as there is no serious threat to national sovereignty and security.

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THE USE OF SOCIAL MEDIA IN ROMANIAN POLITICAL MARKETING

Marius Calin BENE^{A*}, Orlando Demetrius BENE^{A**}

* Faculty of Engineering, Hunedoara, Romania ** The National Institute of Applied Sciences, Lyon, France

Abstract: *The arrival of new media and of the Internet in particular, has completely transformed the classical interactions between politicians, voters and the media. For politicians, creating the appropriate networks meant to keep on exercising an influence over the debates is now vital: the applications of Web 2.0 are, for this purpose, a new opportunity. Facebook, Twitter, social networks allow politics to be also done on the Internet. A new essential type of media after the European referendum of 2005 has shown to what extent it should henceforth count on this new democratic space. A space of anonymity and free speech is born, which disrupts the habits of elected officials and often undermines elaborate communication strategies. And, of course, this is on the verge of attracting the hostility of some political figures and communicants. The goal of this paper is to examine the connection between Romanian politics and the use of social media, and give suggestions on how the use of social media in political marketing could be further advanced.*

Keywords: *Social media, politics, marketing, Romania*

1. INTRODUCTION

The online environment can change easily, according to our actions. The branding and rebranding of the country are not just ideas arising from political headquarters. The actions taken by Romanians in the online medium after they found out *what Google thinks about us* changed the ranking.

However not all Romanians see the social media as a source of worry or as a means of espionage. Increasingly more people accept the technologization and the evolution of social and IT movements. More and more countries are connected to the internet and this can be seen in the social media.

Facebook, twitter, LinkedIn, google+, YouTube, Flickr, Pinterest, all these social media facilitate the access to information and in the same time help create a perception of reality.

The information and analysis given henceforth are not meant to influence any reader, nor do they express the political opinions of the authors.

2. THE EXTENT TO WHICH SOCIAL MEDIA MATTER IN POLITICS

The last few years have shown that the online political marketing is not a necessity anymore, but a must for the politicians.

As demonstrated by the election of 2008 when Barack Obama used the social media to attract young people to vote.

Social media are online platforms and tools through which people share contents, profiles, opinions, experiences and it facilitate the online interactions between groups.

Even though this might be disturbing for some, politicians are actually products like Dacia or Orange.

There are no differences between a Facebook page of a politician and that of a company.

As a consequence, politicians are hiring sociologists, psychologists and other kinds of specialists in order to take care of their image online, in order to “sell” themselves to the “consumers”.

Nowadays, politicians create social media strategies in order to be more popular, more visible, more trustworthy and influent upon public opinion.

The politicians share their messages quickly and easily.

Billions of people worldwide use the Internet and social media regularly.

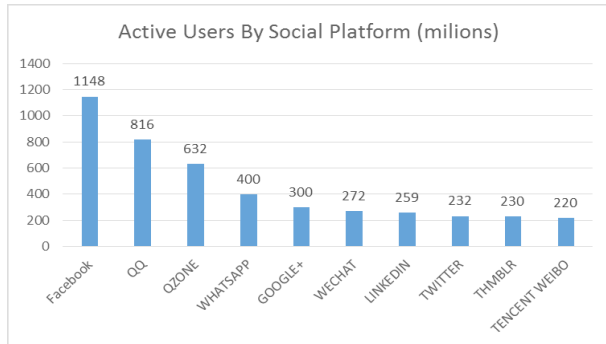


Fig. 1: Active users by Social Platform (millions) [1]

3. POLITICAL MARKETING USING SOCIAL MEDIA: ROMANIAN CASE

Nowadays, in Romania, 10 million people have access to the internet and 7.2 million of them have a Facebook account.

Since more and more people are using Facebook, politicians that want to win a vote, companies that want to sell their products, journalists that want to share their opinion every moment etc. are using Facebook as a marketing tool.

Facebook offers a more direct connection with the targeted audience, it is more convenient, cheaper and easier to use.

The first time the social media had a big influence in the Romanian politics was in 2012 during the referendum on the impeachment of President Traian Băsescu.

This was a sign for the Romanian political scene that understood the power of the social media. "I think that the 2014 campaign will be crucial on the internet, not only for the European elections, but for the presidential elections.

The politicians that will not have a strong basis on the internet will not be able to communicate with the electorate efficiently.

Not to mention what will happen in 2016." – Traian Băsescu.

The following graphs, show the number of followers on Facebook of the most important Romanian political parties and their presidents.

In general, the presidents are the ones who have a greater support than the political party they represent.

Therefore the whole political view of a party is represented by a person, which can be a good thing because it is easier to manage the message to the citizens but any mistake can be a big image disaster for the whole party.

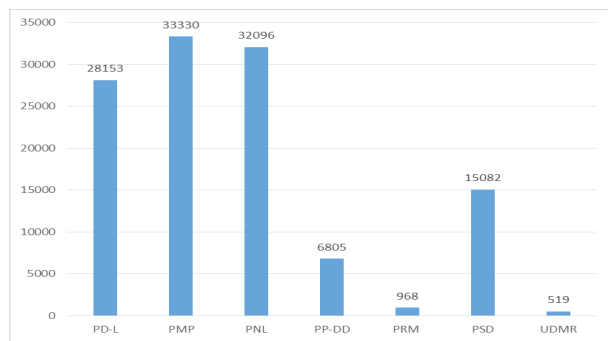


Fig. 2: Facebook followers of Romanian political parties [2]

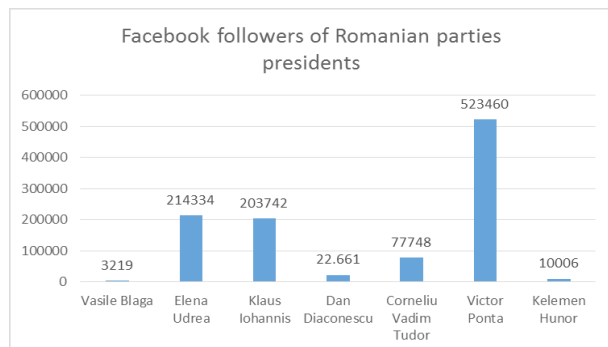


Fig. 3: Facebook followers of Romanian political parties' presidents [2]

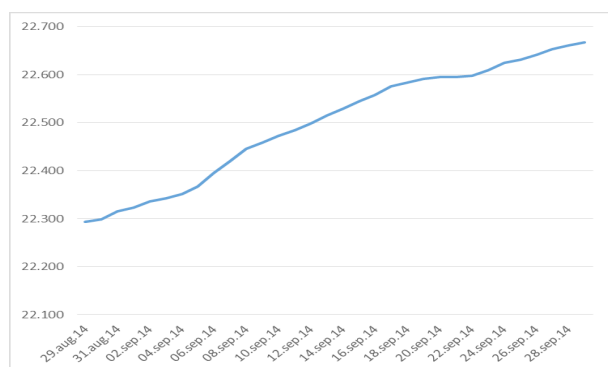


Fig. 4: Evolution of Facebook followers – Dan Diaconescu. Joined Facebook January 12th, 2012 [2]

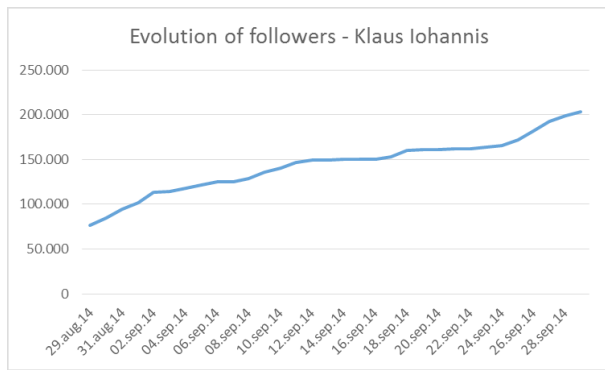


Fig. 5: Evolution of Facebook followers – Klaus Iohannis. Joined Facebook may 28th, 2014 [2]

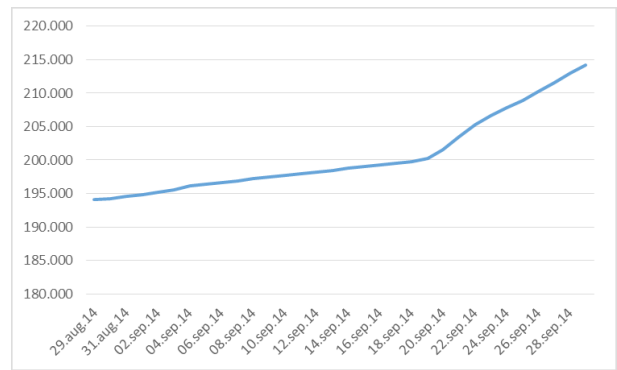


Fig. 8: Evolution of Facebook followers – Elena Udrea. Joined Facebook march 9th, 2010 [2]

