

Emergency Logistics Talent Supply Chain Management and Manpower Security under the COVID-19 Pandemic

Zhan Jun^a, Liu Xuyuan^{b,*}

School of Economics and Management, Shanghai Maritime University, Pudong Avenue, Shanghai, China

^a wodeyouxiangzai@126.com, ^b dlxyuan@sina.com

**Corresponding Author*

Abstract: *After the COVID-19 pandemic, emergency logistics has played a great role in the smooth implementation of the war against the epidemic, however, emergency logistics management also exposed some problems that could not be ignored. This paper will focus on issues related to human resource management in emergency logistics and make suggestions for optimization, discuss how to combine universities and enterprises to build a supply chain of emergency logistics talents, and strengthen emergency logistics manpower security in logistics enterprises through the competency model.*

Keywords: *Pandemic, Emergency Logistics, Talent Supply Chain*

1. Introduction

In 2020, the COVID-19 pandemic broke out in Wuhan, Hubei province during the Chinese Lunar New Year. As Wuhan is the transportation hub of the nine continents, this sudden public health event had a huge impact on China's national life, health, economy and social order. The efficient operation of emergency logistics has played a great role in the smooth implementation of the war against the epidemic. At the same time, we also found that there are still many problems to be improved in storage, transportation, distribution and human resource management. In the future, in order to reduce the harm of such public health emergencies on the country, society and people, it is urgent to formulate a perfect emergency logistics operation plan. Emergency logistics talent team is the main body and basic support of emergency management system. Strengthening the construction of emergency logistics talent team is the key and fundamental way to improve the level of emergency management ^[1]. Human resource management is the most important aspect of emergency logistics management and is directly related to the smooth operation of emergency logistics during public emergencies. Therefore, emergency logistics must improve the overall level of human resources management, pay attention to the human resources supply chain and do a good job of ensuring human resources.

2. Current Status of Emergency Logistics Management under Public Health Emergencies

2.1. The Significance of Emergency Logistics Distribution in Public Health Emergencies

Emergency logistics is a branch of social logistics, a kind of logistics that exists only in a special period. Its transportation object is emergency materials, and the service object is a region or a city. Its main purpose is to meet the emergency needs of society in a specific period. Emergency logistics is not as effective as ordinary logistics, but it can deal with unexpected and unpredictable public emergencies quickly and effectively, so that people can get the most effective relief and minimize the harm.

After the emergence of public health emergencies, the timely transportation and distribution of relief materials can, to a certain extent, provide people in the infected area with some spiritual comfort and relief from the trauma of losing their loved ones. Emergency supplies must be delivered not only rapidly but also efficiently. In the event of a public health emergency, due to its unpredictability, if the relevant materials cannot be mobilized to the affected areas in a short time, it will not only pose a threat to human lives, but also affect the security and stability of the country and society. At that time,

therefore, the emergency logistics distribution centre should immediately formulate an emergency plan that takes account of the actual situation to minimize the damage.

2.2. Problems of Human Resource Management in Emergency Logistics Under Public Health Emergencies

At present, the emergency logistics systems of most cities in China, including regional hubs like Wuhan, are very weak. Many emergency managers are experienced in emergency response but inexperienced in the management and dispatch of emergency supplies. When a public health emergency occurs, the logistics management of massive materials involves coding of items, incoming inspection of items, planning of storage areas and allocation of storage spaces, outgoing inspection, transport management, sign-off management, reverse management, information management, security of materials and other series of work content, requiring a mature logistics management system, a mature logistics operation team and a supervision system. However, judging from the various chaotic scenes shown by emergency management departments and third-party relief agencies in Hubei Province this time, many managers of the emergency logistics system are poorly qualified, weak in managing material logistics, overwhelmed with all kinds of regulation and accountability, and subject to the pressure of public opinion.

