A New Curriculum System for Training Practical Talents of Smart Logistics Management

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Abstract. Modern logistics has entered the era of smart logistics which frees humans from (control) activities that can be delegated to smart products and services. Smart logistics has different requirements on training practical talents of logistics management in terms of talent type, knowledge structure, ability and quality. In this paper, we analyze the requirements of logistics management talents in the context of smart logistics, propose the training objectives of practical smart logistics management talents, put forward a new curriculum system for the practical talents training of smart logistics management, and design the core courses of the curriculum system which include Introduction to Smart Logistics, Smart Logistics Technology and Application, Smart Logistics Equipment and Application, Smart Logistics Operation and Management, Smart Logistics Supply Chain, Smart Logistics System Planning and Design, Practical Training of Smart Logistics System, and so on. The curriculum system develops the traditional curriculum system of logistics management according to the characteristics of smart logistics, and can improve the adaptability and competitiveness of logistics management talents to smart logistics posts.

Introduction

With the development and application of information technology in the domain of logistics, modern logistics has entered the era of smart logistics [1-3]. Smart logistics embraces smart services as well as smart products within logistics, and frees humans from (control) activities that can be delegated to smart products and services [4]. Compared with traditional logistics, smart logistics has three characteristics: intelligence, transparency and convenience [5]. Smart logistics plays an important role in economic construction and development, such as the integrator of social resources, the concentrator of decentralized market, the substitute of shortage of manpower and the creator of green ecology [6].

Smart logistics puts forward new requirements for logistics management talents in modern society, not only in quantity, but also in quality. According to the estimate by relevant departments, during the 13th five-year plan period in China, the demand for smart logistics talents in Jiangsu province alone is about 15,000 [7]. In this paper, we analyze the requirements of logistics management talents in the context of smart logistics, propose the training objectives of practical smart logistics management talents, and put forward a new curriculum system for the practical talents training of smart logistics management.

Requirements of Smart Logistics for Logistics Management Talent

Requirement for Talent Type

Logistics management talents are the important foundation to develop logistics and maintain the operation of logistics system [8]. In the context of smart logistics, it needs smart logistics management talents which can be called high-end logistics management talents, as well as traditional logistics management talents. But it does not mean that the traditional logistics management talents will be replaced by high-end logistics management talents. On the one hand, smart logistics is the development of traditional logistics rather than the replacement of traditional logistics, so part of the
work of smart logistics still relies on traditional logistics management talents. On the other hand, to the transition stage of traditional logistics and transitional logistics enterprises, traditional logistics management talents will still account for a large proportion of the staff.

Requirement for Knowledge of Talents

Smart logistics is an inevitable result of the development of information technology, and is the aggregation effect of many modern information technologies, such as the Internet of Things, cloud computing, big data and mobile Internet [9]. However, smart logistics is the result of the joint effect of technology application and management innovation rather than pure technology application [10]. Modern logistics management theories and methods also play an important role in the development and operation of smart logistics. Therefore, in the context of smart logistics, the talents need to be familiar with the theory of logistics management such as basic management principles and scientific management methods, and have the ability to plan, organize, command, coordinate, control and supervise logistics tasks, to reduce logistics costs, improve logistics efficiency and economic benefits. Meanwhile, the talents need to be familiar with the related technologies and equipment of smart logistics, master the methods and approaches to apply them in the logistics system, and improve the automation and intelligence level of modern logistics.

Requirement for Ability of Talents

Different from traditional logistics, smart logistics has the functions of context awareness, resource integration, intelligent analysis, optimization decision, automatic adaption and active feedback [11]. In the context of smart logistics, the logistics management talents need the ability that match the functions of smart logistics [12], which can be divided into practical skills and innovative thinking. The practical skills include the ability of applying logistics technology, operating logistics equipment and related software, optimal scheduling, collaborative decision-making, and exploiting logistics data benefits. The innovative thinking refers to collaborative innovative thinking, resource-sharing thinking, energy conservation and emission reduction awareness, and green development awareness.

Training Objectives of Practical Smart Logistics Management Talents

According to the demand for logistics management talents in the context of logistics, we propose the training objectives of practical smart logistics management talents, which can be divided into smart logistics business operation ability, smart logistics system management ability and smart logistics system planning and design ability.

Smart Logistics Business Operation Ability

The smart logistics business operation ability is the basic ability of practical smart logistics talents, and it meets the basic needs of practical smart logistics talents for graduation and employment. Smart logistics business operation ability includes: (1) Be familiar with the operation process and main work of warehousing, transportation, distribution, sorting, loading, unloading and handling, freight and other businesses in smart logistics, capable of completing practical business work; (2) Be familiar with the main business and operation process of smart logistics nodes, such as smart logistics park, smart port, and smart logistics transfer center, and preliminarily capable of carrying out relevant work; (3) Be familiar with the performance and operation methods of typical smart logistics equipment and facilities, and preliminarily capable of operate and use the smart logistics equipment and facilities; (4) Be familiar with the basic functions and operation process of common smart logistics management information system/platform, and preliminarily capable of use the smart logistics information system.

