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**Managing the Supply Chain of Medical Products in the Israeli Army
in Order to Improve the Performance of Medical Therapy in Army
Clinics**

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Abstract

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Abstract

The healthcare industry is largely based on decentralized supply chains, where quality and safety remain the cornerstones in delivering effective patient care. Managing the supply chain of medical equipment and medicines are essential in improving healthcare performance (Dobrzykowski et al., 2014). Similarly, within the military, the efficient procurement of medical supplies, their storage, and their distribution to end units for the use in medical treatments of military personnel are critical functions in ensuring the health and wellbeing of the men and women serving in the military and ensuring the combat readiness of the military. In Israel, where conscription to the military is compulsory for most young men and women, and where military personnel numbers 169,500 men and women, caring for the medical needs of personnel in the military is a complex task (International Institute for Strategic Studies, 2019).

This research examined the supply chain of medical equipment and medical items in the military, from their initial procurement until they are distributed for use at the small unit clinics in the field. The researcher used a mixed research method, both qualitative and quantitative, focusing in depth on the challenges involved in management of the medical military supply chain to ensuring a proper and effective supply of inventory to the military units. Although the study mainly addresses the existing situation in the Israeli Defense Forces and the U.S. military, the findings from the study provide valuable conclusions and several recommendations for improving the management of the medical supply chain for with inventory of medical equipment, medicines, and medical kits within most military systems.

Medical inventory which includes medical equipment, medicines, and medical kits is vital for the smooth functioning of military operations, both in regular times and during emergency situations, to maintain the readiness and operational competence of the military units to deal with every medical situation. The management of medical inventory poses its own set of challenges, including dealing with issues of short expiration dates and the need to regularly replace medical kits. The different aspects of managing medical inventory within the military are relevant globally as each military system attempts to develop the most efficient system for the procurement of medical equipment and medicines from the manufactures and its supply to the military clinics for distribution to the end consumer.

Similar practices are encountered in the management of medical inventory in hospitals within the healthcare environment and much research has been conducted in hospitals worldwide, which may be applicable to the operations involving medical inventory in the military. Volland et al., (2017) determined three categories in their review that are relevant for medical materials until they are used in the hospital. The first, supply and procurement, relates to the purchasing of the materials and encompasses all activities regarding hospital-supplier interaction. The second category involves inventory management. Inventory management includes inventory policy, inventory classification

schemes and location planning. Finally, the materials undergo distribution and scheduling (Volland et al., 2017).

The researcher considers that the issue of proper management in an army unit is a central issue and can lead to operational incompetence in military units and cause poor treatment for the army soldiers if it's not properly handled.

The researcher chose this topic out of what he has encountered during his years of service in the Israel Defense Forces (IDF) and he wanted to improve some of the following problems such as; deficiency of medical stock supply, deficiency of medical management in the army units, deficiency of medical equipment renewal that almost never happens on time.

The management of inventory in clinics and warehouses of military medical equipment is a complex issue with many aspects, such as: a) Inventory has a cost, which is expressed in interest that should be paid on the price of the inventory, expenses for holding the inventory (e.g., required storage space), and more; b) The inventory may become invalid on the shelf and lose its value due to renewal of the pharmaceutical product or military medical equipment or due to its limited time of existence or periodic testing of the medical equipment; c) Too low an inventory may disrupt the operation of the Corps clinics, due to an inability to respond to the demands of soldiers and operational units; d) Inventory is a crucial factor in the organization's financial activity; e) There is import tax for imported inventory, for this purpose there is a bonded warehouse - a license shortage from the import tax authority in which goods are stored that will be paid only after the inventory is released for distribution; f) Inventory maintenance and management are an important part of managing a business that stores an inventory of goods and raw materials.