2.2.1. Lack of Professionals

With the establishment of free trade zones, bonded areas and logistics parks across the country, the logistics profession has expanded. However, the majority of emergency logistics managers, who are transferred from other logistics industries, lack relevant work experience in emergency management. In the face of a major epidemic, emergency logistics is extremely specialized, with a large demand for relief materials and a greater diversity of materials. At present, China lacks a management system for emergency logistics and the construction of a unified professional team. In the face of a major epidemic, without the establishment of emergency logistics centre bases in each city and the establishment of professional teams, the golden period of local self-help is missed.

Due to the late start of emergency logistics management in China, the talent pipeline in this field has been in a state of discontinuity. First of all, due to the shortage of courses and teachers in universities, the skills of the logistics talents delivered are weak and cannot meet the development needs of modern emergency logistics enterprises. The logistics talents trained by universities in various regions usually only have good professional theoretical knowledge, but have not accumulated more practical experience, and are unable to engage in emergency logistics management in a short time, let alone become core managers of enterprises. However, the reality is that the demand for high-end logistics personnel in the emergency logistics market is enormous. Logistics personnel are not only required to have a wealth of knowledge and experience in logistics management, but must also be skilled in the use of advanced practical techniques and methods.

Secondly, some enterprises ignore the training of logistics management talents, lack investment, fail to combine the market development trend and the actual development of internal talent training, reasonably formulate the talent training system, improve the talent training management system, resulting in the work in a formality, only regularly share some knowledge and experience in the industry to employees. Logistics enterprises fail to establish a set of effective training system, fail to improve the business ability and professionalism of employees by carrying out targeted professional training activities according to the actual work situation of them. Therefore those employees' professionalism cannot meet the development needs of the logistics market, resulting in the problem of the lack of logistics managers becoming more and more prominent.

2.2.2. Limitations in Management Work Concept

Modern logistics enterprises have certain limitations in their daily business management concepts, such as: a. logistics enterprises are not able to reasonably establish a correct human resource management concept and effectively form a scientific and perfect human resource development and training plan according to their actual operation. Internal staff career planning development cannot be effectively guaranteed. In the process of adjusting staff positions, some talents with professional practical ability and comprehensive quality are often unable to be recognized by management leaders due to poor management, which restricts the development of human resources in logistics enterprises; b. Some logistics enterprises are still not fully aware of the importance of human resources management talent introduction and training. They generally believe that employees at all posts are easy to recruit, and there is no need to create a perfect recruitment and training system, employees can come at the

sound of a whistle. This business management concept will make it difficult for scientific and effective human resource management to carry out smoothly; c. Human resource managers of logistics enterprises are not always be able to adhere to the people-oriented management principle and actively improved the training contents and methods from the perspective of employees. Although they will regularly organize employees to participate in various training and education activities, this work is more of a mere formality and does not fully guarantee the quality and efficiency.

2.2.3. Inadequate Incentive Mechanisms for Human Resource Management

Compared with the western developed countries, China's logistics enterprises lack scientific and perfect performance assessment and talent incentive mechanism in the human resource management work. To a certain extent, material and spiritual rewards for the daily work performance of all employees are neglected in favor of disciplining staff behaviour through the use of rules and regulations. The management leaders of logistics enterprises fail to scientifically combine the growth characteristics of internal talents and the law of human resources development in the logistics market to carry out the differentiated incentives for employees. They usually only set some simple monetary rewards, such incentives will lead to different views and understanding of human resources management work at different levels of talent, and it is difficult to be recognized by all employees, which will affect the common development of logistics enterprises and talent.

2.3. Suggestions For Optimizing Human Resource Issues in Emergency Logistics

Based on the problems exposed by China's emergency logistics human resource management in the recent COVID-19 pandemic, this paper gives suggestions for optimizing emergency logistics human resource management work from the following two aspects.

At present, most of the talents of emergency logistics system are concentrated in scientific research institutes and enterprise experts, a lot of training and reserve talents are needed. The government should support the training of emergency logistics talents, strengthen the guidance of emergency logistics-related disciplines in major universities, and deliver high-quality talent resources for enterprises. It is also necessary to encourage social related service organizations to help logistics enterprises train emergency logistics management talents. Logistics enterprises can establish good cooperation with colleges and universities, so that college students can have more opportunities to practice and enterprises can inject fresh vitality, thus building an efficient supply chain of emergency logistics talents.