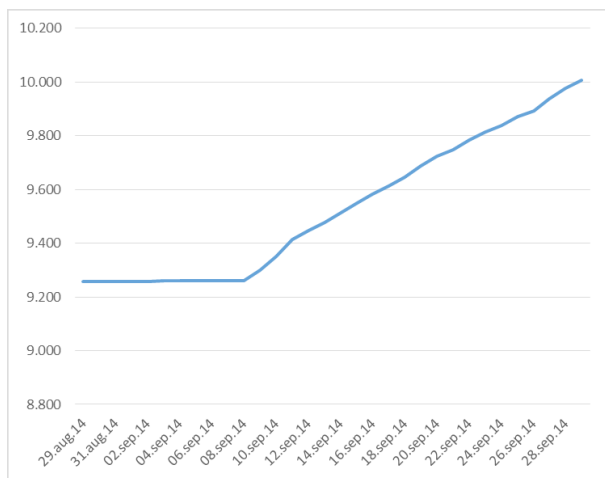


Fig. 6: Evolution of Facebook followers – Kelemen Hunor. Joined Facebook December 11, 2010 [2]

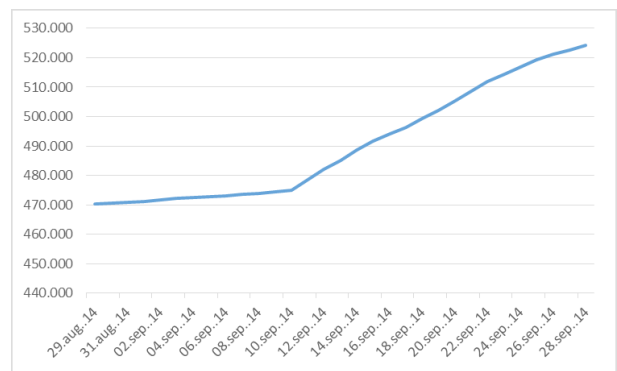


Fig. 9: Evolution of Facebook followers – Victor Ponta. Joined Facebook march 9th, 2010 [2]

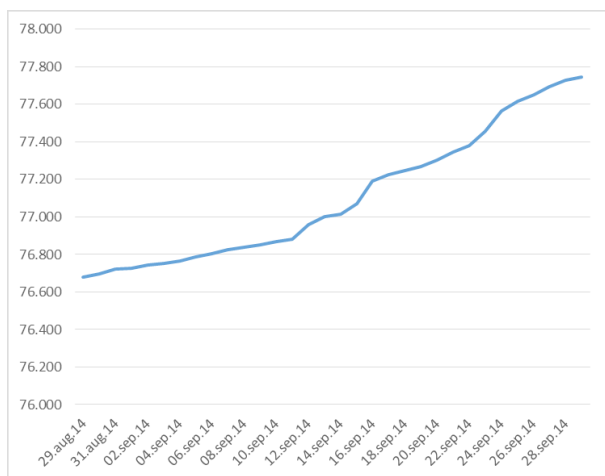


Fig. 7: Evolution of Facebook followers – Corneliu Vadim Tudor. Joined Facebook may 18, 2010 [2]

4. CONCLUSIONS

People are using social media to interact and to communicate with others.

All politicians are using the social media to share their messages faster and to interact with a larger group of people in a new and modern democracy, the so called e-democracy.

The social media are used by governments and involve citizens and the decisions makers.

However, the social media can also be used by the people in order to impart idea with the politicians.

This communication policy is commonly used during election campaigns.

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ENVIRONMENTAL IMPACT OF BROWN FIELDS SITES IN HUNEDOARA AREA

Marius ARDELEAN, Erika ARDELEAN, Lucia VÎLCEANU, Ana JOSAN
Polytechnic University Timișoara, Romania

Abstract: *By national economic restructuring process and global economic business climate, most of the steel production capacities from Romania have been closed and completely disaffected. To clean up the polluted areas related of this disaffected production units, is a huge work has been made and shall be made taking into account the high degree of soil contamination with various type of pollutants, since 1884 when the first blast furnaces were put in operation. The evolution of former Hunedoara steel plant after restructuring and privatization is presented in this paper, and also is presented an environmental impact of brownfields sites results from disaffected of this production unit. It will also make a review of waste deposited on the company land and also proposals for reinstatement in economic circuit.*

Keywords: *environmental impact, disaffected production unit, greening industrial site*

1. INTRODUCTION

Hunedoara city covers an area of 9743 hectares, being located in the center of the county, near the confluence of Cerna and Zlasti creek at the eastern foothills of Poiana Rusca Mountains. Attested at 1265 under the name Hungnod according to papal title registry, Hunedoara will know an impetuous development and will play an important role in Romanian history. The age of this settlement is far deeper into in the mist of time, than the documents who talk about it, [4]. The archaeologists have found both in the precincts of the city and also in the neighborhood villages, traces of habitation dating back to the stone age, but also a steel workshop consisting from eight furnaces dating from the Dacian age.

Hunedoara city was “the factory town”, one factory town, respectively the CSH Hunedoara town. The town was one of the predecessors of the "socialist industrialization" process; the outlining of the town is earlier to the period of communist industrialization.

The Iron factory from Hunedoara is the result of the technical and technological development from the Austro-Hungarian Empire, from the end of the nineteenth century, due to the development of production and acute needs of steel, generated by military campaigns conducted by the state.

The occurrence of the steel factory from Hunedoara was required by market expansion due to increasing the consumption of metal in mechanic workshop and mechanical engineering factories from Transylvania.

In the 50's the steel industry was a top industry, its development was also influenced by the reconstruction effort during that time in Europe. Do not forget that at the foundation of present European Union Community it was the ECSC - European Coal and Steel Community.

CSH Hunedoara integrated iron and steel plant was started, in 1938, with German technology. During the expansion of the factory between 1953 and 1958 there have been built production capacities (with soviet technology that in these years was very similar to western technology, mainly due to the American help during the war).

2. PRODUCTION FACILITIES

Hunedoara iron and steel plant construction began in August 1882, and it was officially opened on June 12, 1884; this date marks the appearance of the iron factories in Hunedoara. In the local Gazette, no 25 from June, it is recorded: “Blessing and good luck Hunedoara! The first melting charge of iron already flowed, the Ghelari hill melts at Hunedoara”, [4].



Fig. 1 Iron and steel plant from Hunedoara, at the beginning of the past century

One year later, on May 24, 1885, the second blast furnace is put into operation. With this, the center of weight of siderurgical industries from Transylvania is moved to Hunedoara. The administration of the factory is also transferred; the former workshops (blacksmith, forging and mechanical workshops) gradually lose their importance, except for the workshop and blast furnace from Govăjdia, that is mentioned in documents as being in service until 1918. After 1920 the Iron and Steel plant from Hunedoara were presented as a mining-steel complex, who owned a significant operating fund formed from: iron ore mining in surrounding area; 5 blast furnaces with production of 119,000 tone/year; an iron foundry workshop with production of 1,500 tone/year; a forging workshop with 2 steam hammer forging; a mechanic workshop for processing the molded or forged components with production of 500 to 600 tone/year; a workshop for manufacturing the bricks for furnaces; limestone mining some charcoal pile; one high blast furnaces with iron foundry at Govăjdia; 400 hp hydroelectric power plant; a funicular network for iron ore [4].

After the industrialization period, CSH Hunedoara was the most important Romanian manufacturer of long profiles. The workflow was integrated and included the production of raw materials, iron and steel production unit and various rolling mill capacities:

- blast furnaces (no 5, 6, 7, 8, 9);
- electric steel plant OE 1 (0.15 million ton/year production) with two 50 ton and two 20 ton EAF furnaces and VAD-VOD refining equipment and REZ installation;
- electric steel plant OE 2 (0.4 million ton/year production) with two 100 ton EAF furnaces and ladle refining equipment, 100 ton EBT furnaces and continuous casting machine;
- Siemens Martin steelworks no 1 with five 100 ton furnaces (0.33 million to/year production) and heavy section rolling mill 800mm;
- Siemens Martin steelworks no 2 has a production capacity of 3.2 million ton of steel per year
- rolling mill production unit with small section rolling mill (0.44 million ton/year), heavy section profile (0.113 million ton/year) and hot rolled wire (0.28 million ton/year).