The research will discuss various issues related to managing the supply chain of medical equipment for military hospitals based on various multiple stakeholders goals and interests. It will discuss issues such as: a) The accuracy of inventory management and its influence on the end-user units of the field and operational competence of the operational units; b) The way of determining the supply of inventory and planning the consumed quantities; c). Examining the compatibility of the Kanban method and how we can use it in the supply and centers and in the units; d) Identify various ways how to cope with urgent and operational requests and the method of supply and influence The research questions formulated by the researcher are the following.

The first research question is how to improve the supply chain system for medical products and equipment in the Israeli military? The second question is which are the ways to improve the management of the supply chain system for medical products and equipment in the Israeli military? Third research question is the following: Which is the relation between the efficiency of the management of the supply networks for medical products and the way medical equipment is distributed to military clinics? The fourth research question is the following: Which is the relation between the changes that have taken place in the supply chains for medical products and the way medical equipment is distributed to military clinics in IDF?

Chapter 1. Introduction: The purpose of the introductory chapter is to provide the background to the study and to provide a justification for pursuing the issue of managing the supply chain of medical equipment and medical items in the military, focusing on the Israel Defense Force, beginning from procurement until these items are distributed for use at the small unit clinics in the field.. The research problem, research goal, objectives, and main research question are outlined in this chapter, in addition to the need for research, its framework, and its contributions to knowledge. Next, a brief reference is made to the research methodology (qualitative and quantitative).

Chapter 2. Literature review related to supply chain management in civilian and military organizations contains the review of the literature on supply chain and inventory, supply chain management which includes the following: definitions of supply chain, definitions of corporate culture, the key types and components of the supply chain, definitions of supply chain management (SCM), the medical supply chain on the civilian and military, their characteristics and differences The chapter discusses the military supply chain and logistics, mainly the medical items military supply chain in the the case of case of the US military forces, Department of Defense (DoD), in the case of the North Atlantic Treaty Organization (NATO) and focuses mainly on the case of the Israel Defense Force (IDF)

There are several definitions of the concept of supply chain. According to the definition given by Little (1999) a supply chain is “the combined and coordinated flows of goods from origin to final destination, also the information flows that are linked with it”. The definition of Chow &Heaver (2004) focuses on the entities which are involved in a value chain which “is the group of manufacturers, suppliers, distributors, retailers and transportation, information and other logistics management service providers that are engaged in providing goods to consumers”. Consequently, the researcher opinion is that a supply chain is adding value to a product by transporting it from one location to another, including the possible transformation of the product.

There are number of supply chain models we have identified. First, there is the SCOM model (supply chain and operations management) (Ivanov et al., 2017), having as key components: sourcing, production, distribution and after sales. These key elements are kept aligned by the management at every planning level strategic, tactical planning level and operational and execution. The second model is the Supply Chain Operations Reference (SCOR model) which consists of the following processes: planning, acquisition, make, delivery and return (APICS, 2017). A different view is taken by the Global Supply Chain Forum model (GSCF). According to this model the supply chain consists of three essential parts: first, supply chain network structure; second, supply chain business processes; and third, supply chain management components.

From the perspective of an organization function, supply chain concerns the management and synchronizing of three flows, namely the product flow from suppliers to final customers, the financial flow of money from customers to suppliers, and the information flow connecting suppliers and customers (Kochak and Sharma 2015; Li and Liu 2019).

The whole process of Supply Chain Management (SCM) is focused on the delivery of the right products or services, in the right quantity, to the right place, at the right time, and with the minimum costs. The first phase is to develop a clear and profound understanding of the current and future needs of their customers. This is an ongoing process because customer needs are dynamic.

The Council of Supply Chain Management Professionals defines supply chain management to be “the planning and management of all activities involved in sourcing, procurement, conversion, and logistics management. It also includes the crucial components of coordination and collaboration with channel partners, which can be suppliers, intermediaries, third-party service providers, and customers” (Lee et al., 2011, page 1195).

The supply chain for the military is composed of supplier organizations, by procurement activities, by manufacturing (in some specific cases), by order management, by transportation and warehousing activities, and by soldiers, who are its customers.

