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Preparing Logistics Managers to Manage Modern Military Supply Chains

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Abstract:

Purpose: *The aim of conducted research was to identify a set of competencies required of a logistics manager, in managerial positions in the armed forces, necessary to manage contemporary military supply chains.*
Design/Methodology/Approach: *The research process consisted of theoretical and empirical parts. The theoretical part included the analysis of current scientific studies on the problem of logistics managers' education, requirements set by employers in the military and civilian labour market, as well as the applicable legal acts on the subject in question. The empirical part of the study was based on a diagnostic survey with the use of an interview questionnaire. The study involved 26 experts holding managerial positions in military and civilian logistics entities and persons responsible for logistics education at universities, 7 managers from logistics companies, 11 officers from military logistics units, 8 university teachers responsible for developing study programs. The research was conducted in 2020-2021.*
Practical Implications: *The research results may be helpful in the process of developing curricula dedicated to logistics managers, both in the armed forces and in the civil market.*
Originality/Value: *This study is an original study of experts involved in the education of logistics managers.*

Keywords: *Logistics, supply chain, management, education, competencies.*

JEL codes: *A22, H56, M53, J24,*

Paper type*: Research article.*

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1. Introduction

Human resources are the foundation of any organisation. This applies in particular to managers who are responsible for managing key processes and systems in the company. Particular competencies are required from managers who administer the processes of goods flow within a group of companies constituting a supply chain or network.

Modern supply chains are extremely complex set of entities that work together to meet the needs of individual customers, businesses and elements of the state security systems, such as the armed forces. Armed forces, performing their tasks during peace or crisis situations, operate in a social and economic environment and in specific local or global economic conditions, depending on the scale of operations. Supply of troops with equipment and materials necessary for training or operations is carried out within the military supply chains. The complexity of modern military supply chains, which consist of many interacting entities, both military and civilian, requires efficient management by appropriately qualified logistics personnel.

2. Characteristics of Military Supply Cain Management

The conditions of the contemporary international security environment determine the nature of tasks carried out by the armed forces of the European Union countries. Concern for common security obliges states and their armed forces to cooperate, which is also seen as an economic advantage. This is particularly visible in the area of logistic support of multinational operations usually conducted at a distance from national logistic resources. At the same time, according to the principle of logistic efficiency, the armed forces use the resources and services of national economy enterprises and civilian logistic companies. The supply of troops with equipment and materials necessary for the implementation of tasks is usually carried out by military-civilian supply chains.

Due to the multifaceted nature, the concept of supply chain is defined in various ways. As part of different approaches to defining the supply chain, there are several main aspects that are emphasised by the authors, such as: 1) in the system approach a set of participants, network, organisations and individuals involved in stream flows, 2) in the process approach sequence of processes and 3) in a functional approach a set of functions (Wincewicz-Bosy, 2020).

According to one definition, a supply chain is a network of organisations involved, through relationships with suppliers and customers, in various processes and activities that create value in the form of products and services delivered to ultimate consumers (Christopher, 1998). In military supply chains, the ultimate consumers (customers) are military branches and subdivisions executing tasks under conditions specific to peacetime, crisis, or war. Most links in the supply chain are logistic military units involved in transportation, storage or maintenance of equipment in

technical condition, as well as military production and repair facilities. At the same time, the armed forces use the services of civilian companies under outsourcing, signed contracts, or purchases on the local market. In the entity dimension, military supply chains should be understood as a set of cooperating, structured internal and external elements that satisfy the logistics needs of the military by providing them with the goods necessary to accomplish training, operational, and combat tasks (Jałowiec and Grala, 2020).