3. DECOMMISSIONING AND GREENING THE BROWNFIELDS

After 1989, the transition and adjustment to the requirements of a competitive market have placed the Romanian steel production companies into an unfavorable economic environment, having as a main effect reducing, stopping and dismantling of production capacity. The economic environment of the '90 years in Hunedoara was dependent on the concept of factory town attributed to Hunedoara, from the years of socialism construction.



Fig. 2 Former Siderurgica Hunedoara - panoramic view

In 1992, the operation at the Siemens Martin steelworks no 1 was stopped, as well as some production capacities from primary production flow.

In July 1999, the operation at Siemens Martin steelworks no 2 is stopped also, fatality or coincidence was that it was stopped on June 12, 1999 (the date they would have had the 115th anniversary of starting the new factory). This certified the final and irreversible stopping the primary production flow (coke plant – in May, sinter plant – in June, blast furnaces – in June which was the last iron melting charge at Siderurgica Hunedoara).

Gradually they closed production unit from OE1, OE2, rolling mills production unit, power station 1 and 2 that partially produced hot water and heat for the city, and many other production facilities and workshops which ensured maintenances of the production facilities.

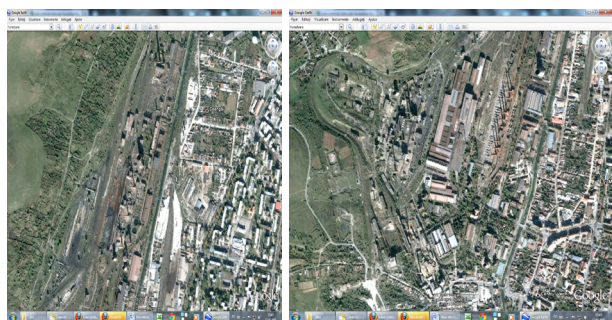


Fig. 3 Disaffected area of steel plant - view

Sinter plant, blast furnaces, raw material plant is presented left and coke plant, steel furnaces plant, rolling mill are in right.

At present, the former integrated iron and steel plant works with 100 tone EBT furnaces, a continuous casting machine and one rolling mills production unit.

The economic impact of restructuring has had a devastating effect on the city and its surrounding areas. So, in 1997 the steel plant had a number of 15,296 employees, from which 85.5% workers, 3.4% foremen and 11.1% office staff, and now the unit has less than 700 employees.

Due to this transformation, a huge area of over 220 hectares resulted, with industrial ruins (buildings and disaffected installation), on the territory of former primary workflow, raw material warehouses, rolling mills facility.

This area must be rehabilitated and reintroduced into the economic cycle, [1,2,3,5].

In the area where the steel plant has developed, a historic pollution of environmental factors is present, due to the heavy metals and hydrocarbons from coke, sinter and steel furnaces disaffected unit. It can be said that the area represents one of the largest industrial facilities with ruins from Romania, called Brown field.

These fields should be fully decontaminated and rehabilitated, after that it must be done an urban infrastructure in order to be capable for a new urban feature integrated into the future concept of the city. Rehabilitation will be done by applying the concept of sustainable development.

Disposal of equipment, installations and technology production space has been made in the first phase by the owner; this focusing especially on the recovery of scrap metal and other metallic materials existing in their structure. To continue the greening of the area, the possession has been ceded to the city council, who founded a company that works at present at the greening of the area [6], using even European funds.

So, for example, on the surface of coke oven batteries, coal transport and store area, surface on coke discharging, coal bunker, and so on, the total quantity of the disposed nonmetallic and metallic waste was around 100,000 m³.



Fig. 4 Former coke plant

In the coke plant area, most of the demolished constructions were metallic (chemical tanks, transport pipes, pumps, etc. but also networks and power stations), the amount of concrete and bricks was around of 43,000 m³.

Almost 140 hectares of the surface are held by the assets of the former coke plant and steel plant.



Fig. 5 Former sinter plant

In the area of blast furnaces and the sinter plant, most of the demolished constructions were mechanical and electrical equipment, the total quantities of nonmetallic waste it was over 74,000 m³.

For the greening of Hunedoara industrial site and its preparation for new activities, there have been made several studies related to polluted areas of the steel plant, [6].

Thus, these projects propose greening of the surfaces in two phases:

- rehabilitation of the polluted site, when the contaminated areas will be identified, specific pollutants for each area, respectively proposals for remediation of soil and groundwater;
- preparing the rehabilitated site for new activities, when there will be made buildings, utilities, derivations and branch pipes in order of production and service activities.



Fig. 6 Former blast furnaces

Based on the activities performed in this area, of the specific technological processes and of the preliminary study, it can be told relative to pollution of the environmental factors that:

- for the soil environmental factor, there have been recorded sensitive changes in soil surface and depth, due to the presence of heavy metals (Pb, Cd, Fe, Cu, Zn, Mn, Cr, Ni) in concentrations below the limit of intervention for less sensitive soil. Adjacent areas have not registered significant influences, the values determined being under the limit of intervention for less sensitive soil (Fe in the old city area and Mn in the pre-village Răcăștie area, where it worked since the year 1884 – area of old blast furnaces).



Fig. 7 Former steelworks OSM 2

- for the environmental factor, in the area of coke plant, in the underground water there have been detected ammonium and heavy metals (Pb, Fe, Mn), etc.

The company that manages the greening of contaminated zone works on a 2010 study conducted by a specialized company, identifying the real values of the pollution degree in affected areas.

Soil from the area of the former Siemens-Martin furnaces, blast furnaces, sinter line and storage area (iron ore, coke and limestone) present a significant degree of contamination with heavy metals, especially Mn, Zn, Pb.

In literature it is recommended decontamination methods which involve the storage of soils contaminated with metals in inert waste disposal, in locations that do not allow groundwater contamination.

In these cases, storage of soil contaminated with heavy metals, stripped from existing locations and in inert waste disposal requires the next steps:

- excavation of contaminated soil on the depth recommended by the consultant;
- charging and transportation in the place which will isolate it;
- smoothing, compacting and waterproofing;
- closing inert waste disposal so established;
- cover with a layer of clay and its compactness, adding vegetation layer;
- monitoring of inert waste disposal (post-closing).



Fig. 8 Former coke-chemical plants area, contaminated soil before rehabilitation works

At the site of the former coke-chemical plants it has revealed sulfur content in the groundwater beyond the limits required by the standards, due to historical pollution and contamination with hydrocarbon of 0 - 1.5 m depth in the area of former pumping stations and reservoirs of coal tar.

Also in area of coking plants were inventoried approximately 9,000m³ volume of soil contaminated with coal tar and significant amounts of brickwork also contaminated with coal tar.

In this case there can be used the thermal rehabilitation (incineration) of hazardous waste, or disposal at the waste disposal area after a technology similar to neutralization of soil contaminated with heavy metals.

Liquid coal tar waste is recommended to be neutralized in hazardous waste incinerators or they can be used like alternative fuel if possible.



Fig. 9 Former coke-chemical plants area after rehabilitation works

Waste from demolition can be valued by selling bricks, the scrap of bricks or concrete waste are used for filling of underground dumps resulted from excavations of contaminated soils.



Fig. 10 Area of former iron and steel plant after demolitions of buildings

The demolition of the buildings can be done both through the conventional methods (such as dynamiting) and through unconventional methods in order to protect historical monuments in the area, especially Hunyad Castle.

4. CONCLUSIONS

Diminishing of the activities and closures of production capacity has a major negative economic impact over the region economy, the economy of region is not recovered until now because of the lack of major investments in the area.

The company had a very hard restructuring process, the number of workers decreasing from 15,296 employees in 1997, to a total of 685 employees according to a 2012 report card.

As far as the types of waste generated by the process of greening of former industrial sites are concerned, we can conclude the following:

- coal tar waste and other petroleum products must be neutralized through burning in specialises facilities, or they can be used as alternative fuel;
- soils and concrete (brick scrap) contaminated with coal tar results from demolition will be recommended to be stored in deposits especially established for hazardous waste according to the current regulations;
- soils contaminated with heavy metals are recommended to be stored in special deposits for hazardous waste;
- concrete and bricks waste is recommended to be used (after crushing) to filling the underground dumps resulting from the excavations of the contaminated soil .