Emergency logistics talents are the carrier to put emergency logistics activities into practice. The competency model of emergency logistics talents can establish high-performance work behavior standards for work analysis and evaluation of emergency logistics management positions, improve reference benchmarks for training and career development of emergency logistics talents, and also provide evaluation indicators and standards for managers' work performance evaluation^[6]. Enterprises can learn from the mature logistics management experience of large enterprises in western countries and combine it with the actual situation in China to set effective strategic development goals, so as to cultivate a group of composite logistics talents with outstanding ability.

3. Emergency Logistics Talent Supply Chain Management

3.1. Building Emergency Logistics Management Talent Training Supply Chain Thinking

To solve the current talent gap in the domestic logistics industry within a limited period of time, it is necessary to improve the existing talent training mindset. In order to effectively solve the problems and obstacles in the process of training logistics professionals in domestic universities, the most important thing is to have talent training supply chain thinking. If we treat the universities that train related talents as enterprises, the 'raw material' is the students who have just enrolled and are studying in the university, and the 'product' are the high-quality students demanded by the society and enterprises. Universities, logistics students and logistics companies, form a talent supply chain. Schools and enterprises are the important links of the whole talent training supply chain. Based on the idea of perfect supply chain, we should ensure that we can achieve the optimal effect through the least cost investment under the existing talent supply chain management mechanism. Based on the cultivation of human resources that respond to the development of the logistics industry and meet the requirements of emergency logistics, all nodes that are in the supply chain are able to share the good benefits. Therefore,

through scientific and reasonable planning and integration of universities, students and enterprises, constituting a new and efficient talent supply chain is extremely important to improve the talent quality and the construction of talent team in the whole logistics industry.

3.1.1. Composition of Talent Supply Chain in Higher Education

The main task of colleges and universities is to cultivate talents needed by society. From the initial enrollment, to years of education, and finally to the employment of students, this continuous process is quite similar to the product processing process of an enterprise. The production process of products can be represented as a supply chain from supplier, manufacturer, distributor and finally to the customer. The two supply chain nodes are similar, i.e., the group / supplier with higher education needs - college enrolment / purchasing - college knowledge and skill training for students / production of products - employment / output products - employers, as shown in Figure 1.

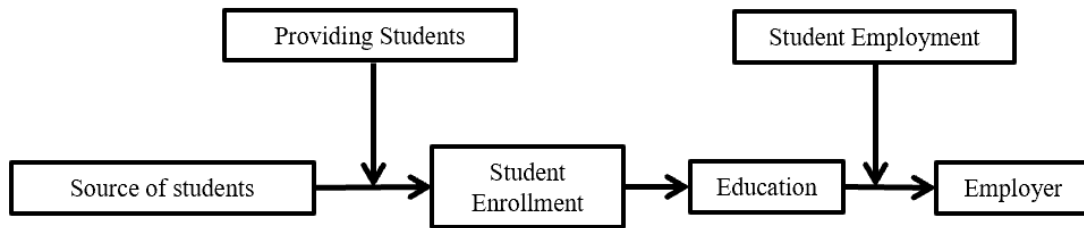


Figure 1 Higher education talent supply chain.

3.1.2. Constructing the Supply Chain Model for Emergency Logistics Management Personnel Training

The supply and demand of higher education is composed of two major supply and demand relationships and three major supply and demand subjects, namely, the supply and demand of higher education opportunities consisting of students - schools and the supply and demand of higher education products consisting of schools - enterprises, and there is complexity in the supply and demand relationship itself. The distortion of information communication and the contradiction between supply and demand affect the healthy development of the supply chain of emergency logistics management talents. The school-enterprise cooperation platform circumvents the bullwhip effect through customer relationship management by collecting and processing information from employers while transmitting it to teaching institutions, which specifically implement the training programs for students. The government plays a coordinating and guiding role in the talent supply and demand activities of colleges and universities and employers. The cooperation and coordination among students, colleges and universities, employers and the government have achieved the overall optimization of the talent supply chain. The supply chain model of emergency logistics talent training in Figure 2 can illustrate the problem well.

