

ESSENTIAL DETERMINANTS IN THE TRANSFORMATION OF MILITARY OPERATIONAL LOGISTICS MANAGEMENT

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Abstract: *The paper analyzes the fundamental characteristics of military operational logistics management in the context of geopolitical changes, technological advances and new forms of conflict, when timely and resilient logistical support becomes an essential pillar in ensuring operational efficiency and rapid response capacity. Appropriate details of operational logistics management are highlighted, which reveal defining elements, specific components, the need for sufficient commitment for timely support with resources and services in accordance with the requirements of operational forces at the tactical and joint levels. At the same time, the study highlights the need for continuous improvement of military operational logistics management, so that the component subsystems function more efficiently through digitalization, automation, the use of artificial intelligence and the development of human capital, as essential vectors of progress.*

Keywords: operations, joint, logistical support, sufficient, resilient

1. Introduction

The requirements of the future security environment involve a rapid and precise response, in order to achieve operational success. In these conditions, military experts believe that the following essential elements must be taken into account: ensuring critical capabilities; the necessary structures and procedures; continuous training of combat and logistical support forces; continuous provision of the logistical resources necessary to carry out missions, according to the operational scenarios developed [1]. This involves achieving an adequate functional combination and correlation between strategy, tactics and logistics, according to the objectives, options and operational actions to be implemented. In this sense, the statement of the famous USN Rear Admiral, Henry E. Eccles, that, "logistics provides the necessary physical means for the combatant forces to exercise their combat power is particularly relevant [2].

Therefore, it is obvious that even the best operational plans developed at the strategic, operational (joint) and tactical levels will fail in the processes of their application, if they cannot be supported logistically, in a sufficient, timely and dynamic manner. For example, it results that, no matter how modern the means of combat are, they represent nothing to the adversary, if the logistical structures (of command and execution) do not provide their own operational forces (for the operation of the equipment at the right times and in the indicated places), the ammunition, fuels and the necessary maintenance, so that they can be used continuously, effectively and efficiently in the specific actions to fulfill the missions received [3].

In the situation of inadequate operational planning, even the best logistical systems of combat forces will fail to accomplish their missions. If this mechanism is also subject to significant tactical errors, as was the case with the Russian offensive forces during the invasion of Ukraine, then the logistical

failure will be greatly aggravated and even total [4].

Modern operational logistics management is a continuous cyclical process, which is carried out from the moment of receiving the mission until the moment of making the decision and, thereafter, during combat actions until the cessation of all activities and even for a period thereafter, during the transition phase. The characteristics of conflicts and situations of instability highlight risks and threats of a military and economic nature with an impact on the infrastructure of the areas and/or theaters of operations and other implications, which requires the provision of adequate and timely logistical support for the successful accomplishment of the missions received by the combat forces engaged in tactical and/or multi-domain operations [5].

In the aforementioned context, it is easy to explain why it is necessary to use operational logistics management to achieve the optimal direction of logistical resources appropriate to achieving operational objectives and achieving the success of military actions. It follows, obviously, that logistics managers and their subordinates have extremely complex missions in the preparation and conduct of operations of the combatant forces of the future. In order to fulfill their operational-tactical goals of a logistical nature, the aforementioned specialists need solid training, competence, responsibility, a lot of initiative and perseverance. Consequently, particularly important in the economy of military actions, in the near future, is the reduction of the "volume" of operational logistics by decreasing the duration of supply/resupply flows appropriate to the areas and/or theaters of operations. This is relatively easy to define, but much more difficult to achieve. The greatest challenge for logisticians of the future will be to ensure a versatile, interactive logistics system capable of effectively and efficiently supporting military operations, prepared for and deployed in increasingly complex operating environments [10].

For a prospective analysis, it results that operational logistics management will be continuously improved as a result of the reconfiguration of integrated logistics systems of combat forces at the tactical and joint levels, as a result of the evolution of equipment, information technology and the functional optimization of combat and support structures, for a greater and more precise response capacity in any circumstances, according to the missions received within the framework of multinational operations carried out on national territory or outside it within and under the aegis of NATO [5].