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MINING REVIVAL – A CHANCE FOR RECOVERING FROM CRISIS

Rareş MUNTEANU, Roland Iosif MORARU
Universitatea din Petroşani, Petroşani, România

Abstract: *The development of the human society has always depended on material resources and energy. Mining provides the basic minerals and conventional source of energy necessary for all other industries. Therefore mining, together with agriculture, forestry and fishing represent the basis of the economy. Accepting the necessity of mining represents a step towards the roots of the economy. Europe has a long tradition in mining. It was assessed that the rich reserves have been exploited and it started to be too expensive to continue mining. Nevertheless, Europe still has resources, the progress of the technology and the increase of demand for resources made the European countries turn once more towards mining. The renewable sources of energy are still too expensive, and so coal continues to be needed. Romania, as a part of Europe, faces the same challenges, and Romanian mining needs to go on. The present paper shows why mining must go on in Romania and particularly in the Jiu Valley.*

The paper gives a systematic and holistic overview of the challenges and opportunities which are ahead the Romanian mining industry in the upcoming two decades, in conjunction with the evolution of European and/or national economic policies and strategies.

Keywords: *mining, raw materials, SWOT analysis, energy market, strategic objectives*

1. INTRODUCTION

According to Prof. Dr. Carsten Drebenstedt from the TU Bergakademie Freiberg, Germany: "The need for raw materials will increase in the whole world, especially in the emerging economies. Therefore efficient and eco-friendly possibilities are required in order to satisfy the demand all over the world."

After some twenty years of reducing or even closure of the mining in Europe, the new policy is to revive it, due to the need to create new jobs and to ensure supply of critical materials.

Mining is also necessary because no mining means vulnerability related to raw materials imports, as for instance the suppliers can increase the prices and there is no control over the quantity, quality or economic policy of the exporting countries.

Also according to Prof. Drebenstedt, the operating efficiency of a mine depends on the technological progress. As new technologies emerge, mines or deposits formerly considered uneconomical, inefficient, are likely to become exploitable from technical and economical point of view.

2. NEW TRENDS IN EUROPEAN MINING

2.1. General aspects. "Europe is rich in natural resources. Our future is one where technological advances lead our industry, where regulation compliments growth and is born from a hard-won consensus for a better future" said Mark Rachovides, President of Euromines.[1] New or resurrected mining and smelting projects in some areas of Europe may provide perspectives for economic growth in the region, as countries fight against recession and unemployment. Some of the European countries are attracting investments with good grades of ore, a large labour pool, improved mining regulations and low political risk.

"Spain has gone from being shy of mining to being welcoming of mining. The political landscape has turned 180 degrees," said EMED Mining Chief Executive Harry Anagnostaras-Adams, whose London-listed company plans to reopen a former Rio Tinto copper mine near Seville. "There has been a marked transformation between when we arrived six years ago, when mining was not conventionally regarded as a favourite industry, to today when it overshadows most other initiatives in the area."

At EU level, new policy initiatives on raw materials have been adopted in order to create jobs and reduce the dependency on imports of vital raw materials. The EU is the world's largest or second-largest producer of some industrial minerals, including feldspar - used in glass and ceramics - and construction mineral gypsum.

It remains an importer of most others including copper, zinc and tin. Its domestic production of metallic minerals is limited to about 3 percent of world output.

Meanwhile, the leading emerging market producers of minerals in Africa and Asia started to adopt new strategies in order to protect their resources for the development of the future generations as well as for domestic markets.

"Growing resource nationalism in many parts of world makes Europe more attractive from a political risk point of view," said Magnus Ericsson, analyst at the Raw Materials Group. According to him, "There's also a slow but steady process of re-formulating EU policy and making it more positive towards mining in Europe to secure supply of metals. There are a number of exploration and investment projects that might come on stream in the next four to five years."

But in order to allow the revival of mining in the European Union, the legislation must be changed, bureaucracy and policy related to this issue must be adapted in order to bring on a full mining revival, in correlation with the principles of the sustainable development.

"The EU is trying to stimulate mining and reduce the dependency of imported raw materials ... but at the same time some of the EU regulators make it much more difficult to operate in Europe," Lundin Mining Chief Executive Paul Conibear.

2.2. New mining policies in some European countries Among the changes so far, Portugal has partly changed its labour code, which in the past was punitive for companies such as miners that must operate 24 hours a day, seven days a week to be viable. Another example is Sweden, who has lowered its corporate income tax from 26 percent to 22.5 percent to attract heavy industry investment such as mining.

Lundin Mining Corporation, which produces copper, zinc, lead and nickel from operations in Portugal, Sweden and Spain is currently expanding its Portuguese and Swedish mines and is actively looking for new base metals assets in eastern Europe.

In order to improve its energy saving and efficiency, Rio Tinto has invested nearly 80 million EUR in its Dunkirk aluminium plant in France in the past 18 months and plans to invest at least that much again over the next five years.

Trafigura, the world's third-largest trader in raw materials, intends to invest more than 300 million EUR into a copper, zinc and lead mine recently acquired in Spain.

Trader Glencore has reopened its Portovesme lead smelter in Sardinia.

Finland has attracted more new mineral discoveries and mine projects than other parts of Europe as a result of favorable mining legislation and an attractive tax regime.

Certain ex-communist Central and Eastern European countries are also trying to revive their mining sectors, but with varying degrees of success, Conibear said.

Slovakia has substantial untapped industrial metals and coal reserves, EMED's Anagnostaras-Adams said.

The European Commission announced to issue new recommendations to revive the steel industry, which has been affected by low demand and high energy costs compared to rivals in the Middle East and United States.

The "EU steel action plan" is the first comprehensive attempt by the Commission to stem a decline in the steel sector since the Davignon Plan sought to tackle an industry slump in the mid-1970s. A similar plan is in the works for the aluminium industry. [2]

In Germany (the greatest coal producer in the European Union), there is a revival of mining in the Ore Mountains (das Erzgebirge), in the south of Saxony. After more than 20 years of break, a new mine was opened in Oberwiesenthal. Since the prices on the world raw material markets have increased, the region became again interesting. [3]

While most of the nations are privatising their companies, France is founding a state-owned mining corporation, ten years after the closure of the last French coal mine. Arnaud Montebourg, the French minister for re-industrialisation, seems to bring back the ideas of Colbert...

The new state corporation will seek for instance for lithium deposits, a metal needed for batteries. This concern is intended to be used in order to defend the national interest of France.

The state will invest some 200–400 million EUR in the Compagnie nationale des mines de France (CMF) in the next five to seven years. This company will be active also overseas, not only on the French soil. [4]

3. MINING IN ROMANIA

3.1. Raw materials in Romania. In European terms, Romania is rich in mineral potential, especially oil, gas, salt, gold and silver ores and non-ferrous metals. Historically, the Romanian mining industry has frequently been at the forefront of European development, often leading the way to the identification and evaluation of deposit types that have subsequently proved to be of major importance elsewhere.

Table 1 Useful mineral substances of Romania

| Substance or group of mineral substances | Mineral resource at January 1 st , 2011 | | Net production during the year 2011 | |
|--|--|----------|-------------------------------------|-----------------------------|
| | Unit | Quantity | Unit | Quantity |
| Lignite | Mt | 3,296 | 000 t | 33,293 |
| Hard coal | Mt | 602 | 000 t | 2,122 |
| Gold&silver ore deposits | Mt | 760 | 000 t | 0 |
| Poymetallic ore deposits | Mt | 67 | 000 t | 0 |
| Copper ore | Mt | 443 | 000 t | 31.8 concentrated of copper |
| Uranium ore | * | * | * | * |
| Salt | Mt | 4,390 | 000 t | 2,249 |
| Nonmetallic substances | Mt | 308 | 000 t | 1,064 |
| Useful rocks: | | | | |
| • Ornamental | Mt | 80 | 000 m ³ | 21 |
| • Sand and ballast | Mt | 1,250 | 000 m ³ | 31,326 |
| • Others | Mt | 9,789 | 000 t | 1,064 |
| Underground waters: | Mt | | | |
| • Heat from the hydrogeothermal systems | 000 tcc | 3,820 | Gcal | 99,773 |
| • Geothermal waters | m ³ /day | 22,612 | 000 m ³ | 2,789 |
| Spa waters (therapeutic mineral waters) | m ³ /day | 82,621 | 000 m ³ | 4,265 |
| Natural mineral waters | m ³ /day | 37,326 | 000 m ³ | 1,253 |

In Romania varied ore deposits has been exploited from the earliest times, gold, copper, lead, zinc, manganese, iron and salt having been worked extensively. Archaeological evidence suggests that there has been mining in Romania for thousands of years, with artifacts from various ages having been shown to have been made from locally produced metals and minerals. Ore production became better organised during the Roman period, while simultaneously processing techniques became more diversified.

The most productive mining centers with classical metalliferous ore deposits (containing gold, silver, lead, zinc, copper, iron and manganese) are located in Neogene volcanic zones in the Metaliferi and Oas-Gutai Mountains, and in the Banat region and in the Bihor massif related to Upper Cretaceous-Paleocene intrusive structures, as well as in the East and South Carpathians in the Poiana Rusca massif, or in Dobrogea, the latter related to Palaeozoic or older metamorphic rocks. [5]

In Romania, a national strategy for the mining industry was drawn up. [6] The useful mineral substances on which the strategy is focused, are as in table 1.