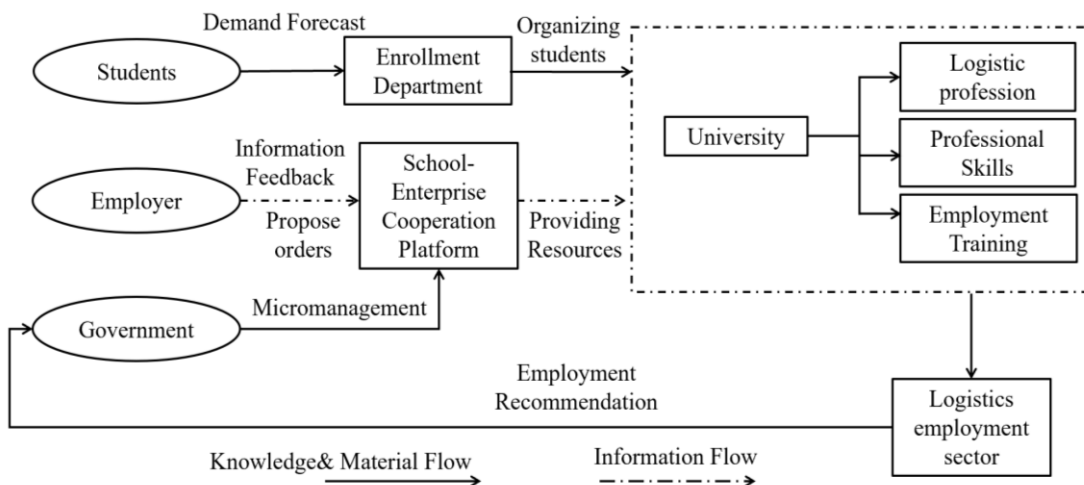


Figure 2 A supply chain model for emergency logistics talent training

3.2. Establish A Talent Training Mechanism for Emergency Logistics Management Based on the Idea of Supply Chain Management

The 'bullwhip effect' is an important phenomenon in the talent training supply chain [2]. According to the human resource situation of emergency logistics at the present stage, the talents needed for emergency logistics and the logistics talents from universities do not match. Once there is a demand for a new skill in emergency logistics in public health emergencies, there will definitely be a shortage of talents for a period of time, and when universities realize the importance of such professionals, they will expand their enrollment and output a large number of relevant talents. However, the rapid change in demand for emergency logistics will make the demand for such talents reach saturation or even disappear, resulting in students losing their jobs once they graduate. We must appropriately strengthen the existing emergency logistics talent supply chain response mechanism, establish the 'forward awareness' of talent training, prevent the 'expansion' and 'lagging' of the supply of talents, and reduce the probability of 'bullwhip effect'. Therefore, it is necessary to have a complete and timely understanding of the emergency logistics market and make accurate predictions and responses to changes in market demand in the short term, so as to respond to all kinds of public health emergencies, keep up with the changes and development of the times, and ensure that the supply chain talent training mechanism can be implemented smoothly.

3.2.1. The Goal of Emergency Logistics Management Talent Training Based on the Idea of Supply Chain Management

This paper introduces the idea of supply chain management into the training system of logistics management talents in universities, constructs the supply chain structure of emergency logistics management talents, reasonably forecasts the demand for emergency logistics management talents, improve the efficiency of talent supply and realize the rational allocation of educational resources by optimizing and integrating the supply chain of emergency logistics management talents; improve the original supply-demand relationship between universities and employers, realize the seamless connection between universities and the market, and finally achieve the high degree of satisfaction for students, universities, employers and even the whole society.

The goal of emergency logistics management talents training should be determined based on the mastery of emergency logistics market talent demand trends, and in combination with the training characteristics of logistics professionals in universities, including quality goals, knowledge goals and ability goals. Quality goals, that is, combined with the characteristics of emergency logistics market, in teaching, take high-quality emergency logistics service as the core to cultivate students' good professional ethics; Knowledge goals are to train students with the professional knowledge and ability required by the market; ability goals are to focus on cultivating students' five professional core abilities: warehousing and distribution management ability, vehicle scheduling and transportation optimization management ability, material procurement management ability, production and operation management ability, and supply chain logistics management ability.