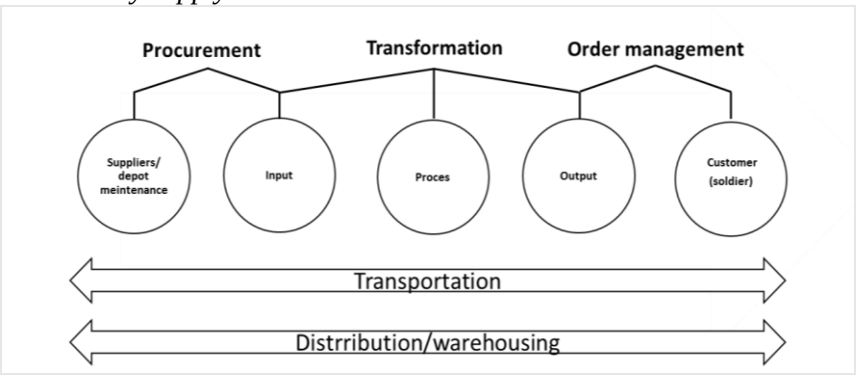
Supply chain management is the management of relationships with suppliers and customers and clients to deliver the highest quality product to the customer at an appropriate cost for the entire supply chain (Christopher, 1998). It involves effectively linking suppliers, manufacturers, warehouses, and stores so that goods and services are used in the right place, in the right quantities, at the right time, and at the right cost (Erturgut and Soyúekerci, 2011).

Management of military supply chains is understood as integrated planning, preparation and use of means of supply, as well as performance of services and specialised services in order to maintain troops in appropriate combat readiness in the territory of the state and to secure the functioning of troops performing tasks outside its borders (Jałowiec and Grala, 2020).

Supply chain management in its essence is similar for both the civilian market (corporations) and the military environment. However, it is important to distinguish some important differences specific to military supply chains. First of all, the main purpose of the military supply chain is to create logistical conditions for the performance of tasks by military units (e.g., achieving the goal of a military operation). Economic factors are taken into account, but they are not at the forefront. In contrast, civilian supply chains focus on generating profits for the entities involved. Another difference is that transportation, distribution, and storage are unidirectional in the civilian supply chain, but bidirectional in the military model (Figure 1). Depending on the operational situation, equipment and materials may be moved back, for example, to make priority repairs or to replenish worn-out stocks (Lenzini, 2002). Therefore, in the organisation of logistic support, besides proper forecasting and planning, flexibility consisting in the ability to quickly change e.g. the source of supply is so crucial.

Moreover, the management of the military supply chain is determined by external factors, typical for military operations, such as operational requirements and procedures, current operational situation, enemy influence, among others. Consequently, the flow of a wide range of supplies takes place in changing conditions, under time pressure, limited access to resources, disrupted information flow. Another important issue, especially in the case of multinational operations, is funding, which, depending on the agreements reached, can come from the budget of the operation, budgets of international organisations, or countries sending troops (Jałowiec, 2020).

Figure 1. *Military supply chain*



Source: *Lenzini, 2002, p. 12.*

Table 1. *Comparison of the parameters of civilian and military supply chains*

PARAMETER	**MILITARY SUPPLY CHAIN**	**CIVILIAN SUPPLY CHAIN**
Aim	Operational aim	Profit - money
Resources	Insufficient, difficult to access	Strictly defined and (generally) sufficient
Scope of needs	Very wide	Strictly defined and limited
Actors (chain links)	Military units, multinational units, contractors	Civil enterprises and companies
Time	Time pressure, changeable	Strictly defined and (generally) stable
Information	Limited, disturbed	Real-time complete information (generally)
Financing	State budget (UN, NATO)	Supply chain budget

Source: *Jałowiec, 2020, p. 99.*

It should be emphasised that proper supply chain management resulting in efficient flow of goods is desirable not only in economic terms, as a profit for companies. It is also one of the conditions of the so-called logistical support of customers of the supply chain – companies, military units and even countries. This is particularly evident in crisis situations, during which there are unforeseen market disruptions, as could be seen, for example, after the outbreak of the Covid-19 pandemic (Pawlisiak, 2020).