The need to build relevant scientific content and relate appropriate reference elements led me to formulate the research questions specified below. The first question expresses:

How have military organizational advances influenced the functional elements of operational logistics management? The second question shows: *Why are some future reconfigurations of operational logistics management required?*

Various scientific research methods were used to carry out this work, applied individually or in combination, which allowed the development of a coherent and current structure, oriented towards a unitary vision based on continuity, complementarity and modernity. Among the methods applied are analysis, comparison, extrapolation and functional relationship, each contributing to the solid foundation of the investigative approach.

2. Functional elements of operational logistics management determined by evolution and progress

The transformations produced in the knowledge-based society generate profound and diverse changes in the field of military operational logistics management, which is in permanent interdependence with the economic environment. Operational logistics management specific to military structures,

especially in contexts of crisis or conflict, is a complex and integrated concept, characterized by a wide range of specific activities. These include, overall, essential processes such as: forecasting, planning, programming, decision-making, organization, command, control, analysis and evaluation.

Within this type of operational logistics management, considered a true science, several components are distinguished: a rich volume of factual data and relevant experiments in the field; various hypotheses through which the necessary logistical efforts at national and allied levels are anticipated, both quantitatively and qualitatively, depending on the missions of the operational military structures-hypotheses that can be subsequently validated or rejected; own concepts, theories and laws, confirmed by logistics practice; a general vision of the technical-material and financial interdependencies between operational military structures and suppliers of products and services [6].

The combatant military organization, as an entity in itself, is in a continuous transformation and in a permanent interaction with the operational environment in which it operates, and the lever that nuances this interaction is the profile logistics management, which is achieved through the specific logistics decision-making process. As an impressive number of authors note [7], in general the organizational environment, including logistics, is under the sign of change, and

its pace and implications are increasingly alert as a result of military operational requirements. The fundamental purpose of the military operational logistics management activity is the complete and complex provision of combat and peace support structures, in crisis or war situations, with equipment, inventory items and materials (consumable and non-consumable) of appropriate quality, at the requested place and terms, with a minimum cost [5].

Taking into account the organizational side, experts believe that operational logistics management in the combatant military organization (combat or support) must be studied from a holistic perspective, taking into account: people (personnel, leadership, education and training), processes (fundamental doctrines), organizational forms, technologies and resources of any nature, for the realization of logistical support in situations of crisis and/or armed conflict [6].

In order to use the concept of operational logistics management instead of the notion of logistics leadership, one must consider the perception of combatant force logistics as a science responsible in the future, from a managerial point of view, for optimizing operational effects by adequately superimposing material effort over action effort, in order to successfully achieve the final state [8]. In Figure 1, I present, from a conceptual point of view, the structure and relationship of the essential components of operational logistics management.

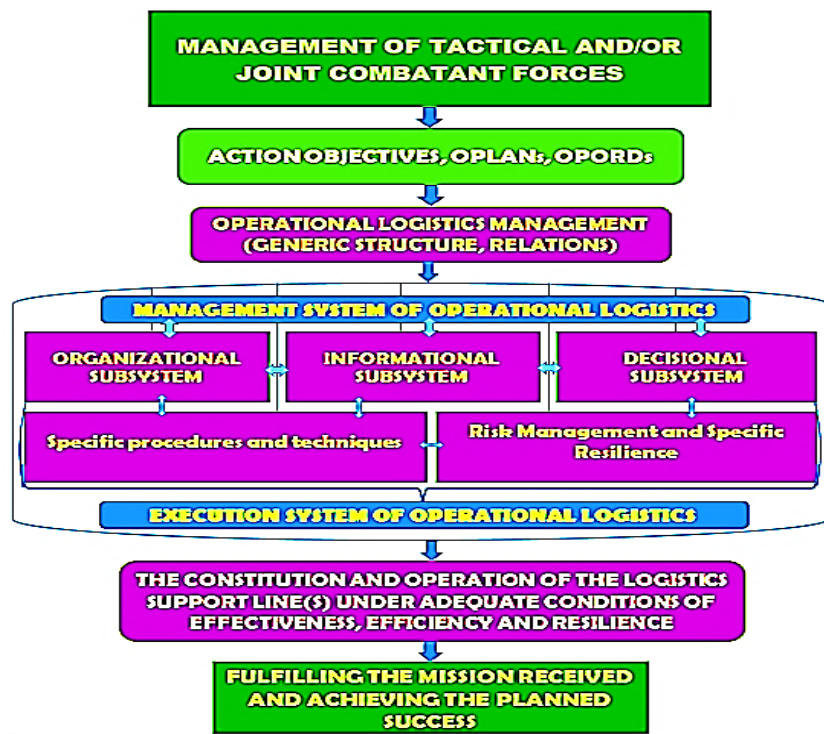


Figure 1. Overview of the essential components of modern operational logistics management and appropriate relationships [5]

Flexible and continuously adapted operational logistics management includes, according to the specifics of each echelon, specific organizational, decision-making and information systems, as well as its own working procedures and techniques, including those appropriate to resilience and risk management, for the continuous, effective, efficient, flexible and protected operation of the logistics support execution structures [5].