There are differences mainly because external factors influencing military supply chain are specific, such as the fact that the soldier needs represent the number one factor. Soldiers who are fighting a war are dependent of the continuous support to accomplish their specific war mission. The smallest failure to do so is putting their lives, their health and also their fighting mission at high risk.

In the medical supply chain in the military, the stakeholders would be the suppliers, the warehouse staff, and the military inspectors, military clinic management personnel and the military medical staff, who would all be involved in some stage of the ordering and managing of medical inventory needed in the clinics and on the battlefield. In conclusion, in the medical supply chain for military there are two major categories of stakeholders: military and non- military. Each one has its specific characteristics, while the military must obey military discipline.

In the military, the goal of the supply chain is to satisfy the requirements of the military missions, by providing maximum supply support to ensure the maximum military field capability (Zanjirani et al., 2009). For the medical military supply chains, the main goal is to achieve maximum effectiveness, that is to improve the quality of healthcare services provided to the military personnel (Kwon et al., 2016).

The specificity of the military healthcare supply chain management consists of the fact that its main aim is to provide constantly a high-level quality healthcare since patients in the military healthcare activities are soldiers and other military personnel, who are paramount to maintaining a high level readiness for executing their mission both in times of peace and war.

There are three systems which usually are used in practice for the distribution of medical supplies in hospitals. The first, and mostly used by hospitals is the multi-level inventory type system. Suppliers deliver the needed medical supplies directly to a central warehouse. Next, the medical supplies are distributed from the central warehouse to end-locations which are close to patient care facilities. The end-point locations are managed as point-of-use inventories, from where the medical supplies are delivered to the medical care giving process to people in need of treatment or medical assistance. The semi-direct delivery system is the second type of supply distribution system. In this system, the suppliers deliver the medical supplies directly to the point-of-use locations where they are directly used to provide healthcare to patients. The third type of medical supply system, the direct delivery type consists of the supplier to supply directly to the point-of-use location and, thus being responsible for responding to the demands of the healthcare provider (Volland, et al., 2017).

In the NATO alliance, Chapter 16 “Medical support” of the Logistics handbook states that “the mission of the medical services of the Alliance can perhaps best be expressed as To Preserve The Fighting

Strength. They have a dual responsibility, in that they owe the individual patient the best possible care while they owe the commanders their best efforts to ensure that the unit personnel are physically and mentally able to carry out the military mission” page 1602, [NATO Logistics Handbook: Chapter 16: Medical Support](#) . In order to fulfill this dual responsibility the following services are provided: “preventive medicine, clinical care (outpatient and in-hospital), evacuation, dental support, mental health support, and required support services such as laboratory and medical supply.” page 1602, [NATO Logistics Handbook: Chapter 16: Medical Support](#)

The logistics for the Department of Defense (DoD) and the U.S. military forces have been managed by the Defense Logistics Agency (DLA). Under the DLA’s control are approximately 5 million items. Eight supply chains have been used to manage these items (Haraburda, 2016). Managing the required medical supplies and equipment for the use by the military is also a responsibility of the DLA.

In Israel, Israel Defense Force (IDF) has been given responsibility for receiving the supplies and equipment and for managing the inventory. The Ministry of Defense has dealt with the procurement itself, including the selection of suppliers, the preparation of contracts and the payment to the suppliers through the Finance department (Tachnai, 2017). The Technological and Logistics Directorate is a directorate in the General Staff. The main responsibilities of the directorate are the coordination of multi-agency logistics in order to enable the IDF to continuously fighting on land, air, and sea on a daily basis and in situations of emergencies. The Technological and Logistics Directorate is organized in three departments called “corps”: the Logistics Corps, the Medical Corps and the Ordnance Corps.