Other important minerals can be found in very small quantities or have not been discovered yet (table 2).

Table 2. Critical raw materials important for the competitiveness in the EU

| Metal/Mineral | Existing in Romania | Potential to be discovered in Romania |
|-----------------------|---------------------|---------------------------------------|
| Antimony | No | Low potential |
| Beryllium | Yes | |
| Cobalt | No | |
| Fluorine | No | |
| Gallium | No | |
| Germanium | No | |
| Graphite | Yes | |
| Indium | No | |
| Magnesium | Yes | |
| Niobium | Yes | |
| Platinum group metals | No | |
| Rare earths | No | |
| Tungsten (Wolfram) | yes | |

3.2. SWOT analysis of the situation of the raw materials in Romania. There are a lot of raw materials exploited in Romania, such as: hard coal, lignite, salt, nonmetallic substances and useful rocks, mineral waters, polymetallic ore, gold and silver ore, copper, uranium ore, but they have some common strengths, weaknesses, opportunities and threats.

Strengths:

- significant deposits
- good infrastructure
- qualified personnel
- long tradition in mining
- coal has an important contribution to the energetic security of Romania in case of crisis of other resources
- salt, nonmetallic substances, useful rocks mining has an important contribution to the state budget
- in some cases, modern technology

- some modern preparation plants
- efficient in cases of surface mining, salt and mineral waters

Weaknesses:

- difficult underground conditions
- low calorific power for coal
- old technology
- metallurgic activity has restrained or ceased activity
- high personnel costs
- high production costs
- low degree of mechanization for underground mining
- high impact on the environment due to the surface mining
- personnel overaged

Opportunities:

- increasing need for raw materials
- demand for coal on the energy market
- ongoing mining has a positive economic impact on the population
- neighbouring countries have no salt deposits (except Ukraine)
- high quality of mineral waters, attractive for investors

Threats:

- aggravation of the world economic crisis
- increase of the production costs due to safety and environment regulations
- lack of a regulated price close to the production costs
- social vulnerability
- dependence to the power plants
- competition on some external markets for salt
- imports for mineral waters
- possible financial difficulties due to the beneficiaries
- shortage of funds for investments

3.3. Strategic objectives of the mining industry. In the Strategy for the Mining Industry for the years 2012-2035 there are stated the objectives for the following years.

There are some general objectives and based on them there are objectives specific for the relevant domains. [6]

The general objectives of the Romanian mining industry are:

- Ensuring the mineral resources for the sustainable development, especially from internal production
- Conformation of the national needs with the need for capital for investments and the requirements for sustainability
- Getting into the economy of as high and various mineral resources as possible
- Reducing the dependence to imports of primary energy resources and mineral raw materials

As far as the research and development are concerned, the objectives aim at the invisible and intelligent mining, automation of processes, efficient use of materials, water and energy. In addition, the gas emissions are to be reduced, chemical and biological processes for enrichment will be used. For the survey, multi-dimensional systems of data and modelling will be used. The metals will be extracted and processed in high-tech processes, but at the same time recycling and use of new, alternative materials are desired. Last but not least, environment management and assessment are part of the strategy. As far as the production is concerned, the main objectives are to maximise the economic efficiency, regulation of the informal and formal, artisanal and small scale mining, transparence in the international commerce with mineral raw materials (including new technologies, prices, markets) and the complete cycle: mining – transition – post-closure.

4. CONCLUSIONS

In the international circumstances, ensuring the energetic independence and the necessary of raw materials is very important.

Thus, the dependence to external suppliers is reduced or – ideally – energetic independence is achieved.

Of course, mining should not be done at any cost. New, more efficient technologies must be used in order to increase the cost-effectiveness of mining and also to protect the environment, according to the principle of sustainability (Nachhaltigkeit), stated by Hans Carl von Carlowitz in his work *Sylvicultura oeconomica* in 1713.

On the other hand, due to the strategic character of the resources, principles of effectiveness cannot be applied in mining just as in other industries.

Mining (together with agriculture, forestry and fishing) belong to the primary branch of economy, base for all other branches, and therefore in some situations even subsidies are legitimate.

A sustainable national economy needs an intelligent management of the domestic resources, and that means mining.

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INTERCULTURAL ADJUSTMENT – THE PREMISE OF THE SUCCESS OF YOUTH EXCHANGE PROGRAMS

Roxana MAIER

Western University “Vasile Goldis” of Arad

***Abstract** The current study brings to light several dimensions of the success of youth exchange programs. The endeavor comprises the analysis of the situation of several young Romanian students who have left in exchange programs in different countries, of their families and of the young people from elsewhere who came in Romania through the same exchange program. The analysis observes the stages of the multileveled intervention for the success of the program, as well as a healthy readaptation to the return in the home country. The study's objectives are to identify the exchange student's motivation to take part in this endeavor and to make their adaptation process more efficient through short-term interventions*

Keywords: intercultural adjustment, the young, family.

1. INTRODUCTION

The long-term youth exchange programs are created for a duration of a year and have, as a final goal raising the participants' relational and even professional insertion and it stimulates the young people's mobility in the world. Besides these challenges, there lays the problem of structuring the entire process so that it is a success. The main goals of these kinds of programs are:

- Developing the concept of an international culture and the differences that exist between the countries [art of this exchange
- The encouragement of students to acquire a vast personal experience, and also to develop their own flexibility and their own adjustment abilities
- The students' motivation for educational mobilities
- The students' support in gaining and sharing multicultural knowledge and experience
- Developing the tolerance towards other cultures
- The possibility to reflect upon values and upon the importance of the culture they come from, and the discovery of the cultural influence upon the young person's general formation
- The opportunity to share the experience accumulated throughout the exchange with their peers

Buber sustains that: “If a person walks along the road and meets another person who comes from the opposite direction, she or he only knows her or his own side of the road not the other one's side.

That knowledge can be achieved in the meeting with that person. Communicators can create a space between them if both parties want to share and learn from each other.” [1]

When the young students go from a country to another, they come in contact with other people who have different customs and have different ways of acting and living.

Presently, migration towards a stable life, a better workplace brings along more intercultural contacts than before, all the while they realize much faster than ever before.

This thing shows a constant change in the world we live in, and thus a greater and faster need of acclimatization.

One of the causes of this change is represented by the short or long-term exchange programs of which have been defined and described several models of intercultural adjustment.

One of the most recent models sustains that they have to deal with contradictions between their internal identity and this external world around them.

It is also noted that communication lies at the heart of the adaptation process. In intercultural communication situations all communicators affect each other and in most cases people have to adapt to some extent.

Without a good motivation to adapt, this process brings with it several difficult moments and the possibility of missing the learning opportunities, and implicitly the exchange period.

The theory of social constructionist emphasizes the interaction and mutual meaning making process. The process of learning new cultural patterns is not a passive adaptation of other people's cultural concepts but a gradual meaning making process. Another approach of acclimatization draws the attention towards relational and stress-related aspects.

The interactions that begin in the social environment imply, with necessity, the admission of the social influence phenomenon as an adjustment to external conditions mechanism. This can appear as follows: conformism, compliance, obedience. Even though in exchange programs, all the above-mentioned mechanisms appear, we are mostly interested in the conformism problematic. This represents adjusting one's behavior or thought process to coincide with a group standard. Conformism is often the results of the group pressure. Usually, the person adopts the new type of behavior or attitude, making it its own. The first studies on conformism were realized by Sherif in 1936, and one of the conclusions is that the person who wishes to adapt will adopt the group's evaluations as references and that, in ambiguous situations there are social norms that intervene.[2] Later one, Deutsch and Gerard have identified two different types of influence which have convinced the participants to the experiment to conform:

- The informational influence – the other people in the group ensure a source of information in case of ambiguity or uncertainty
- Normative influence – in the situation in which ambiguity is reduced, the group norms and a strong social pressure will convince people to conform.

When people are explicitly identified with the members of the group, the normative influence contributes to the emphasis of conformism and this things gets us to the *autocategorizing* concept.

Being a member of a group is very important for and what we do must be in accordance with the quality of being a member of the group. This autocategorization theory gives us an explanation of the question why some people are anticonformists, trying desperately to be different than the others.