3.2.2. The Operation Mechanism of Emergency Logistics Management Talent Training Based on the Idea of Supply Chain Management

Basic knowledge learning. As freshmen in colleges and universities are interested in new things, schools can arrange lectures and visits related to emergency logistics to help students realize the important role of emergency logistics in public emergencies and cultivate their sense of responsibility and professional enthusiasm.

Professional courses learning. The teaching system should meet the characteristics of emergency logistics management talents. First of all, the professional courses should be timely enriched with the relevant contents of emergency logistics, that is, the latest technical knowledge related to the profession, so as to enhance the timeliness of the professional skills learned by students. In the selection of knowledge, the teaching content should be updated in time by combining with the actual requirements of emergency logistics. In the choice of skills, the content should reflect the aspect of cultivating students' action skills. The second is the comprehensive development of multiple components of ideological and moral, cultural, business, and physical and mental qualities. Lastly, it is the development of students' innovative ability. Specifically, schools can carry out more extracurricular activities to develop students' overall quality.

Off-campus practical learning. Schools and employers should also form a partnership based on the idea of supply chain management, so that students can practice in the front line of production, combining the professional course knowledge with the actual work of enterprises, helping students feel

the professional environment of logistics management. Students will have the opportunity to directly contact the actual work process of logistics enterprises, apply their knowledge and skills, analyze and solve the problems encountered in the internship, improve their comprehensive skills and clarify their future career development plans in advance.

3.2.3. The Design of the Guarantee System for Emergency Logistics Management Talent Training Based on the Idea of Supply Chain Management

Faculty management construction. First of all, we should advocate the measures of combining teaching with practice, promote teachers' participation in enterprise practice, and cultivate the logistics management teachers into composite talents who have both theory and practical skills. Second, integrate external resources. Encourage teachers to bring back the first-hand practical materials obtained from posting or serving in enterprises to classroom teaching, so as to enhance the practicability and vividness of teaching contents and stimulate students' learning enthusiasm. In addition, enterprise professionals can be hired to establish a team of part-time teachers with professional skills and knowledge. Promote logistics management teachers and logistics management enterprise experts to jointly cultivate talents according to the talent training objectives.

Practical training base construction. For the cultivation of emergency logistics management talents, we need to pay attention to the training of practical skills. We should strengthen the training of extra-curricular practical activities to make students familiar with the working characteristics of emergency logistics and promote the improvement of their ability.

The above operation mechanism of emergency logistics management talent training based on supply chain management idea completes the transformation and integration of basic knowledge, core knowledge and comprehensive knowledge to basic skills, core skills and comprehensive skills of logistics management students, which finally helps students master emergency logistics management professional knowledge and ability, and finally they can master job operation skills in the vocational stage to complete the work objectives of enterprises and ensure the effective implementation of the emergency logistics talent training mechanism.

3.3. Building a Shared Platform for School-Enterprise Alliance

For the 'efficiency first' emergency logistics system, it is inevitable that technology-based enterprises will be able to make a big impact. If the establishment of an emergency command system is likened to an emergency brain, and the hardware aspects such as national network strength and team strength are likened to an emergency torso, the level of technology means the ability to respond to emergencies. This ability to respond quickly in the first instance and to implement and manage it efficiently and effectively is a particular advantage of technological enterprises in the practice of emergency logistics. Although a lot of human and material resources are required, it is imperative to use advanced modern information technology to fully integrate logistics enterprises with the Internet and to constitute a new pattern of logistics economic development with a complete infrastructure.