Currently, the supply chain in the IDF is referred to as a logistic network, which is different to the traditional supply chain since it relies on several suppliers and the dispersion of production over several sites. The main differences can be distinguished by relating to three central aspects of logistics. These aspects include first, the planning and control, second, management of cooperation between the units, and third, the switch from an efficient logistics management approach to an efficient supply chain approach.

Chapter 3, “The research methodology”, presents the research approach: goals, research questions and hypotheses, and research instruments both for qualitative and quantitative approach.

The main research goals are described next. The first research goal is to identify proper inventory management in all army units and in the replenishment section, and regular and calculated as required military medical equipment supply. The second research goal is to examine in depth the source of the problem of the supply of standard and efficient military medical equipment supply to military units. The third research goal is to examine the supply chain of the medications and the medical equipment, from the procurement step to the supply to the end-user units. The fourth research goal is to explore the problem of a proper and timely refresh of the all equipment, both in regular and emergency situations, to improve the preparedness and operational competence of the army units. The fifth research goal is to examine the method of streamlining the management, supply, and replenishment of the entire army.

The researcher has formulated 8 main hypotheses and 22 sub hypotheses, referring to the research goals.

For the qualitative research, the researcher developed two open-ended questionnaires, They were prepared to be used in one-on-one interviews with different categories of personnel dealing with the

supply of military materials in the Israel Defense Forces. Twenty-two participants responded to the open-ended questionnaire nr. 1 during their interviews. Two additional in-depth interviews using qualitative Questionnaire nr. 2 were conducted with commissioned officers in the military. For the quantitative research 100 participants completed a structured questionnaire which provided data used for the validation or rejection of the formulated hypothesis.

To enable the quantitative analysis, the researcher developed a questionnaire for distribution amongst military personnel and the management of the military warehouses. The questionnaire consists of 17 statements, assessed based on a Likert scale from 1 to 5. Of the 17 statements included in the questionnaire, 3 statements examine the distribution of medical equipment to the clinics, 4 statements relate to actions for improving the supply chain system, 3 statements relate to the management of supply chains for medical products, and 7 statements relate to changes occurring in the supply chains for medical products.

The responses to the questionnaires underwent quantitative analysis, such as statistical tests for validation of the questionnaire, Pearson correlation analysis, T test and ANOVA test. The data processing in this research requires that all data be collected from a medical equipment center, from the General Staff Headquarters, suppliers, and end-users in the army. The use of data is carried out in accordance with the information security guidelines without causing any harm or the disclosure of essential information.

Chapter 4 presents the results of the qualitative research, about the structure of the sample, results about stocks and suppliers, about changes in the medical military supply chain management, drivers and obstacles, about the performance of medical therapy in army clinics, about the criteria affecting the provision of the medical care in the military and the suggestions formulated by respondents for changes to the medical military supply chain management.

Chapter 5 presents the results of the quantitative research, about the structure of the sample and the results for each of the eight hypotheses and twenty two sub hypothesis formulated and their validation or rejection.

In **chapter 6, Discussion of results**, the researcher discusses the qualitative and quantitative results, related to the main research questions. The Israeli military has been using an effective system of logistics to ensure that inventory stored in warehouses is available for use when needed in the end unit. To fulfill the need for transferring inventory, transportation systems are in place to move inventory from the logistic centers to local warehouses. In addition, computerized systems have been used to control the management of the transportation of equipment and supplies.

The way the medical equipment is distributed to clinics is shown by results to strongly influence the effectiveness of the supply chain system, and several factors involved in supply chain management were examined for their likely effect on medical supply distribution. The perception of respondents was that a positive relationship with the providers drives the supply of medical supplies directly to the clinics and is expected to lead to improvements in supply chain management, limiting the need for other agents to be involved in medical supply distribution.

In this study, the number of suppliers was perceived by the respondents as an influencing factor, with a reduction in the number of suppliers leading to supplies being delivered to central warehouses, which then necessitated distribution to secondary warehouses and their storage until use. Furthermore, the participants perceived that reducing the inventory itself is likely to lead to the medical supplies to be received by a central warehouse, followed by distribution directly to the clinics.