It might be that part of the self image which makes the individual be different than the others. The factors that influence the conformism degree are the following: the size of the group, group decision, unanimity, the inter individual differences in conformism. It is uncomfortable to be the "exception" in a group, which is why people conform to the group to be able to become an incorporated part of it. This thing is mostly applied to exchange students – they are suddenly immersed in a different country, in a different group, between people who speak a different language, have different values and thus it becomes necessary to adapt to be part of the group. In the case of exchange students, they do not know what the adequate behavior is for different circumstances. In these situations, the individual will look to copy other people's behavior, a behavior that offers information about what is actually right in the given situations. In terms of gender differences, in this interaction of adjustment of exchange students, females conform much faster than males. The cause would be that they are socialized in this sense. In general it is considered that a bigger importance play the situational factors, as opposed to the individual ones. Before the selection process of the people leaving in an exchange program, a good knowledge of the intercultural adjustment process is needed. In this process, adjustment motivation plays a crucial role. A few aspects of the selection pertain to the following dimensions:

- The adequate perception of reality – it has to be as realistic as possible in the establishment of their reactions and capacities and in the interpretation of what is happening around them
- The aptitude to exercise a voluntary control of the behavior
- The existence of auto-respect and the acceptance of your own self. The well adapted persons have an approximate idea of their own value and feel accepted by those around them. They feel well in the company of others and are capable to react spontaneously in social situations. At the same time, they do not feel compelled to submit their opinions completely to the group
- The aptitude to create relationships full of affection – to be capable to create strong and satisfactory relations with other people.
- The existence of productivity – the well adapted persons are capable to channel their qualities in productive activities.

The exchange program includes:

- Meetings with the students and his or her family prior to the departure
- The careful selection of the host families, the supervision of the host family and of the student throughout the duration of the program
- Free accommodation and food for the student offered by the host family
- Offering detailed informative materials for the student prior to the departure
- The student's airport pick-up by the host family and/or by the local program coordinator
- Informative sessions at the arrival in the host country, in the middle of the year and at the end of the program, sessions which take place in the community the student will live in
- Free assistance and counselling offered by the personnel of the organizing institution responsible for this exchange program

In order to ensure an adequate exchange program, the birth family of the exchange student is prepared. A few of the conditions which the family will go through are:

- Accepting the departure for almost a year
- Accepting and understanding the 'daughterly' connections that develop abroad
- facilitating the child's adaptation and constituting it into a real support
- Encouraging their own child to: be positive, to relativize the events, to communicate with the host family, to integrate well in the life and in the scholar activity, to respect the rules of the organizing institution

Starting from these premises, the place and role of the psychologist is to counsel the exchange students and their families before the departure, while on exchange and after the child's arrival in the country of origin, but also to offer counselling to the host families.

The adjustment process to the exchange program is thus multifaceted - adapting to a new country, with all its implications, but also at the end of the program, readapting to the country of origin, the adjustment of the family to the break from their own child and the adjustment of the very same family to hosting an exchange student from another country.

The student will be hosted for the duration of a school year by two or up to three families, so that, besides adapting to a new country and culture, the student will have to face the differences brought by the host families, and the student's family will have to adapt to one, or maximum two exchange students.

Throughout the year in which the exchange student is away, he or she will take part in classes so that on the duration of that year he or she would graduate the class in which he or she was in the country of origin, while upon their return they will be able to equate their studies and not lose the school year. However, this is a condition that is not compulsory during the exchange year. In the situation in which a participant on the program, does not conform the participation rules or is considered unfit for the responsibilities the organizing institution aims to develop through the programs it organizes, the latter reserves the right to break off the staying in the host country and to send the exchange student back to their country of origin before due term.

Starting from these the study desires to answer a few questions:

- What motivates students to leave in exchange programs and do these factors motivate the success?
- What does cultural adjustment mean? What does the process entail?
- observing the sense of adjustment and of avoiding the exchange students' transformation in "outsiders" (persons who understand the sense of change and adjustment to a new culture, but cannot realize it or even persons who can't understand the sense of change and adaptation)

Objectives:

1. Emphasizing the motivational factors implied in the intercultural adaptation process which take to the sociocultural learning
2. Observing the differences in terms of the adaptation level for the Romanian exchange students and those from abroad

The hypotheses of the study:

1. The students' selection constitutes a premise to create a successful exchange program
2. The student's way of relation with the family modifies after the intervention of the counselor or psychologist

For the realization of the hypotheses suggested above the endeavor was initiated over the duration of a schooling year – specifically 2011-2012.

Sample description:

This study was comprised of 5 exchange students - three departed from Arad to Canada and Mexico, and two who arrived in Arad from Brazil and Mexico.

Tools used:

The tools used in this study are provocative working tools used in personal development and a questionnaire which targets the motivation to adapt to the exchange year.

The endeavor to understand the intercultural adjustment comprises following the phases of the process, stages which refer to the processing and the return from the cultural shock and the adjustment to this stressor.

Anderson sustains that there are four categories of models which describe the process of adjustment to a new culture – the recovery of the models, learning the models, the journey of the models and the balance of the models.

The first category “the recovery of the models” refers to the impressions the newcomer amasses at the beginning and the emotions he or she senses – at the beginning everything seems new and wonderful and then he or she starts feeling alone, sad, unaccepted or even rejected by the others, lost, strained, confused, anxious, angry and unhappy.

It is the moment in which he or she starts to look for solutions to get out of this crisis and to discover about his own self what exactly makes him or her feel good in the new situation, this will lead towards the adjustment to the new culture. The same process happens at the return to the country of origins and it is called reverse cultural shock.

The second category – “learning the models” consists in the fact that people have to learn “the parameters of the new sociocultural system and acquire the sociocultural skills necessary for participating in it”. A first step towards this is learning the new language – without communication, the students do not have access to differences, they cannot understand what exactly happens, the frustration and anger levels simply grow and there is no possibility to adjust to stress factors.

The third stage – “the journey of the models” – is a step by step process, a psychological journey from ignorance to the understanding of the new culture, of all the differences.

The fourth stage - “the balance of the models” - represents the stage in which new construct of intercultural adjustment is finalized. In this stage, stress is diminished, solutions are found, there is a perceptual frame to reference the new culture, behavior and surrounding environment.

In grand terms, the stages towards which the adjustment refers to are – being immersed in the new environment, the student’s bias towards adaptation, acceptance, data on communication – both personal and social and the intercultural transformation.

The personal communication refers to way in which the person sees, hears, understands and answers to the surrounding environment.

The social communication refers to each other’s capacity to communicate in one’s own environment, but also in new and different environments.

Results and Discussions

For the success of the exchange program it is necessary for the students to understand the utility of social relationships built in a new environment as fast as possible. The number of students who arrived in Romania in 2011-2012 was 7 and most were hosted in two families throughout the year. In Arad, there have been two people hosted – a student from Mexico and one from Brazil. For the student in Mexico, the situation was easier as he already knew English on a conversational level at his arrival in the new country. For him it was easier to make the passage to a new language as there was already a language to liaise with, English and this facilitated the access to relations and communication. Even though the two students were at the same school, they did not form a support web and , throughout the year they did not have common activities other than the compulsory ones imposed by the organization. The student from Mexico managed to speak the language at a conversational level after approximately three months from his arrival, however the Brazilian student did not speak the language even after 6 months of immersion. The adaptation difficulties were in connection with the school insertion – their presence was requested, however, because they were not speaking the language, they could not participate to the classes, thus leading to long hours of boredom. After learning the language this step was overcome by both and, by the end they have managed to graduate the class they were in. The difficulties connected to the adjustment to the new family were in liaison with the dynamics of the host family – the participation to family schedules, sharing the responsibilities, the manner in which the relationships were built in the new family. Their difficulty was to choose to be functional in the new family and in the new conditions. If for the student from Mexico these difficulties were overcome after 6-7 months of immersion, for the Brazilian student, most of the difficulties remained until the end of the exchange. In the relationship with the organizing institution there were not adjustment difficulties.

In the regards of the exchange students who have departed the city of Arad, two went to Canada and one to Mexico. From the three students, only two have managed to adjust to the exchange program, the two who have gone in Canada, the third one has returned after approximately two months from the departure.