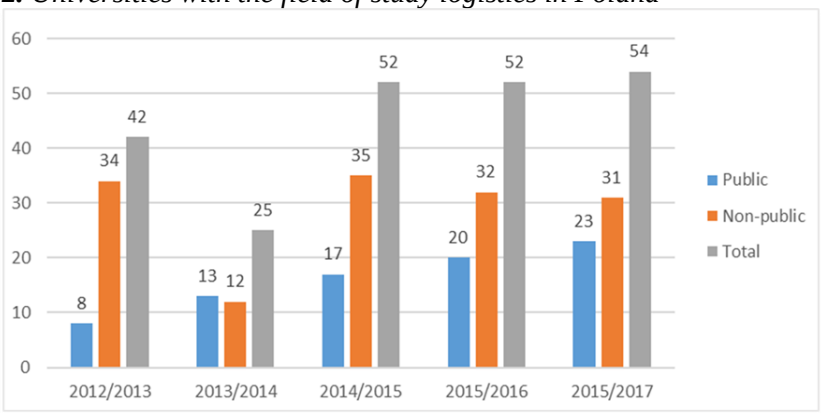
Given the complexity of modern military supply chains, the competencies of a logistics manager include interdisciplinary knowledge, the ability to use tools that support logistics management, and the necessary experience. Future logistics

managers in the process of education in the university are prepared to manage civilian chains. Whereas the graduates of universities of military studies and courses are able to manage flows of goods in military logistics systems. However, in practice, military logistics managers will very often have to manage civil-military supply chains.

3. Logistics Manager Education Offer

The first step to becoming a good logistics manager is getting the right education. The popularity of "Logistics" majors has not waned for several years. Currently, more than 50 universities in Poland offer logistics education. In addition, more than 100 universities educate logistics managers in other faculties that offer logistics majors or subjects (Logistics, 2018).

Figure 2. *Universities with the field of study logistics in Poland*



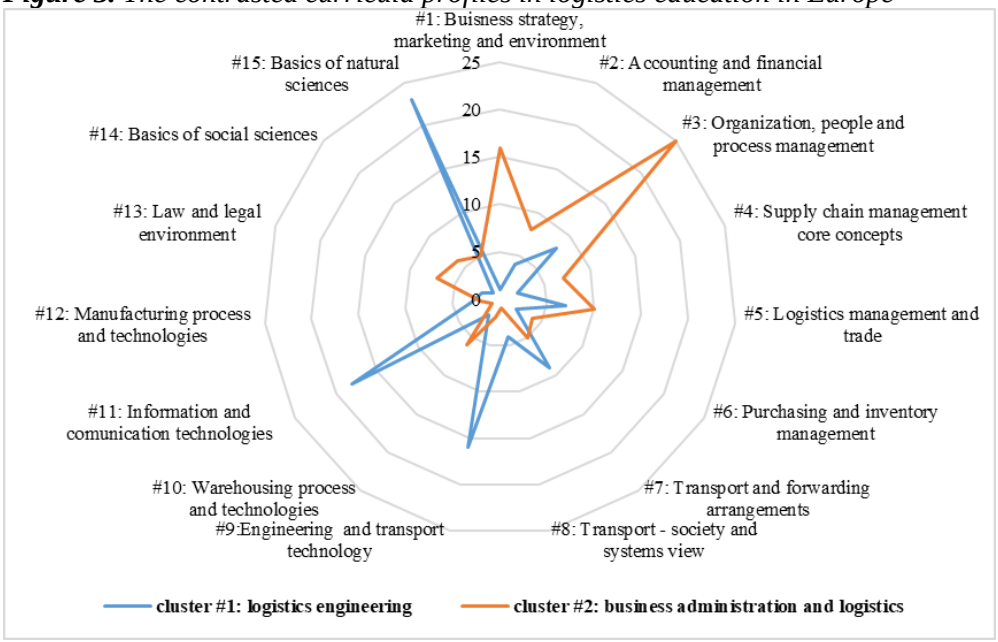
Source: *Logistyka w Polsce raport 2017, ILiM, 2018, p. 139.*

Universities educate logisticians both within dedicated faculties, (or majors) or as part of other faculties (majors) with similar topics. A separate issue is the scope of educational content provided during studies. Due to the lack of clear standardisation in the field of logistics education, universities try to adapt the educational content to the expectations of the labour market, taking into account its local conditions and their own capabilities. Hence the wide variety of curricula at different universities. In a study conducted in the UK to examine the curriculum of undergraduate logistics and supply chain management (LSCM) courses offered by selected universities and compare them with employers' requirements, it was shown that very few curricula met the actual expectations of employers (Wong, 2014).