A questionnaire was used to examine the respondents' perceptions of the efficiency of the management of medical supply chains in the military using the three possible options for the distribution of medical supplies to the medical clinics. When the examination of supplies being directly delivered to the medical clinics by the suppliers was conducted, the correlation with observed efficiency was significant. Not only was efficiency improved, but in addition the introduction of supply chain management technologies had the potential to improve the management of supply chains where the medical supplies were distributed directly to the medical clinics by the suppliers.

For the second option of medical supply distribution, whereby the medical supplies are transferred to the central warehouse and then directly distributed to the clinics, efficiency is perceived to be improved but to a lesser extent. Introduction of supply chain management technologies was also found to positively influence the supply chain management process. However, indications of efficiency of supply chain management when the option of transferring the medical supplies to a central warehouse, from where they would be distributed to secondary warehouses and stored until needed by the medical clinics were examined and were not found to be significant.

Despite the different positions held by the personnel dealing with supply chain management, the differences in the perceptions of personnel holding different positions in the military about the way that medical supplies are distributed in the military were not significant. The warehouse managers and operations managers were more likely to believe that medical supplies were distributed directly to the medical clinics by the suppliers than their colleagues holding positions such as clinic managers or unit commanders, but these differences were limited. The unit commanders thus are more likely to believe, by a small margin, that medical supplies are transferred to a central warehouse and then distributed to secondary warehouses and stored until needed in the medical clinics.

In **chapter 7, Conclusions and recommendations**, the final chapter, the researcher formulates detailed conclusions based on the results of the qualitative and quantitative research, formulates several recommendations for the improvement of the supply chain management of IDF, discusses the limits of his research and formulates future research directions.

The researcher has formulated 8 main hypotheses and 22 sub hypotheses, presented in table 1, below. The results of the research validated one main hypothesis (H1), partially validated two main hypothesis (H2 and H5) and rejected five main hypotheses (H3, H4, H6, H7 and H8). For the 22 sub hypotheses, 5 were validated, 5 partially validated and 12 rejected.

Table 1. Synthesis of the validation of formulated hypotheses

Nr.	Hypothesis	Status
H1	There is a link between the steps to be taken to improve the supply chain system and how medical equipment is distributed to clinics.	VALIDATED
H1A	There is a correlation between the type of supply chain that transfers medical supplies directly from suppliers to military medical clinics and the need to improve the relationships with the medical items suppliers.	VALIDATED
H1B	There is a correlation between the type of supply chain that transfers medical items from suppliers to a central warehouse followed by distributing them to secondary warehouses to be stored until they will be required by military medical clinics and the need to reduce the number of medical items suppliers.	VALIDATED
H1C	There is a correlation between the type of supply chain that transfers medical items from suppliers to a central warehouse followed by distributing them directly to military clinics when they will be required and the need to reduce the medical inventory.	VALIDATED
H2	There are correlations between the efficiency of the management of the supply networks for medical products and the three types of medical supply chain.	PARTIALLY VALIDATED
H2A	There is a connection between the efficiency of the management of the supply networks for medical products and the type of the medical supply chain to through which medical equipment and medical items are distributed from suppliers directly to military clinics so that the efficiency of the management of the supply networks will increase.	VALIDATED
H2B	There is a correlation between the efficiency of the management of the supply networks for medical products and the type of supply chain that transfers medical items from suppliers to a central warehouse followed by distributing them to secondary warehouses to be stored until they will be required by military medical clinics so that the efficiency of the management of the supply chain will increase.	REJECTED
H2C	There is a correlation between the the efficiency of the management of the supply networks for medical products and the type of supply chain that transfers medical items from suppliers to a central warehouse followed by distributing them directly to military clinics when they will be required by military medical clinics so that the efficiency of the management of the supply chain will increase.	VALIDATED
H3	There is a correlation between the results of changes that have taken place in the supply chains for medical products and the three types of medical supply chain.	REJECTED
H4	Differences will be found between the current role of the respondents (warehouse manager, operations manager, clinic manager or unit commander) about the types of medical supply chain.	REJECTED