In the student's selection, an important step was understanding the reasons they wanted to leave on this experience. At the departure, the declared reasons were:

- **E1** the desire to learn a foreign language, the preference for French has made me desire to leave in French Canada, the desire for independence, to demonstrate that I can, the curiosity for another culture, I want to see the aurora borealis, the positive attitude towards Canada and the exchange program
- **E2** - the desire to learn a foreign language, curiosity, the positive attitude towards Canada and the exchange program
- **E3** - the desire to travel, curiosity, the preoccupation with their celebration of death, the positive attitude towards Mexico and the exchange program

Legend:

E1 = student from Arad, departed for Canada

E2 = student from Arad, departed for Canada

E3 = student from Arad, departed for Mexico

The conditions for the selection also target aspects related to the school conduct, the level of school grades, data about the balance of the origin family. For the two students who arrived in Arad, the reasoning situation was:

- **E4** - the desire to travel, curiosity towards Romanian customs, desire for independence, demonstrating that I am capable, the positive attitude towards Romania and the exchange program
- **E5** - the desire to travel, curiosity, the positive attitude towards Mexico and the exchange program

Legend:

E4 = student from Mexico, arrived in Arad

E5 = student from Brazil, arrived in Arad

From following the reasons exposed by the students we can deduce that not all of them had personal reasons and that their reasons were structured mostly on generalities (e.g. curiosity – without it being necessarily oriented towards something specific – folklore, climate, cultural differences, etc.)

The strongest motivation to adjust is connected to the understanding of one's own choice of going on an exchange, the desire to learn and do new things, the desire to see and understand a new culture, the desire to find one's place in the new conditions.

These young people have their primal needs insured by the organizing institution – food, shelter, safety, but they need to be able to satisfy all their other needs in the new conditions, and this is not an easy task. For this, it is necessary to have their eyes and mind open to understand the differences and to be able to adapt to them.

Throughout this whole process the person who is on exchange will change affectively, cognitively and behaviorally transcending the distance from the ethnocentric stage (denial, defence, minimization) to the ethnorelative stage (acceptance, adaptation, integration).

In order to be able to transcend these stages easily, the organizing institution realizes, throughout the exchange year several activities for the students – the presentation of their country, of their country's values, of their family values, for them to understand the new country and its values.

Besides these activities, it is important for watch host family to understand their role in facilitating the student's adjustment – thus, in the host families, the one who initiated several socializing activities and who was more preoccupied in the inclusion of the student in family activities had the best success rate. The adjustment dynamics makes the exchange student at the acknowledgement of these differences feel lonely or look for isolation and this thing can be avoided with a constant support from the host family.

The second step is the implication in activities with people of the same age – and here, the host family has the role to create the right environment for this. Across these steps it is assumed that the student will learn the language and the pursuit of the results from the host family. The intervention at this level targets the family's efficient understanding of this necessary effort which they need to make in order to make it easier for themselves, as the good adjustment of the student will be positively felt in the family, while the student's bad adaptation will be a source of stress for the family. „Through communication with the others, the students manages to distance oneself from the concrete reality and the experience enriches step by step, as the reports with reality become more and more numerous, [...]” [3].

A smaller role, but just as important was played by the weather – the meteorological conditions being highly different compared to the country of origin.

For those in Canada the low temperatures were a challenge at the beginning because of the many months of winter and the outdoors activities being mainly oriented towards winter sports.

For those who came from Mexico, and Brazil respectively – the existence of winter was a pleasant surprise, however difficult to surpass – adapting to different low temperatures being a challenge.

At the end of the exchange program the situation of these stages for the students from Arad was as follows:

Ethnocentric Stage(A)

Denial(1) The person denies the existence of cultural differences

Defense(2) The person attempts to protect their own worldview to counter the perceived threat of cultural difference

Minimization(3) The person attempts to protect the core of their own world view by concealing differences in the shadow of cultural similarities

Etnorelative Stage(B)

Acceptance(4) The person begins to accept the existence of behavioral differences and underlying cultural differences

Adaptation(5) The person becomes empathetic toward cultural differences and become bicultural or multicultural

Integration(6) The person applies ethnocentrism to their own identity and can experience difference as an essential and joyful aspect of all life

| | | E 1 | E 2 | E3 | E 4 | E 5 |
|---|---|-----|-----|----|-----|-----|
| A | 1 | x | x | x | x | x |
| | 2 | x | x | x | x | x |
| | 3 | x | x | x | x | x |
| | 4 | x | x | | x | x |
| B | 5 | x | | | x | |
| | 6 | x | | | | |

Legend

E1 = Elev 1 (From Romania to Canada)

E2 = Elev 2 (From Romania to Canada)

E3 = Elev 3 (From Romania to Mexico)

E4 = Elev 4 (From Mexico to Romania)

E5 = Elev 5 (From Brazil to Romania)

We can observe, from following the indicators from the tables the different levels of the young people’s adaptation. Throughout the course of the stay in Romania they have received psychological assistance at request, both the students and the host family. The assistance was offered on the following themes – the differences to rapport to the situations, the different crisis situations, the adaptation upon return for the student who came home early, realationing difficulties.

Following the psychological intervention, the students have overcome the difficult situations and these were also overcome by the host families. The psychological intervention was realized in Arad for the two exchange students who came from abroad, but also for the student who discontinued her year. The interventions have allowed the exchange students to explore the space of their own image, of their own culture, of their personal identity, of their personal resources and also of the role each of them has in the host family’s home. At the family’s level, the interventions targeted the support patterns with which they can participate to streamline the adaptation, the connection to the personal resources in order to overcome the difficulties that intervene and finding the balance in these conditions.

Limits of the study

The study started from the premise that the team formed of the exchange student and the host family has a better efficiency if the families and the exchange students fathom the motivational factors to make such an effort. A first limit would be that of fathoming the motivational factors only for the exchange students and not for the host family. Another limit is set by the small number of subjects. Another limit is set by the fact that the specialists in the area are not invited to be part of the team with the organizing institution, or this leads to the loss from sight of several aspects that are necessary to adaptation. The continuous existence of psychological counselling would make the exchange programs more efficient, however, this is not presently done this way, the psychologist being contacted only in need and not always by the organizing institution, but mostly by the families who cannot overcome a temporary situation.

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FAMILY IN ACCEPTATION OF MILITARY MEDICAL STUDENT TARGETING HIS CAREER

Maria Dorina PAȘCA, Andreea Elena IACOB, Ana Luciana COCA

University of Medicine and Pharmacy of Târgu Mures

Abstract: Purpose: *This paper aims to highlight the family concept on military medical student regarding his future career.*

Methods and materials: *As methods of psychological investigation we have used the questionnaire, conversation and talk.*

Results: *After processing the data from the questionnaire that comprised 10 items, it appears that most of the subjects want family, at half of them occurring the wish of forming a family with a coworker to avoid the appearance of misunderstanding the work schedule and the sacrifice of a military health care specialist. The students in higher military education MM – Targu Mures constituted the representative sample amounting to 54.*

Conclusions: *Starting from the premise that many from the medical students want a family despite the professional sacrifice, the performed study confirms the working hypothesis, demonstrating that the morale principles and will underlie family*

Keywords: *family, military specialist, relationship, profession*

1. Introduction

“Family is an element as important for national security as military organization.” – Father Teofan, Metropolitan of Moldova and Bucovina

The strength of our nation is our army. The strength of our army is our soldiers. The strength of our soldiers is our families. ^[1] The family is the cornerstone of society and the welfare foundation of each individual.

2. Purpose

This paper aims to highlight the family concept on military medical student regarding his future career and the capability of maintaining in balance work and personal responsibilities.

3. Objectives

Our study focused on:

- processing information of the questionnaire which highlighted the wish of military medical student of having a family

- describing purposes and opinions of students which follow a higher military institution have about founding a family
- our study highlights the fact that the choices made in present will be also kept in future

4. Results

After processing the data from the questionnaire which comprised 10 items, it appears that most of the subjects want a family, at half of them occurring the wish of forming a family with a coworker to avoid the appearance of misunderstanding the work schedule and the sacrifice of a military health care specialist. Student from MM – Targu Mures higher military education, constituted the representative sample amounting to 54.

The questionnaire included 10 items, each question is subject to categorization on 4 levels: (1) yes, (2) no, (3) don't know, (4) I don't care.

Questionnaire

1. Do you wish to have a family?
 Yes No I don't know I don't care
2. Do you want that your husband/wife be a doctor?
 Yes. Why? _____
 No I don't know I don't care
3. Is important for you that your husband/wife be a military?
 Yes. Why? _____ No.
 Why? _____
 I don't know I don't care
4. Do you consider that family can be springboard for your military career?
 Yes No I don't know I don't care
5. Do you think family can be an obstacle in you military career?
 Yes. Why? _____ No.
 Why? _____
 I don't know I don't care
6. Name 3 specializations which you think would influence in a negative way family life.