In light of the particularly complex aspects involved in the transformation process of Romanian operational (tactical and/or joint) forces, special emphasis is placed on elucidating specific managerial mechanisms that could remove many of the obstacles that the evolution of operational logistics systems (from organic) naturally implies. To this end, there is an adequate analysis of behavioral, human, cultural or ethical factors in the operational logistics field, with profound influences on the efficiency of specific organizational processes, as well as a

concentration of efforts on solving the quantifiable aspects of the transformation of logistical capabilities, intended to support combat forces, related to equipment, other material resources, supply, replenishment, transport, maintenance, campaign services, etc. [8].

The operational logistics management process is cyclical and takes place in stages. This process begins with the establishment of objectives for a specific mission and ends with the evaluation of the final results. Within each stage, the operational logistics management system involves a set of complex, relatively independent actions, which change successively, with implications for the logistics execution system in order to materialize the effects of the logistics management functions. Therefore, operational logistics management is based on the principles of the transformation of Romanian and NATO operational forces, which aim at the need to create modular, flexible and mobile combat, combat support and logistics support structures, with a high response

capacity. At the same time, operational logistics management must allow the development of an integrated, flexible and functional military logistics system, able to meet the needs of supporting combat units (combat and support) with all types of equipment and other materials (at the right time and place, as simply as possible and with minimal costs), in accordance with the requirements for achieving interoperability with the logistics systems of modern armies in NATO member countries [6].

3. The need for future reconfigurations of operational logistics management

In order to move towards a modern operational logistics management, the path from network logistics process management to logistics management through network centers must be followed, with the aim of creating a cooperative planning and execution of logistics, namely the transition from logistics management based on supply to another specific to flexible, agile, distribution-based logistics [7]. Therefore, a new operational logistics management must allow the modeling of Romanian operational military logistics that has as a reference the concept of NATO member states, according to which operational logistics management is responsible for planning, executing the movement and maintaining the forces at high combat capacity [9], [10].

The continuous evolution of operational logistic support needs has led to numerous changes to permanently adapt operational logistic management to the configurations and requirements of combat forces at the tactical and joint levels. For example, the Polish army uses the concept of logistic knowledge management, taking into account the specificity of the logistic system and its missions (achievable in profile through modern, flexible and continuously adaptable command and execution structures integrated at all levels of military art) to support operational

forces in peacetime, in crisis situations and in war, regardless of time, season and weather conditions [11].

An efficient operational logistics management must allow the integration of the areas of troop logistics with the planning and execution of maneuvers at different levels of command, starting in peacetime through appropriate training exercises, so that in crisis situations and in war it allows the optimal engagement of all logistical resources (human, material, financial, informational and functional protection) in support of the fighting and support forces, in order to achieve success and reach the projected final state. In this regard, the particularly relevant lessons learned from the Gulf War, as well as the lessons identified following the armed conflict in Ukraine, must be taken into account [5], [10].

The increased demands and requirements of the future war, taking into account the lessons identified from the armed conflict in Ukraine, reveal new challenges for operational logistics management, especially in the processes of planning and timely delivery of logistical resources to combatant structures. Therefore, in this regard, it is very important for the logistic management mechanism to focus the profile activities on four essential factors, namely demand, distance, destination and duration [14] within the achievable parameters of effectiveness, efficiency and economy. Here, particularities come into play depending on: the operational echelon engaged in the military action and the form of operation in which it participates; the logistical support line to be established; the existing territorial infrastructure; available logistical facilities in the area of operations; the level of protection of the combatant force; the framing, endowment, flexibility and resilience of the logistical support structures, etc. [5].