Another study, which analysed 42 undergraduate logistics curricula offered by European universities, also showed clear differences in the approach to logistics education (Figures 3 and 4). The findings define the spectrum of logistics education in four clusters, ranging from "business administration" with little focus on most

specific logistics topics, through "interdisciplinary logistics management" and "modern transport management" to "logistics engineering" with a strong quantitative and technology approach. However, a problem remains that curriculum title does not always reflect actual profile. A typical title “logistics management” might in one case contain various engineering elements, but in another none at all (Niine, 2015).

Figure 3. *The contrasted curricula profiles in logistics education in Europe*



Source: *Nine, 2015, p. 4-11.*

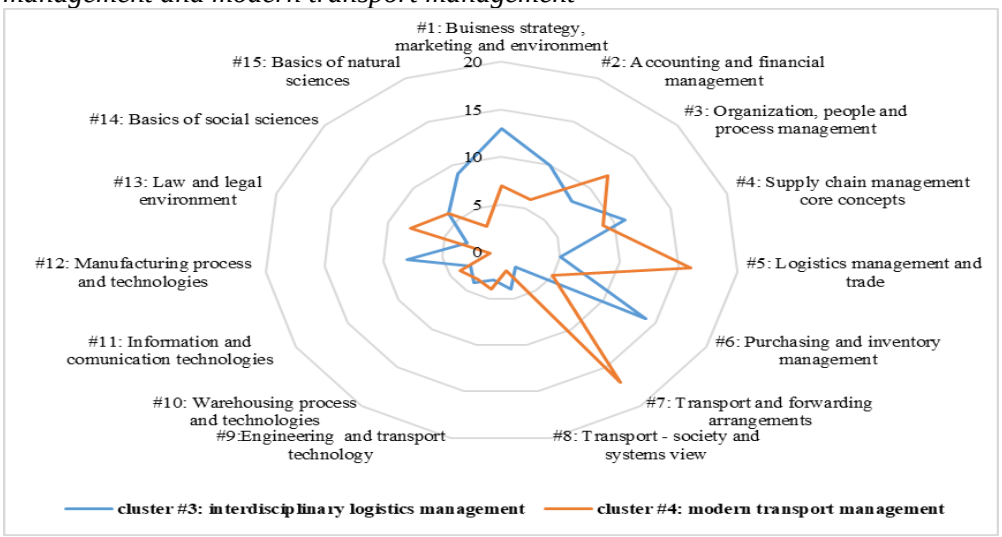
The results illustrate the diversity of approaches to logistics education at different universities. This is caused, on the one hand, by the local needs of the labour market, on the other hand, by the capabilities of a given university resulting from its profile and teaching potential. It is also influenced by the lack of clear standardisation. Only military universities have curriculum requirements for logistics education, but they have a national dimension. For both civilian and military education, it is necessary to constantly analyse the labor market in order to identify the competencies required of a logistics manager.

4. The Required Competencies of a Logistics’ Manager in the Civilian and Military Market

Currently, in the armed forces of most countries, about 60-70% of positions are provided for civilian employees. The situation is similar in multinational organisations (NATO, EU, UN) and their peace support or crisis response operations. Until recently, such positions were usually filled by former soldiers after completing education in logistics and management. Due to the reduction in the size

of the armed forces, people with civilian logistics education without knowledge of how military logistics systems work are increasingly applying for such positions. Such individuals are directed to training and courses to supplement their knowledge of military logistics. In turn, logistics officers in military academies, are primarily prepared to manage logistics processes and systems in the armed forces and to work with civilian companies in contracting. Given the nature of contemporary military supply chains and the current organisational structure of logistics in the armed forces, it is imperative that both military and civilian logistics executive personnel be adequately prepared.