If we are to improve the training mechanism of emergency logistics talent supply chain, we must take school-enterprise cooperation as a strategic development goal and form a new value chain of cooperation. By building school-enterprise information exchange platform with immediacy and efficiency, the content of the school-enterprise cooperation will be deepened through information technology. In the traditional school-enterprise cooperation, the relationship between schools and enterprises is only superficial, and the mutual cooperation is only in professional research, conference exchanges and the establishment of off-campus practical training bases. Using the intelligent supply chain as a carrier to build a perfect school enterprise information sharing and cooperation platform^[3], which plays an important role in promoting the seamless connection of school-enterprise resources and the subsequent implementation of school-enterprise cooperation education.

As mentioned above, the rapid development of technology has brought opportunities and challenges to the emergency logistics industry in the new era of 'Internet plus'. In order to effectively overcome the increasingly serious talent gap, many domestic colleges and universities must formulate effective measures according to the situation in the talent training mechanism of intelligent supply chain emergency logistics specialty, so as to make due contributions to the sustainable development of emergency logistics talent supply chain.

4. Emergency Logistics Manpower Security

Emergency logistics talents are the main body and basic support of emergency logistics system. High-quality talents are helpful for enterprises to brainstorm, so as to continuously identify the shortcomings in emergency logistics management and propose corresponding solutions. Strengthening the construction and security of emergency logistics talent team is the fundamental way and key to improving the level of emergency logistics management.

4.1. Components of Competency Model for Emergency Logistics Talents

The American psychologist David C. McClelland^[4] first introduced the concept of ‘competencies’ in the 1970s. The Spencer’s suggest that a competency characteristic refers to ‘an underlying characteristic of an individual that distinguishes outstanding achievers from mediocre performers in a job (or organization, or culture), and can be motivation, traits, self-image, attitudes or values, domain knowledge, cognitive or behavioural skills- any individual feature that can be reliably measured or counted and can significantly distinguish excellent from average performance’.

The competency of emergency logistics talent is the underlying and deep-seated characteristics that ensure that emergency logistics personnel can successfully complete their tasks or meet their objectives, and that distinguish between high and low performers^[1]. The Emergency Logistics Competency Model (ELCM) is a highly performance-related competency structure model based on a scientific research methodology that seeks to significantly differentiate between high-performing and average employees in the emergency logistics workforce, and after repeated comparative analysis, finally establishes a highly performance-related competency model.

By conducting behavioural event interviews and questionnaires with personnel in the emergency logistics industry, and coding and counting the interview reports, a preliminary competency model for emergency logistics personnel was constructed as shown in Table 1^[1].

Table 1 A preliminary competency model for emergency logistics personnel

Quality elements	Key events involved	weight(%)
Organization and management ability	28	19.6
Command and control capability	25	17.5
Business capability	35	24.5
Interpersonal public relations ability	22	15.4
Achievement orientation	18	12.6
Personal quality	15	10.5

4.2. Application of Competency Model in Management Practice

The competency model is a specification of the core competencies and qualities of each position, and its external expression is a behaviour description. The emergency logistics management system can integrate the competency model into job analysis, talent selection and recruitment, performance management, talent training, salary incentives and other human resources management practices, so that its role can be fully reflected.

4.2.1. Establishing A Job Analysis System Based on A Competency Model

Competency-based job analysis is oriented towards the performance of the best employees, examining the characteristics and behaviours of the best performers in the job position and defining the competency requirements of the job in relation to the characteristic behaviours of these people. By comparing the behavioural performance of employees at different performance levels, it distils the key factors that affect employee performance levels and provides specific and clear criteria that help employees to target their work and thus improve the overall performance level of the organization.

4.2.2. Establishing A Talent Selection and Recruitment System Based on A Competency Model

The human resources department of the enterprise should pay attention to the reserve and management of talents, so as to screen out a high-quality workforce for the enterprise and lay a solid foundation for the long-term development of the enterprise.

In the process of selecting and recruiting emergency logistics management talents, the examiners

need to closely match the precise definition of each competency and the specific behavioural requirements in the competency model, paying attention not only to the external characteristics such as the candidate's education, professional knowledge, skills and work experience, but also to deep-seated qualities such as the candidate's self-perception, inner qualities and demand motivations.