Smart Logistics System Management Ability

The management ability of smart logistics system which is the core ability of practical smart logistics management talents, can be divided into: (1) Be familiar with the basic theories and knowledge of mathematics, computer, operations research, management, economics and so on, and
be able to analyze and solve related problems in the field of smart logistics management with the theories and knowledge; (2) Be familiar with the basic theories and methods of traditional logistics management, understand the new theories and methods of smart logistics management, and be able to apply relevant theories to solve practical problems of smart logistics management; (3) Be familiar with the function and performance of smart logistics facilities and equipment, and be able to manage the facilities and equipment; (4) Be familiar with the characteristics and operation modes of smart logistics links or nodes such as smart warehousing, smart transportation and distribution, smart logistics park and smart port, and have corresponding operation and management capabilities; (5) Be familiar with smart supply chain thinking and methods, and be able to manage smart supply chain.

**Smart Logistics System Planning and Design Ability**

The planning and design ability of smart logistics system which is based on the improvement of operation and management ability, includes: (1) Be familiar with the theories and methods of traditional logistics system planning and design, and be able to solve practical problems in the field of logistics system planning and design; (2) Be familiar with the development status and trend of smart logistics, and be able to innovate in the development of smart logistics; (3) Be familiar with smart logistics technologies such as Internet of things, cloud computing, big data, mobile Internet and artificial intelligence, and be able to apply these technologies in smart logistics; (4) On the basis of being familiar with the operation process of various specific businesses in smart logistics, and be able to optimize the workflow of smart logistics; (5) On the basis of being familiar with the usage and performance indexes of common smart logistics facilities and equipment, and be able to apply the facilities and equipment in smart logistics; (6) Master the basic methods and means of smart logistics information management, be familiar with the basic structure, functional modules and business process of smart logistics information system, and preliminarily be able to design and develop smart logistics information system.

**Content of the Curriculum System**

According to the training objectives, we put forward a new curriculum system for the practical talents training of smart logistics management, which is divided into four modules: public basic course, professional basic course, professional course and practical operation course, as shown in Table 1. The curriculum system is the improvement of the curriculum system for training traditional logistics management talents, and the main difference is the added new courses, which are italicized in the table.

**Public Basic Course**

Public basic courses which are the basic courses of business related major, are inherited from the traditional logistics management curriculum system. In our curriculum system, we keep these courses such as College English, Economic Mathematics, Computer, Computer Network Technology, Linear Algebra and so on. Meanwhile, we keep the corresponding content system unchanged.

**Professional Basic Course**

In our curriculum system, professional basic courses are developed from the traditional logistics management curriculum system. For the classic professional basic courses, such as Management, Operations Research, Economics, Introduction to Logistics Management, Supply Chain Management, Introduction to E-Commerce, Logistics Cost Management, the original curriculum can be unchanged, but some contents need to be replaced according to the actual development of smart logistics. For professional courses that have great changes, such as Logistics Facilities and Equipment, Logistics Information Technology, the content system should be reorganized according to the actual situation of intelligent logistics. In our curriculum system, these courses are replaced by Introduction to Smart Logistics, Smart Logistics Technology and Application and Smart Logistics Equipment and Application.
Table 1. Content of the Curriculum System.

<table>
<thead>
<tr>
<th>Course Module</th>
<th>Main Course</th>
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<tbody>
<tr>
<td>Professional course</td>
<td>Smart Logistics Operation and Management, Smart Supply Chain, Smart Logistics and E-Commerce, Logistics System Engineering, Smart Logistics System Planning and Design.</td>
</tr>
<tr>
<td>Practical operation course</td>
<td>Statistical Analysis of Logistics Data, Intelligent Forecasting Method of Logistics Demand, Practical Training of Smart Logistics System, Design and Application of Unmanned Warehouse, Use and Maintenance of Mechanical Arm, Operation and Use of AGV, Operation and Use of UAV, Professional Cognition Practice.</td>
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</table>

**Professional Course**

Professional courses are designed to develop talents' core competencies. For smart logistics is different from traditional logistics, it is necessary to redesign the professional course. In our curriculum system, we add some new courses, such as Smart Logistics Operation and Management, Smart Supply Chain, Smart Logistics and E-Commerce, Smart Logistics System Planning and Design.

**Practical Operation Course**

Practical operation courses are also designed to develop talents' core competencies. Operational courses determine talents' practical ability and adaptability to practical posts, so it is necessary to add some new courses according to the requirements of smart logistics, such as Statistical Analysis of Logistics Data, Intelligent Forecasting Method of Logistics Demand, Practical Training of Smart Logistics System, Design and Application of Unmanned Warehouse, Use and Maintenance of Mechanical Arm, Operation and Use of Automated Guided Vehicle (AGV), Operation and Use of Unmanned Aerial Vehicle (UAV), etc.