Figure 4. *The contrasted curricula profiles in logistics of interdisciplinary logistics management and modern transport management*



Source: *Nine, 2015, p. 4-11.*

Most experts agree that the modern logistics manager should be prepared to manage the entire supply chain, not just the logistics processes (Erturgut and Soyúekerci, 2011). Thus, modern logistics managers are concerned with managing the flow of materials and information within an enterprise, supply chain, and supply network. The essence of supply chain management is properly implemented decision-making process with the synchronisation of physical, informational and financial demand and supply streams flowing between market participants in order to gain competitive advantage and create added value for the benefit of all its elements, customers and other stakeholders (Witkowski, 2010).

Analysing job offers for logistics manager, it is possible to determine the most commonly expected requirements for job candidates. The first and most important factor determining the interviews for people applying for the position of logistics manager is their education: logistics or economic, preferably complemented by postgraduate studies in logistics. Employers also pay special attention to the

previous work experience of the candidates – preferably several years in a managerial position related to a similar scope of responsibilities, for example (https://www.pracuj.pl/):

- supply chain operations experience (production, material planning; demand, inventory management);
- experience in managing a logistics department;
- experience in system and data management / analysis – SAP and Excel;
- practical knowledge of S&OP process and tool;
- practical knowledge of inventory management techniques (ABC, MOQ, EOQ, MRP parametrisation, safety stock vs reorder point);
- strong analytical skills;
- practical knowledge of Lean concepts and tools in respected field (Specifying Value, VSM, Product Flow, Customer Pull);
- project management experience;
- experience with green filed projects.

Military universities, while preparing logistics personnel, focus primarily on imparting knowledge on the management of military logistics processes. The qualifications in terms of knowledge, skills and competencies necessary for a logistics officer are defined in normative documents on military education standards for officer candidates (Decision, 2020). The most important competencies that a logistics officer (manager) candidate should meet include:

- knowledge of concepts and tools necessary to describe logistic issues;
- skills to manage logistic processes in military logistic systems;
- skills to implement logistic system solutions used in command of logistic subunits (units);
- skills to solve logistic problems using engineering methods and techniques;
- skills to use IT tools supporting logistic management, cost, finance and capital management in the environment of functioning and available systems within the supply chains of a military budget unit;
- skills to run projects, organise the work of task teams / working groups and use analytical methods.

The comparative analysis of competencies required from a logistics manager in the civilian and military market allows indicating the directions in which the offer of logistics education should develop. In addition to the typical managerial competencies and specialised knowledge, a modern manager is also required to have the ability to use modern IT tools to support the processes of planning, management and logistics design. Curricula at universities take into account these issues. However, they do not always "keep up" with the changes on the labour market. This applies especially to military universities, where the introduction of changes in the curricula is conditioned by an extensive legislative procedure. Therefore, it is

necessary to constantly analyse the needs of employers, study the labour market and cooperate with the socio-economic environment, both in the construction of educational programs as well as trainings and internships for students and entrusting the teaching of classes and workshops to experienced professionals from the industry. The basic forms of logistics education for the armed forces are:

- education of future officers in military universities for undergraduate and graduate studies;
- education of civilian logisticians on first and second degree studies at civilian universities majoring in military logistics
- postgraduate studies in military logistics for civilian and military logisticians
- specialised logistics courses.