H5	Gender differences will be found in the respondents' opinions regarding the distribution of medical equipment to clinics, the steps to be taken to improve the medical supply chain system, the management of supply chains for medical products and a description of changes that have taken place in the supply chains for medical products.	PARTIALLY VALIDATED
H5A	Gender differences will be found in the respondents' opinions regarding the supply chain types of distribution of medical equipment to medical clinics.	PARTIALLY VALIDATED
H5B	Gender differences will be found in the subjects' opinions regarding the steps to be taken to improve the medical supply chain system.”	REJECTED
H5C	Gender differences will be found in the subjects' opinions regarding the management of supply chains for medical products.	VALIDATED
H5D	Gender differences will be found in the subjects' opinions regarding the description of changes that have taken place in the supply chains for medical products.	REJECTED
H6	Differences will be found according to age in the respondents' opinions regarding how medical equipment is distributed to medical clinics, the steps to be taken to improve the medical supply chain system, management of supply chains for medical products and a description of changes that have taken place in the supply chains for medical products.	REJECTED
H6A	Differences according to age will be found in the subjects' opinions regarding the supply chain types of distribution of medical equipment to military clinics	REJECTED
H6B	Differences according to age will be found in the subjects' opinions regarding the steps to be taken to improve the medical supply chain system.	PARTIALLY VALIDATED
H6C	Differences according to age will be found in the subjects' opinions regarding the management of supply chains for medical products.	REJECTED
H6D	Differences according to age will be found in the subjects' opinions regarding the description of changes that have taken place in the supply chains for medical products.	REJECTED
H7	Differences will be found according to education in the respondents' opinions regarding how medical equipment is distributed to clinics, the steps to be taken to improve the medical supply chain system, management of supply chains for medical products and description of changes that have taken place in the supply chains for medical products.	REJECTED
H7A	Differences according to level of education will be found in the subjects' opinions regarding the supply chain types of distribution of medical equipment to military clinics.	PARTIALLY VALIDATED
H7B	Differences according to level of education will be found in the subjects' opinions regarding the steps to be taken to improve the medical supply chain system.”	REJECTED

H7C	Differences according to level of education will be found in the subjects' opinions regarding the management of supply chains for medical products.	REJECTED
H7D	Differences according to education will be found in the subjects' opinions regarding the description of changes that have taken place in the supply chains for medical products.	REJECTED
H8	Differences will be found according to the type of service (regular or permanent) in the respondents' opinions regarding how medical equipment is distributed to clinics, the steps to be taken to improve the medical supply chain system, management of supply chains for medical products and description of changes in supply chains for medical products.	REJECTED
H8A	Differences according to the type of service will be found in the subjects' opinions regarding the supply chain types of distribution of medical equipment to military clinics.	PARTIALLY VALIDATED
H8B	Differences according to the type of service will be found in the subjects' opinions regarding the steps to be taken to improve the medical supply chain system.	REJECTED
H8C	Differences according to the type of service will be found in the subjects' opinions regarding the management of supply chains for medical products.	REJECTED
H8D	Differences according to the type of service will be found in the subjects' opinions regarding the description of changes that have taken place in the supply chains for medical products.	REJECTED

The researcher opinion is that all the three major types of supply chain should be used for medical items. The decision about which one is the most appropriate should be based on various criteria each one having allocated a coefficient of importance correlated with the fulfillment of the medical supply chain to ensure the maintenance of the combat capacity and combat readiness of each military unit of the IDF.

Another conclusion is that a significant change to military medical supply chain management has occurred over the last two to three years in Israeli Defense Forces with changes in the information technology system used for supply chain management. The Systems Applications and Products in Data Processing (SAP) is a software used for organizational management consisting of integrated modules that enable the flow of data through the organization. The Israel military initiated a transfer to the use of SAP for managing the medical supplies in the military. Other automated technologies are being developed and implemented for use in supply chain management.

