

Review About Military-Civil Integration and Distribution

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ABSTRACT

The urgent need of emergency logistics distribution under the epidemic situation has promoted the urgency and necessity of military-civil integration, especially in major public health events. Existing studies mainly focus on the distribution organization, distribution service, distribution mode, distribution central location and other aspects of military-civil integration, but the theoretical framework of each influencing factor is not clear, and the participants and distribution path of military-civil integration need to be further studied. On the basis of reviewing the existing studies at home and abroad, this paper summarizes the distribution research framework under the background of military-civil integration, so as to guide the effective implementation of military-civil integration distribution under the background of China.

Keywords: *Military-civil integration, Distribution, Logistics, Innovation distribution path.*

1. INTRODUCTION

Although military-civil integration has been introduced into China's scope of logistics development, in fact its development is still in the introduction stage, it is relatively immature. In general, the mode of military-civil integration was similar to that of some logistics together to work for one thing, allocating resources, but it often occurs confusion, for example bringing wrong contacts or delayed delivery. In the face of the COVID-2019 epidemic in 2020, due to the lack of emergency supplies such as masks and medicines, military-civil integration is extremely urgent. In particular, the demand for peacetime services and combat services cannot be met in a timely manner. Therefore, military-civil integration still needs more attention from scholars. So far, the number of the researches about military-civil integration was really not enough. The integration of military and civilian is a major feature of the development of collaborative distribution under China's national conditions [1]. Based on the context of China, the problem of the military-civil integration still exists. For example, the partial policies maybe not meet the real needs, especially for the civil logistics, for the reason that the logistics company needs to survive, they need to develop economic values. In fact, there are not enough subsidies for special cases, for example in COVID-2019. In

recently, the military-civil integration has attracted the attention of the masses and scholars, much more studies about how to develop military-civil integration come out.

However, the existing researches mostly focused on the analysis of influencing factors, the exploration of distribution system, the conceptual analysis of distribution mode and the construction of models, and the hot research direction and overall framework of military-civil integration remain to be clarified. Therefore, based on literature review, this paper searched CNKI database, and a total of 60 literatures were retrieved. Through systematic literature review, the distribution research path under the background of military-civil integration is obtained, so as to guide the development and research direction of military-civil integration distribution under China's national conditions.

2. SEARCH CRITERIA AND SOURCE

Military and civilian integration and distribution can be said to be one of the characteristics of China's emergency logistics. Based on CNKI, this study selected the inspection method with the title = "military and civil integration" or/and "logistics" or "distribution", and retrieved a total of 60 pieces of journal articles, as shown in Figure 1. It can be seen from Figure 1 that

since the concept of military-civil integration distribution was proposed earlier in 2008, its development has been relatively stable. Until 2015, studies on military-civil integration distribution showed a straight upward trend, and peaked in 2018, and then showed a downward trend. This indicates that the articles can objectively reflect the hot spots and trends of the research on military-civil integration distribution by studying the journal literature in the recent three years, especially in 2018. There were 15 pieces of journal articles had been published in 2018.



Figure 1 Statistical literature

The author was authorized to download 60 pieces of articles to the detailed reading, by searching the journal title in this year on military-civil integration distribution related research mainly focused on the following aspects: current situation of the development of military-civil integration, logistics, distribution logistics system construction guarantee mechanism, building military-civil integration system, transportation service procurement, coordination mechanism, logistics command system, distribution system construction standard construction, etc [2]. In addition, through systematic sorting of text contents, it is found that studies on military-civil integration distribution focus on distribution organization, distribution service, distribution mode, central location and other contents. From Figure 1, the number of articles which had been published in 2018 was maximal, the focus on military-civil integration can be thought as in 2018. So, this study will focus on the intensive reading of journal papers published in the peak period of 2018, and extract the core of journal papers published in 2019 and 2020, in an attempt to explore the research path of integrated military-civil logistics distribution [3]. In addition, the research sites of the remaining years are analysed to support the results obtained from the data analysis of 2018.

The literature in 2018 was retrieved, and the co-word network information in Table 1 was obtained. From Table 1, except keywords distribution, military logistics, civil logistics, we find that logistics system construction was cited 12 times by scholars, and then style of integration, logistics support, logistics standard, distribution network. It can indicate that in the research process of military-civil integration distribution, these five keywords had been widely concerned by scholars. They may be the research hotspots, or research trends,

or actual problems that scholars tent to do studies about military-civil integration. These findings will contribute to the innovation path of military-civil integration. What's more, We have made statistics on the cited times of literatures. Table 2 lists the top five literatures with cited times by performing authors and year. By looking for the theme, we found that experiences of the other countries in world developing military-civil integration gave us many directions about researching this theme [4]. The next articles mainly researched about mode of military-civil integration and logistics network construction. Scholars had suggested us to construct he logistics system by considering theoretical and practical needs [5]. The mode of world military-civil integration had referred four styles, including military helped civilian, military as a leader and civilian as a follower, civilian helped military, military and civilian distributed together and mutually [4]. These findings brought theoretical basis for the innovation path of military-civil integration. The details about these findings were shown from subsection 2.1 to subsection 2.4.