The research conducted at the War Studies University on the directions of logistics education for the needs of the armed forces allowed for the preparation of a program offer that meets the current needs of the armed forces. Experts particularly stressed the need for postgraduate studies as an element of professional development of the staff. The development of personnel is a process aimed at increasing professional competence to the level required for the position and the full use of already possessed competence while performing tasks (Majewski, 2012). Such studies should be dedicated to logistics managers, both civilian and military officers, as a complement and update of existing know how. A prerequisite for the attractiveness of these studies would be frequent modification of the educational content and teaching by specialists from the logistics industry and the armed forces. As a result of the conducted study, subjects that should be included in the curriculum of postgraduate studies with a major in military logistics were proposed (Figure 5).

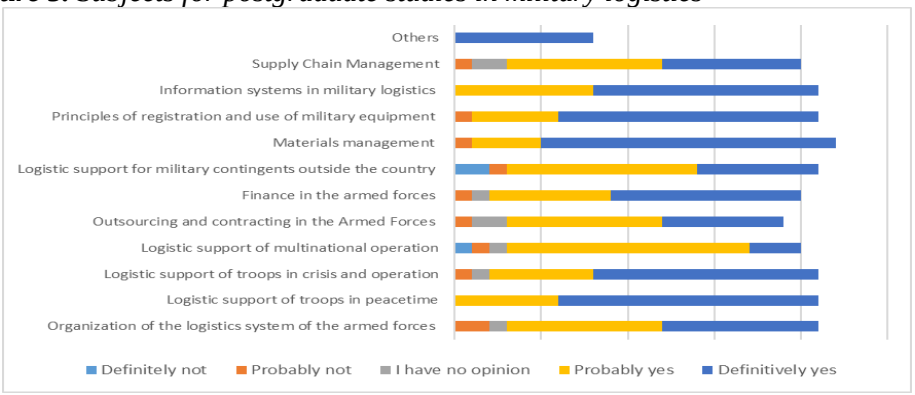
The most frequently selected subjects (knowledge areas) in the interviews are related to material management, principles of operation of military equipment, logistic support in times of peace, crisis and war, information systems in logistics, and military finance. The next most popular group includes: organisation of the logistic system of the Polish Armed Forces, supply chain management, logistic support of Polish Armed Forces and multinational operations, outsourcing in the armed forces. In addition, the respondents indicated areas outside those proposed in the interview questionnaire: public procurement law, tender procedures, acquisition and quality assurance of military equipment, logistics support during mobilisation, use of the ZWSI RON system. In another survey, experts emphasized the need to educate military logisticians in the area of supply chain management. This issue should be included primarily in the curricula of graduate and postgraduate studies, both at civilian and military universities.

5. Conclusions

Research conducted so far indicates that today's armed forces both during standard training and military operations are supplied through military and civilian supply

chains. Civil-military cooperation in the implementation of logistics tasks requires from logistics managers interdisciplinary knowledge and competence in effective management of military-civilian supply chains.

Figure 5. *Subjects for postgraduate studies in military logistics*



Source: *Own study.*

Military universities educating logistics officers focus on the issues of military logistic support, paying little attention to cooperation with civilian companies contracted to meet military needs. On the other hand, civilian universities educating logistics managers do not prepare them to cooperate with the logistics systems of the armed forces, and the armies very often act as the customers of logistics companies. Contemporary logistics manager in the armed forces should have knowledge in many areas of both military and civilian logistics and the resulting competencies necessary to manage modern military-civilian supply chains. The research generated suggestions for improving the military logistics manager education system, i.e:

- the offer of civilian studies for logistics should be expanded to include a major in military logistics containing issues on the organisation and operation of logistics systems and processes in the armed forces and military supply chains;
- issues concerning supply chain management should be introduced into the curricula of military studies;
- it is reasonable to introduce a postgraduate course offer with a major in military logistics which will enable logistics managers to deepen and refresh their knowledge;
- it is necessary to cooperate closely with the socio-economic environment, especially with logistics enterprises and armed forces logistics management bodies in order to adapt the educational offer to current needs.

This publication only partially illustrates the broad issue of preparing logistics executives to manage supply chains in the armed forces. Additional research should

seek to identify standards or minimum requirements that should be included in any education program dedicated to logistics managers.

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