The deep-seated qualities that emergency logistics managers should possess, such as responsibility, reaction speed, decisive ability and emergency handling ability, need to be examined by means of the interviews. Interview questions should be designed around the necessary competencies of an emergency logistics manager, and situational or behavioural questions should be developed based on interview data to form the questions for a structured interview, ensuring that the objectivity of the interview and its relevance to the position as much as possible in order to improve the success rate and quality of the interview.

4.2.3. Establishing A Performance Management System Based on A Competency Model

The construction of the performance management system based on a competency model should be based on the characteristics of emergency logistics work in China. The performance management system constrains the work behaviour of employees to make them highly consistent with the organization's development strategy, ensuring that emergency logistics managers do not deviate from the organization's development track and make full use of the organization's limited resources to create higher performance. The system is generally composed of specific, measurable indicators such as the performance accomplishment of emergency logistics managers and the performance of their job responsibilities, which clarify the differences between those with excellent performance and those with average performance, and also concretely reflect these differences in the whole process of emergency logistics management. In addition, the system also provides the organization with a comparison of past and present work behaviour and possible future performance, so that supervisors can better evaluate whether the employee is competent for the current job and its future trends, so that different measures (internal transfer, training, promotion, demotion, dismissal) can be taken for different appraisees. The emergency logistics personnel themselves can also be more clearly aware of the differences between themselves and the best performing employees, thus prompting the employees themselves to consciously improve their overall quality, which in turn promotes the overall performance of the organization.

4.2.4. Establishing A Training System Based on A Competency Model

The training system based on the competency model should firstly make an objective and comprehensive evaluation of the competency potential of the existing and reserve emergency logistics management talents, help them understand their own attributes, the job characteristics of their respective positions and their career development needs, and identify the gaps between themselves and those with excellent performance in terms of competency, and then design a training plan in line with their personal attributes and the organization's strategic development according to the actual situation. The training plan is implemented to improve the competency of employees. In addition, attention should be paid to the whole training process of talents tracking and feedback, so that the training plan can be analysed and improved in time to optimize the training effect as much as possible, so that the level of employees can be improved to the maximum, so as to effectively realize the development and training of emergency logistics management talents. In addition to actively encouraging employees to participate in training, it is also necessary to introduce a competitive mechanism to fully motivate the employees, which is not only conducive to improving the current management level, but also enables training to play a greater role.

A professional government management team, a combination of full-time and part-time expert consultants, and also a professional logistics enterprise team and a volunteer team should be established. Joint government and professional institutions for the above teams to carry out professional, systematic and regular training. Stress tests and sandbox exercises for emergency logistics managers are difficult to reflect their value in normal times, but are crucial in critical times. Therefore, strengthening daily stress tests and special sandbox exercises for different items is beneficial for emergency logistics managers to grasp the dynamic emergency material supply situation and also to improve the response capability of emergency logistics managers under the public health emergencies, which plays an important role in improving the emergency logistics service management system.

4.2.5. Compensation Incentives Based on A Competency Model

The main influence factors of salary mainly include three aspects, such as position, ability and performance. In the design of the salary system, full consideration must be given to the key influence

of various competencies of emergency logistics talents as 'composite' talents. In practice, organizations can link the salary system of emergency logistics talents with their competency quality play in conjunction with their own reality. Through quality assessment, the level of competence of employees and their corresponding salary levels can be determined, so that those with strong competence and high performance can receive more salary incentives, thus effectively motivating employees to continuously learn, continuously improve their professional knowledge and skills, and continuously improve their own level of competence, so as to continuously improve emergency logistics management capabilities.

5. Conclusion

In this public health emergency, emergency logistics played a huge role in the smooth implementation of the war on epidemics, while some human resource problems were also exposed. This paper first emphasizes the importance of emergency logistics in the COVID-19 pandemic, reveals its human resource management problems and puts forward optimization suggestions, then proposes to build emergency logistics management talent training supply chain thinking, establish a mechanism for emergency logistics management talent training, operation mechanism and guarantee system based on the idea of supply chain management. Finally, the competency model is used for the selection and recruitment of emergency logistics talents, also for establishing training, performance management and incentive system to strengthen the construction and guarantee of the emergency logistics talent team.

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