Table 1. Top five keywords co-citation

No	Keywords	Frequency
1	Logistics system construction	12
2	Style of integration	8
3	Logistics support	6
4	Logistics standard	3
5	Distribution network	3

Table 2. Top five references co-citation

No	References	Frequency
1	Chengmou Zhao, et al. [1]	181
2	Runxia Wang [5]	122
3	Guangrong You [6]	111
4	Jihai Zhang, et al. [7]	79
5	Jiaxi Wang, 2007 [8]	74

2.1. Distribution Organization

Exist in the military-civil integration of many participants, including the military and civilian integration of emergency logistics, local logistics and military logistics departments etc, through the construction of information platform for the transmission of information, goods distribution, the source of the goods involved emergency supplies national, local emergency stockpile and the army,

military and civilian capacity resource, etc. [8]. In addition, rations, clothing, lubricants and lubricants, tents, vehicle chassis, cables and other tools are needed by the military, and the timely supply of each material category corresponds to a department. Therefore, distribution procurement services also include procurement agencies, after-sales departments and so on. In addition, the government has played an indelible role in the process of military-civil integration, providing appropriate policies for military-civil integration to ensure the continuation of cooperation [10]. As a participant, the government can plan logistics infrastructure construction, traffic network layout, etc., and provide convenient conditions for military-civil integration and collaborative distribution through macro-logistics regulation. By analysing the construction of distribution organization, the distribution operation points behind it are explored, including army troops, battle warehouses, distribution centrals, logistics enterprises, army equipment repair plants, equipment production factories, equipment receiving units [11,12].

2.2. Distribution Service

Figures and tables should be placed either at the top or bottom of the page and close to the text referring to them if possible. The service scope of military-civil integration includes train distribution, army truck distribution and air distribution [11,13]. The military-civilian integration process includes military service procurement, including numerous service procurement activities such as conference, training, reception, research and development, printing, publishing, insurance, leasing, property management, personnel agency [14], such as whole-process outsourcing and sector-stage outsourcing. In the process of military material procurement, open bidding, inviting bidding, competitive negotiation, single-source procurement, inquiry procurement, etc. can be adopted. In order to fully realize the quality of distribution services, scholars Geng and Xie had analysed the influencing factors of military-civilian integration distribution, and applied balanced score card to achieve strategic management and organizational performance assessment, it provided ideas and basis for military-civilian further better cooperation [15]. What ' s more, distribution organization together constructed an appropriate logistics information system which promotes to develop military-civilian integration [10], just like logistics information technology applying to Internet of Things technology and 5G communication technology.

2.3. Distribution Mode

The integration of military and civilian distribution activities cannot be carried out without long-distance transport activities. The distribution transport service

requires all kinds of unnecessary transport resources, including multimodal transport, such as water road to road transport, railway to road transport, air to road transport, etc., and even direct air transport (such as the delivery of emergency supplies for unmanned aerial vehicle, UAV) [14]. Distribution routes act on railways, waterways, highways and aviation. According to the characteristics of military-civil integrated emergency logistics distribution, it is necessary to design a distribution mode combining peacetime and wartime [11].

According to the current situation of China's logistics enterprises, combining with the development situation of military-civil integration, can be summarized as five kinds of logistics distribution mode [9,14], including local dominant military collaborative distribution mode and the military where collaborative distribution mode, integration of military and civilian integration distribution model, the independent distribution, local logistics company or professional transport enterprises separate direct distribution, etc. Military-civil integration of integrated distribution mode is by the military and local concentration of resources, capital, human common emergency distribution [8], suitable for most cases of emergency logistics demand, such as natural disasters emergency logistics distribution (water, food, etc.), anti-terrorism stability emergency logistics distribution (drugs, articles for daily use, etc.), the public health event emergency logistics distribution (mask, isolation device, etc.).

2.4. Location of Distribution Nodes

Different distribution modes involve different nodes, such as equipment suppliers, equipment distribution centrals, army units and other sites, which directly affect the efficiency of distribution [11]. Military-civil integration distribution is characterized by practice can be decided based on the integer linear programming model and with the minimum total network mileage as the core [13]. According to the characteristics of military-civil integrated distribution, the location of distribution centrals should be closely combined with the actual demand, and three demand points (such as troop stationing area), two demand points (such as natural disaster-prone area), and one demand point (other material distribution demand area) should be considered [13]. Like other types of distribution central site selection, the distribution central under the background of military-civil integration still needs to consider its service radius, service scope, economies of scale and investment cost, and strive to achieve low cost and high efficiency. For example, the timeliness of distribution, the amount of material distributed, and the location of distribution are relatively special compared with other logistics. These are worthy of more attention for military and civilian, and government.