**Core Courses of the Curriculum System**

The core courses of the curriculum system are designed to answer the four questions: 1) What is smart logistics? 2) What is smart logistics based on? 3) How to manage and develop smart logistics system? 4) How to operate smart logistics system? As shown in Table 2, question 1 is answered by Introduction to Smart Logistics. Question 2 is answered by Smart Logistics Technology and Application, and Smart Logistics Equipment and Application. Question 3 is answered by Smart Logistics Operation and Management, Smart Supply Chain, and Smart Logistics System Planning and Design. Question 4 is answered by Statistical Analysis of Logistics Data, Intelligent Forecasting Method of Logistics Demand, and Practical Training of Smart Logistics System.
Table 2. Core Courses of the Curriculum System.

<table>
<thead>
<tr>
<th>Question</th>
<th>Core Course</th>
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<tbody>
<tr>
<td>What is smart logistics?</td>
<td>Introduction to Smart Logistics</td>
</tr>
<tr>
<td>What is smart logistics based on?</td>
<td>Smart Logistics Technology and Application, Smart Logistics Equipment and Application.</td>
</tr>
<tr>
<td>How to manage and develop smart logistics system?</td>
<td>Smart Logistics Operation and Management, Smart Supply Chain, Smart Logistics System Planning and Design.</td>
</tr>
<tr>
<td>How to operate smart logistics system?</td>
<td>Statistical Analysis of Logistics Data, Intelligent Forecasting Method of Logistics Demand, Practical Training of Smart Logistics System.</td>
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</table>

The Course: Introduction to Smart Logistics

This course is a basic course of smart logistics, which introduces the basic theory, the overall development of smart logistics and the development of each link and node, such as smart transportation, smart warehousing, smart distribution, smart packing, smart logistics information platform, smart logistics park, and smart port. It is aimed to help the talents to be familiar with smart logistics and form a sense of identity for smart logistics industry.

Smart Logistics Technology and Application

This course is also a basic course of smart logistics, which introduces the related technologies applied in smart logistics, such as Bar code, Radio Frequency Identification (RFID), Electronic Data Interchange (EDI), Global Positioning System (GPS), Geographic Information System (GIS), Cloud Computing, Internet of Things (IoT), Big Data and so on. It is aimed to help the talents to be familiar with the principle of these technologies and the application of them in the field of logistics.

Smart Logistics Equipment and Application

This course is a basic course of smart logistics too, and introduces the related equipments applied in smart logistics, which can be divided into transport equipment, storage equipment, loading, unloading and handling equipment, packaging equipment, and integrated unit equipment, especially the equipments only used in smart logistics, such as unmanned aerial vehicles, unmanned vehicles and intelligent express cabinets. It is aimed to help the talents to know the performance and purpose of the equipments and how to apply them in smart logistics.

Smart Logistics Operation and Management

This course introduces the links, main tasks, business process, operation and management methods of smart logistics. It is aimed to help the talents to form the thinking of smart logistics operation and management, and have certain smart logistics operation and management ability, so as to engage in smart logistics operation and management after graduation.

Smart Supply Chain

This course is based on traditional supply chain management, and introduces the concept, principles, tasks, optimization methods of supply chain management, the smart supply chain model, the operation and management of smart supply chain. It is aimed to make the talents to know the principles and methods of smart supply chain management, and to be able to operate and manage smart supply chain.
Smart Logistics System Planning and Design

This course is based on Logistics System Engineering, and introduces the structure and functions of smart logistics system, the methods and approaches to develope smart logistics system. It is aimed to help the talents to know what is smart logistics system and how to develope a smart logistics system according to the actual situation of the enterprise.

Statistical Analysis of Logistics Data

This course is based on big data, and introduces the types of logistics data, the methods and technologies to collect logistics data, and the general process, methods and common tools of logistics business data statistical analysis. It is aimed to make the talents to have strong ability of logistics business data statistics, analysis and decision-making.

Intelligent Forecasting Method of Logistics Demand

This course introduces the forecast methods, the selection of different quantitative indicators and logistics demand forecasting performance evaluation standard of logistics demand forecast. It is aimed to make the talents to be familiar with the methods of logistics demand forecast, and to know how to forecast the logistics demand in real business.

Practical Training of Smart Logistics System

This course focuses on the practical ability of smart logistics management talents. It is aimed to help the talents to be familiar with the structure and functions of typical smart logistics system, and the operation flows of various smart logistics equipment and facilities, have certain practical operation ability of smart logistics system, and be able to meet the basic ability and quality requirements of corresponding posts of smart logistics of related logistics enterprises.

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References