In the fluctuating and increasingly harsh conditions of the future war, a high-performance operational logistics

management essentially employs the profile human resource, according to their skills, for: planning and implementing logistics operations according to the specifics of tactical and/or joint actions carried out in the field; in-depth knowledge and concretization of the military-civilian supply chain operations, a vital objective for providing the necessary logistical support to the combat forces on time; effective protection of the logistical support lines, which ensure the necessary supplies and equipment reach the troops; adjusting transportation plans, according to the specifics of the forces, means and modes of transportation in order to achieve the parameters of opportunity, effectiveness and efficiency for the logistical support of large units and units operating in tactical and/or joint operations areas with national and/or multinational status; planning, organizing and conducting maintenance and medical support interventions according to the requirements and constraints of the national and/or multinational operational environment [5], [10], [15], etc.

Operational planners approach operational logistics management at the tactical and joint levels, taking into account the correlation "engaged military force-time-

space-technology related to the war of the future, as well as the pace of military actions. Therefore, the characteristics of future conflicts and instability situations determine the real needs for providing logistical support to achieve operational success, depending on the nature of the adversary's actions, economic development, infrastructure of the areas (theaters) of operations, etc." [11].

According to the specified, operational logistics management must materialize the full functioning of focused logistics, which reveals the ability of profile (logistic) systems to provide tactical and joint (multi-domain) operational forces with the necessary personnel, equipment and other material assets at the right place and time, in the required quantity, across the entire spectrum of military operations. For this purpose, networked information systems will be used - specialized in ensuring all the necessary connections between the fighter and the logistician, as well as total visibility over the development of the phases of operations and the related logistical support [5], [12], [13]. In Figure 2 highlights an adapted conception regarding the objectives and functions of logistics focused at the joint (multi-domain) level according to the managerial requirements of the profile.

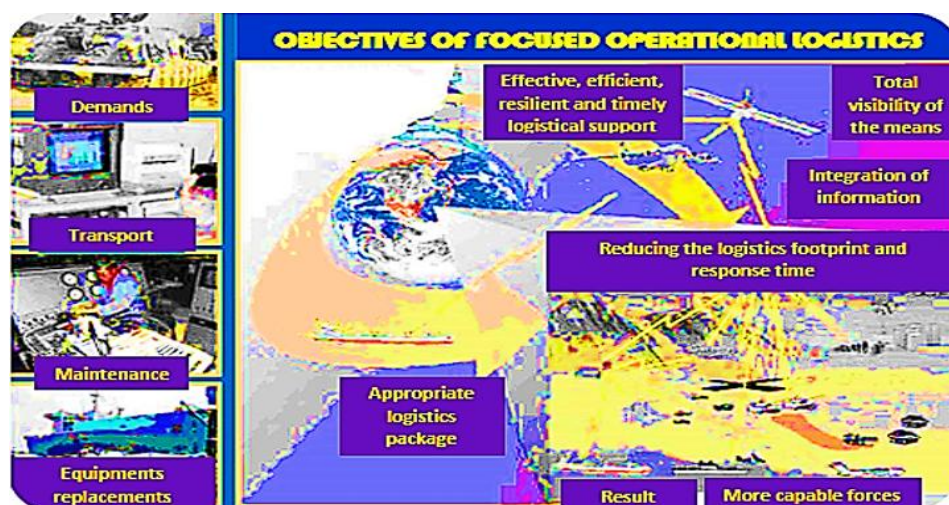


Figure 2. The objectives and functions of logistics concentrated at the joint (multi-domain) level in accordance with the requirements of specific evolved management [5]

In the future, as a result of the reconfiguration of the logistics system, by modernizing the information technology specific to modern warfare (high-tech, digitalized, robotized, based on artificial intelligence and continuously networked), operational logistics management will be continuously improved, due to the new requirements resulting from the reconfiguration and/or creation of more flexible combat structures with high reaction capacity and capable of acting in any conditions, according to the entrusted missions[15]. Considering the aforementioned, we appreciate that military operational logistics management must be designed and implemented in society 5.0, under the constraints determined by the economic and financial crisis, armed conflict in Ukraine and other global military challenges and threats, based on the principles of: speed; anticipation; overall and analytical vision; progressiveness; continuity; evolution [5], [10] and so on.