7. Name 3 specializations which would influence positively family life.

8. Which specializations would you choose.

9. Would family have a say about accomplishing military missions in theaters?
 Yes No I don't know I don't care
10. Would you give up on military medical career for family?
 Yes. Why? _____ No.
 Why? _____
 I don't know I don't care

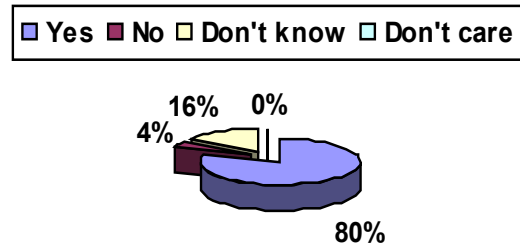
Thank you for your time!

Students were put in the situation of choosing the answer that fits better their opinions regarding the subject to which the items were referring and also to motivate their choice.

1. Do you wish to have a family?

So, 80% of students answered yes, 16% don't know and only 4% don't want a family. These percentages show the fact that the majority want to build a family, while a small part of them considered that is too soon to think about such an important decision.

Fig.1 Question no.1



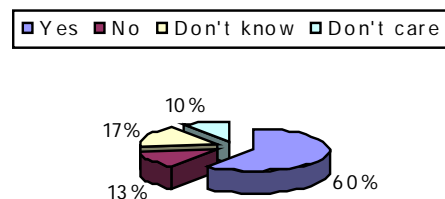
2. Do you want that your husband/wife be a doctor?

At this question it has been found that 60% answered affirmatively, 17% don't know, 13% don't want this thing and 10% don't care.

The reasons for that most of the subjects wish to have a medical spouse are: the existence of understanding from the spouse regarding the busy schedule for professional responsibilities, sharing the same ideas about the work they perform, the mutual help and support in building the family and the career.

Regarding the participants that answered negative, they consider that having a husband/wife that doesn't work in a medical environment offers the freedom of detaching from the issues related to the work at the moment of coming back home. [4]

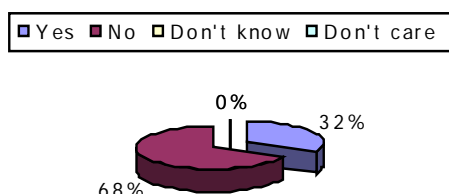
Fig. 2 Question no.2



3. Is important for you that your husband/wife be a military?

68% of the students interviewed gave a negative answer, considering that military environment is restrictive and rigorous enough to create conflicts and tensions in family based on military stress. Yet there were subjects that answered yes which means that the existence of two military members of the family represents the base of career rising for both spouses. [2]

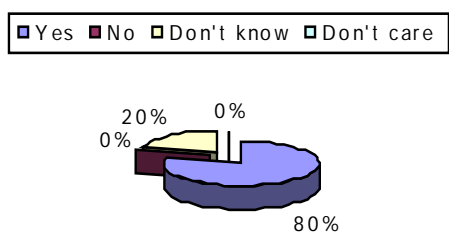
Fig. 3 Question no. 3



4. Do you consider that family can be springboard for your military career?

We obtained the nest percentage: 80% yes, 20% don't know. These results sustain the idea of mutual help, the understanding and the trust in moments of loss and support in moments of glory.

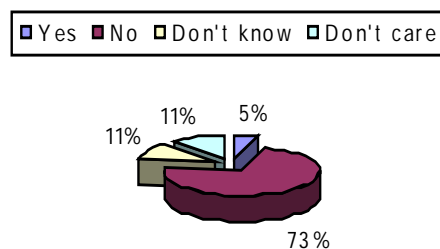
Fig. 4 Question no. 4



5. Do you think family can be an obstacle in you military career?

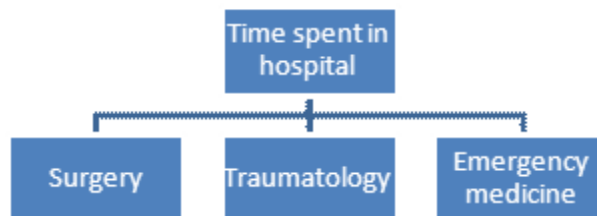
It was found that 73% answered no, 5% yes, 11% don't know and 11% don't care. Most students believe that family represents the place where they can find their selves spiritually, this special helping on the process of exceeding daily obstacles.

Fig. 5 Question no. 5



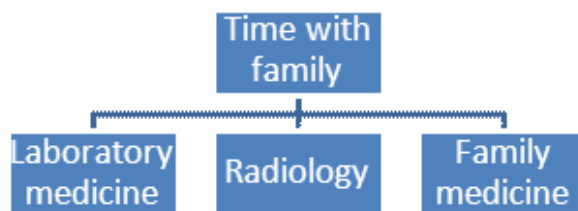
6. Name 3 specializations which you think would influence in a negative way family life.

At this item surgery, trauma, emergency medicine and intensive care were nominated as specializations with negative impact on couple relationship. This problem is due to not only the busy schedule allocated for caring invalids, but also to the individual professional training which have to held throughout his career. Also, to these aspects contributes the stress that legal responsibility impose. [4]



7. Name 3 specializations which would influence positively family life.

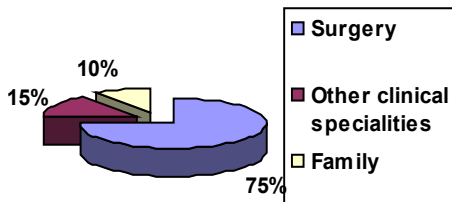
Laboratory medicine, radiology and family medicine are branches of medicine that allow the military health care specialist to spend more time with his family.



8. What specializations would you choose.

The wishes that students expressed revealed the fact that most of them want to follow a surgical specialization, even if this implies a longer time allocated to professional responsibilities in detriment of time spent with family.

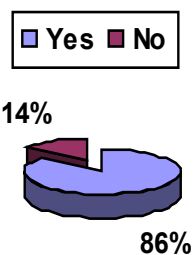
Question no. 9



9. Would family have a say about accomplishing military missions in theaters?

In this case we have obtained the following numerical values: 86% said yes, while 14% no. The opinions of the subjects led to a common point: family is an entity which has its important role in the community which means that decisions are made with one consent. [3]

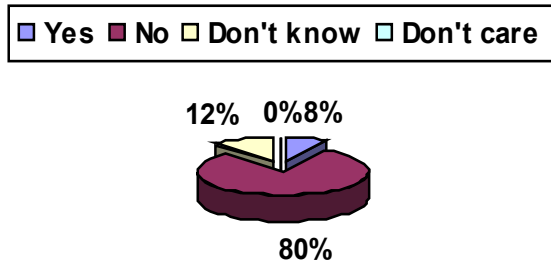
Fig. 6 Question no. 9



10. Would you give up on military medical career for family?

The last item from the questionnaire aims to highlight the importance of family. So, 80% of participants wouldn't give up family life in favor of professional achievement. They consider that once made the decision of founding a family you make efforts to feel accomplished personal and professional.

Fig. 7 Question no. 10



5. Conclusions

This study has shown that:

- confirmed the fact that military medical students want on future a family even if this thing assumes professional sacrifice
- students that really want family are basing on grounded family morals
- the sacred institution of family must be cultivated, maintained and strengthened

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The whole paper must be written with no free space between lines using the Times New Roman CE; the margins of the text: Top – 28 mm, Bottom – 20 mm, Inside – 25 mm, Outside – 20 mm, Header – 18 mm, Footer – 15 mm, Mirror margins activated, Paper format A4 210x297).

It is recommended that the paper should have an even number of pages (maximum 6). The title will be printed in Upper cases 14 pt, bold, centered. The name of the author will be written two free spaces below the title of the paper: First name, surname, font 12 pt, bold, centered. A free space (12 pt) below the name will be left before writing the name of the institution, font 12 pt, centered.

Papers must be prefaced by a brief abstract in English up to 250 words. The text will be written in 11 pt high, Italic, justified, left-right alignment. A number of maximum 8 keywords will be written 11 pt below the abstract. The words will be 11 pt high, Italic, left alignment, separated by a comma.

The text of the paper will be written in English two free spaces below the keywords divided into two columns separated by a 5 mm free space. The characters will be 12 pt high, justify (left-right alignment). The main parts of the paper will be introduced by numbered titles with Arabic figures and printed in capitals, font 12 pt, bold, centered. A free space will be left above the text and another one below it. Paragraphs will be 6 mm indented.

Drawings diagrams and charts will be separated by a free space from the text and be printed as close as possible to the first reference. Their width will not exceed that of the column they belong to. Should this be impossible to achieve then they will be printed across the whole breadth of the page either at the top or the bottom of the page. Diagrams and charts will be numbered by using Arabic figures and will be accompanied with captions. Ordinal numbers and figure captions will be printed leading of free space 12 pt below the drawings, centered, font 12 pt. Ordinal numbers and the charts explications will be printed above the chart, right alignment, and font 12 pt.

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