3. INNOVATION DISTRIBUTION PATH

Compared with other industries, military-civilian integrated distribution logistics is a special form of logistics, which mainly deals with the material distribution needs of emergencies occurring in countries and regions. Because of the particularity of demand, higher requirements are put forward for the work efficiency of logistics.

When facing national or regional emergencies, it is urgent to mobilize a batch of military supplies to relieve the pressing need of military logistics. To realize the timely supply of goods and materials through the collection of civil products and materials. Now, the integration of military and civilian distribution is required. How to meet the needs of military emergency material distribution while ensuring the current operation of enterprises poses a challenge to the integration of military and civilian, because enterprises have to consider its develop and survival.

In order to deal with the distribution of emergency supplies in emergencies, especially public health emergencies, military logistics and local logistics have carried out active cooperation, mainly in the form of collaborative distribution. In the emergency logistics distribution process, it is recommended that all personnel participate. Based on the consideration of distribution cost and distribution efficiency, the theoretical framework designed at this stage fully considers the preconditions of peacetime development and wartime emergency [16-18]. Taking land transportation as an example, the main design of the distribution strategy is as follows, as shown in Figure 2.

(1) Peacetime development. Guided by the government and taking local regions as units, military administrative personnel should be organized to visit various regions to learn about the production and operation capabilities of local logistics enterprises and local material suppliers, and conduct objective research. In addition, it is suggested that the local government give a certain proportion of policy subsidies to local logistics enterprises and suppliers that participate in military-civil integration, so as to encourage each enterprise to realize social value and meet social demand.

(2) Emergency response in wartime. When one side is in trouble, help comes from all directions. In the face of emergencies, especially major public health events such as COVID-19, local logistics companies must provide material support to military logistics, such as food and protective equipment. Whether the logistics supply is in place is directly related to the operational benefits of the military in wartime. Time is tight, and timely supply can reduce the huge losses to the minimum. The supply force of a logistics enterprise may not be enough to realize the huge demand for materials

in an emergency, which forces local logistics enterprises to unite and cooperate. For example, according to the investigation of various enterprises in peacetime, the government will make statistics on the list of enterprises with prominent development in procurement, production and logistics, and their operation capacity, and timely dispatch according to military logistics requirements, including transportation equipment, loading, unloading, and handling equipment, storage equipment, etc. Is not just about logistics enterprise scheduling, but also involves the civilian goods production enterprises, such as food suppliers, lubricating oil suppliers, medicine, such as suppliers, isolation equipment suppliers in the development stage at ordinary times each supply research, in view of the wartime emergency in time to arrange the relevant local logistics enterprises auxiliary supplies its distribution activities.

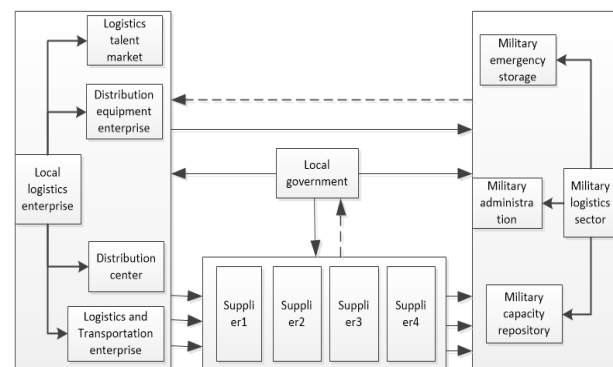


Figure 2 Distribution path

4. CONCLUSION AND TREND

This article systematically combed the military-civil integration under the background of the development of the distribution, mainly concentrated in distribution organization, distribution services, distribution central location, distribution pattern, based on the existing research design the military-civil integration of distribution innovation path, achieve development, wartime emergency two-way demand at ordinary times, in order to guide the development of China's situation military-civil integration and distribution.

The existing studies tends to static studies on the integration of military and civilian distribution, and further studies are needed on how the military and civilian sectors play games in the dynamic environment to achieve balanced benefits. The author will continue to consider the impact of dynamic environment on military and civilian decision-making based on previous theories.

AUTHORS' CONTRIBUTIONS

Conceptualization, Bingbing Li; methodology, Bingbing Li; software, Bingbing Li and Rongyan Zhu;

writing—review and editing, Bingbing Li; visualization, Bingbing Li; supervision, Rongyan Zhu. All authors have read and agreed to the published version of the manuscript.

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