According to what has been stated, it is obvious that logistics officers (leadership and execution) have the obligation, especially in the current context, to achieve in crisis situations and war the complete and complex provision of operational military organizations with all the necessary logistical resources, in quality conditions, in the places and at the requested deadlines, with reduced costs, according to the missions that they have to fulfill on the national territory or in external theaters of operations. All these activities must be carried out in a specific economic and performance perspective, which determines continuous projections and decisions in a managerial profile, as well as permanent developments of the processes of resupply, transport, maintenance, medical support, campaign services, etc. before, during and after the deployment of tactical and/or joint operations. Therefore, logistic decision-makers must resolve

appropriate logistical support situations, for which they are not always sufficiently well prepared - theoretically and/or practically. In these conditions, it is necessary to study the evolution of operational logistic management towards modernity, in order to make correct and concrete decisions, imposed by the dynamics and complexity of the future battlefield, which will determine a high-performance conduct of operational logistic organizations (management and execution) in the action system (offensive or defensive) of the combat forces [10].

4. Conclusions

The future security environment will be increasingly complex, due to the continuous challenges to the international regulatory order and the manifestation of long-term strategic competition between the main global actors. Therefore, the future operational environment will be characterized by a modernized infrastructure, complex and dynamic operating methods, which integrate technologies, equipment, automated and robotic systems, artificial intelligence, as well as advanced planning and action procedures.

Under these conditions, both for NATO and national forces, operational logistics management will have to ensure the capability and protection necessary to provide adequate logistical support to multi-domain, non-linear and/or expeditionary operations conducted at greater distances, due to the context and complexity of the threats specific to the future confrontation environment.

The continuous and rapid development of military equipment that is and will be available to NATO national and multinational combat forces has a major impact on the improvement of operational logistics management. This determines that logistics managers and their subordinates, from the strategic level to the lower tactical level, to act in the direction of implementing logistics principles and

functions according to the new operational requirements identified from the lessons learned resulting from the conduct of the armed conflict in the theater of violent confrontations in Ukraine. The accumulation of modern equipment by operational structures and as a result of the aforementioned identified lessons, will determine new challenges for management and execution logisticians. In this sense, operational logistics management will involve the specific areas of support for combat forces, such as supply, maintenance, movement and transport, which will be correlatively and systemically engaged to ensure the consumption of materials necessary for operation, the provision of maintenance services, as well as for their timely movement to the area/theater of operations, but also within it.

There is a close connection and mutual conditioning between the management of combat structures and operational logistics management (integrated into the former). Decisions in military actions (in times of crisis and/or armed conflict) reveal the direct direction of forces and means to accomplish the missions received by the operational forces and the logistical support structures based on the plans and orders elaborated for this purpose.

Operational logistics management will become the fundamental element in designing the success of the operational force, resulting in the essential assertion that: good planning of the tactical and/or joint operation implies well-established objectives and in accordance with the support requirements of the combat and support structures, in order to accomplish the missions in conditions of effectiveness, efficiency and resilience.

At the same time, it is necessary for the operational logistics management specific to the Romanian combat structures to continuously adapt to the specific conditions of current and future military conflicts, through the evolution of conceptual, systemic, methodological and practical elements to the size, configuration

and missions of the forces in order to effectively and efficiently manage logistics systems capable of fulfilling the functions of operational logistics, in accordance with the requirements, standards and procedures developed by NATO and national bodies in the field.

Current and future military challenges determine that state and Alliance responsibility factors, at different levels, give increased importance to national and multinational future defense requirements. To this end, there is a need for very well-prepared and trained military operational leaders and logistics managers (subordinates) with the skills necessary for immediate functional adaptations to the developments and changes of the future joint theater of operations.

The logisticians of the future army will be those leaders of the leadership or execution structures of logistical support with major importance on the battlefield. They must delegate, adapt, assume risks and invest energy and effort to fulfill the complex missions that are incumbent on them. As heads of the J4, G4, A4, N4, S 4 logistics modules (or their components), as well as commanders (deputies or chiefs of staff) of the logistics support execution structures (from the joint to the lower tactical level), they must be experts in understanding, hierarchically transmitting the real logistical situation in the field, proceeding further to carry out the planning processes and providing the logistical support requested by the combat forces.

The further development and improvement of operational logistics management, according to the new requirements revealed by the war of the future, will allow the leadership and execution structures of logistical support, at the tactical and joint levels, to become more prepared, flexible, effective and efficient in accordance with the objectives, demands and requirements of future missions received by the combat and support forces at the tactical and joint levels with national and allied status within NATO.

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