The study has shown that attention should be focused on the way the medical supplies are distributed to the clinics and on the factors that can influence the efficiency of the supply chain distribution. The researcher has shown that factors such as the type of relationship with providers, the number of suppliers and the amount of inventory items that are distributed along the medical supply chain are the major factors which are affecting the efficiency of the medical supply distribution of the IDF.

Changes in the information technology system used for the military medical supply chain management together with the changes happening to the physical locations of the supply centers, represent a major change in the management of the military medical supply chain has occurred over the last two to three years. The Israeli military has been implementing a software the Systems Applications and Products in Data Processing (SAP). This is a software used for organizational management consisting of integrated modules that enable the flow of data through the organization. The Israel military initiated the process of changing from the previous multiple information systems to the use of the SAP for managing the medical supplies in the military.

7.2. Recommendations

The first recommendation is the introduction of independent delivery methods, where the medical units work directly with the manufacturer of the medical supplies to manage and monitor their supplies. Under these conditions, to be able to maintain readiness for all types of emergency situations that may arise in the military, the General Staff would need to maintain an inventory of medical equipment and medicines that could provide a response in an emergency, like a war or national disaster. Also, is needed to improve warehousing and management of inventory, and to optimize the transportation and distribution of medical items.

Another recommendation is to introduce independent procurement of medical equipment for the special units by allowing them to work directly with the medical suppliers. The third recommendation is to undertake the adjustment of the work processes in the medical supply chain because it represents an integral part of getting the best performance from using these technologies in the daily work of personnel involved in the supply chain.

The researcher recommends for the IDF and its logistics units to increase the number of suppliers for medical items, medical equipment and medicines. The goal is to ensure the availability of medical items and medicines at any given moment,

The researcher recommends developing, integrating, and continuously analyzing their medical supply strategy. The efficient performance of medical therapy in the IDF military clinics depends on the accessibility to adequate medical supplies in army clinics, and adequate supply of medical supplies to the forces in the field and the need for them to be in a constant state of battle readiness.

Therefore, the researcher recommends implementing strategic management and strategic leadership of the whole medical supply chain, managing suppliers, sharing of information and technology across the medical supply chain participants, and implement customer relationship management approach and practices.

A very important recommendation is to continue to add new technological instruments based on using specialized supply chain management software to improve the efficiency, the speed and the in-time delivery of the medical supply chain management. This is crucial to executing the mission of the medical military supply chain management that is to care for the health of military personnel and soldiers to maintain the combat readiness.

Another recommendation is to continue to implement the suggestions about making the changes of the SAP system to simplify its functioning and ensure a smooth operability of the medical supply chain.

Another recommendation is to organize and deliver effective training of all the personnel involved to use the new and existing systems when considering the implementation of new technologies in a setting where the personnel are of different ages and with different levels of education. Appropriate training must be carried out for the professionals who will oversee the management of the medical inventory, in dispensing and managing medical drugs and medical equipment.

The researcher recommends giving greater independence for the military clinics to manage their inventory and to be able to withdraw medical supplies directly from the suppliers.

Another recommendation is for managers of the medical supply chain to implement performance management and continuously update set key performance indicators related to the functionality, effectiveness and efficiency of the medical supply chain.

Future research directions

A deeper understanding of the key factors that affect the supply chain management of medical supplies in the military may assist with the planning and implementation of modern technologies and lean and agile processes that could be expected to increase the efficiency of managing supply chains of medical supplies in the military setting. Future research could focus in greater depth on the criteria relevant to the military medical clinics, like the accessibility of supplies, the readiness of the military medical clinics, the quality of medical treatment and the cost of maintaining inventory, and which are criteria that affect the required changes to improve the supply chain management in the military.