



INTERNATIONAL LOGISTICS CRITERIA ON MEDICINAL PRODUCTS FOR HUMAN USE



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ABSTRACT

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Medicinal products for human use relates to international logistics of pharmaceutical raw materials to the world people's health and life, therefore international logistics provider plays an important part in order to ensure the stability of the quality of medicinal products. This study investigates international logistics provider to establish pharmaceutical industry outsourcing client satisfaction under international logistics criteria to confront with pharmaceutical good distribution practice (GDP) and good manufacturing practice (GMP) on medicinal products for human use. In the first phase, the international drug logistics criteria are referred from domestic and international GDP and GMP procedures and past literature review basis on outsourcing client logistics satisfaction. The second stage is the establishment of a standard questionnaire following the Delphi method. According to Delphi procedures, this study establishes logistics service criteria questionnaire items base on ten experts' opinions and suggestions. After collecting the Delphi questionnaire, we realize the international logistics service provider lack the concept of the GDP logistics criteria, resulting in differences on the demand for logistics service. The logistics industry should take the initiative to pay attention to the GDP criteria that demand-side and supply-side consistency awareness in order to achieve the best logistics criteria. Through expert experience and specification to build a set of international logistics criteria for the pharmaceutical industry in order to provide international logistics provider to shorten or reduce the barriers to entering current international medicinal products for human use market to create high profit competitive environment.

1. INTRODUCTION

Current world's population structure has an aging society to increase the demand for pharmaceutical product. The medical care for public health to enhance the quality of life and environmental issues such as sustainable development concerns as prompted the development of the biotech and pharmaceutical industry become more and more vigorous. Roy *et al.* (2009) stated that drug list available was not fully matching with the requirement of the population and demand estimation of the pharmaceutical items were not done scientifically quantity of medicinal products supplied was not in consonance with community needs. International logistics processes been difficult to meet the raw material medicines traders demand due to the global demand for medicinal products for human use

concept of quality continued to improve its pharmaceutical quality control has been extended to expand the distribution so the concept of the international logistics provider should follow sophisticated more in line with the pharmaceutical industry to provide the desired logistics service and the need to ensure the quality of pharmaceutical product. Under the trend of globalization of markets increasingly active drugs which for international quality management system has been gradually extended from the manufacturing side to marketing side in order to strengthen the management and control of the medicinal products distribution chain. Since 2013 Taiwan is ahead of Japan, South Korea became a member of the PIC/S (The pharmaceutical inspection co-operation scheme), and will fully complete the implementation of the PIC/S in 2015. Medicinal products specification for good distribution practice (herein stated GDP) continued the spirit of good manufacturing practice (herein stated GMP) quality management. The world GDP specifications management attention to ensure delivery of all patient's drugs, in manufacture, storage, transport, and distribution process are consistent with quality assurance. Therefore, Taiwan ministry of health and welfare starting 2011 commission a plan to delegate plans progressively promoting GMP/GDP management system, in order to feel free to international logistics criteria and more robust supply chain quality management.

Lai (2004) draw resource-based view of the logistics outsourcing firms exist different types of logistics service providers and criteria. Medicinal products logistics is very complexity involved in the process by air, sea, land transport and its vulnerability to the impact of the quality of the external environment or human error, such as pharmaceutical product failing storage conditions stored in the correct warehouse, warehouse or transport vehicle temperature and humidity monitoring failure, pharmaceutical packaging damaged during transport, are not arrived at a reasonable time and so many uncertainties in order to prevent and avoid the occurrence of abnormal events, during transport monitoring becomes extremely important, responsible for the transport and distribution of the transport industry plays key role, providing the logistics industry under the terms of the delivery of drugs to follow the criteria of the operation and monitoring, can achieve commitment to customer service, goods exporters can also ensure the stability of the quality of pharmaceutical product. The outsourcing of logistics activities can help increase the efficiency and effectiveness of a company's logistics functions on large-scale enterprises are moving towards multinational production to best allocate resources, by division of production and marketing using global logistics (Meng, 2014). The International logistics providers are mainly charged to cargo logistics outsourcing manager, then in its own name and the actual delivery of goods who signed a contract of carriage, the carrier makes the delivery of goods to the consumer or the specified destination such as inland trucking arrangements, documentation, booking space, customs clearance, insurance, visas, production permit, warehousing, payment guarantee, etc. Different drugs during transport or storage for temperature, monitor humidity, the national customs operations in the development of customized criteria for pharmaceutical logistics of another set. Chikumba (2009) proved that geographic information system can help health and medicinal products logistics officers to get additional spatial information, such as locations of health facilities and environmental factors and computerized to monitor the flow of medicinal products from a warehouse to health service delivery points and determine understocked or overstocked products at each health facility. This study according to the transportation process in different regions to climate change, the special considerations of long-range transport vehicle on land, sea, and air shipment. Through this study, literature review GDP and GMP criteria, service criteria screened out the first stage, the Delphi method to implement the survey, by the opinions of experts who reviewed the repeated exchange, to achieve consistency of service criteria opinions.

2. GOOD DISTRIBUTION PRACTICE, GDP

The concept of pharmaceutical quality continued to improve, quality control from production to sales surface extending surface, the medicinal products quality management covers the entire life cycle of drugs of GDP came into being. Drugs are many external factors that can affect the quality of drugs, based on this factor in international

pharmaceutical inspection treaty organization in the distribution process. Over 120 participating countries for common GDP of wholesale distributors of risk management, inspection, inspectors found counterfeit drugs in discussions, etc. Table 1 shown good distribution practices scope implementation parties.

Table-1. GDP and scope of the implementation parties

Country	Time	Suppliers
WHO	2015	manufacturers, distributors, suppliers, distributors, wholesalers, traders, transport companies, transport operators
EU	2015	manufacturers, dealers, distributors, wholesalers
Singapore	2016	manufacturers, distributors, traders, distributors, dealers
Malaysia	2015	manufacturers, importers, wholesalers
Canada	2015	manufacturers, packagers, the label suppliers, inspectors, distributors, importers, wholesalers
United States	2017	manufacturers, pharmacies, distributors, importers and exporters, wholesale distributors, logistics providers

Source: Taiwan Generic Pharmaceutical Association (2017)

World Health Organization (WHO) in 2005 and the promulgation of GDP, in other countries or organizations have reference to the provisions, then according to their national laws, industrial development and operating environment to develop criteria for GDP. WHO and other countries of the criteria content shown in table 2 selected countries within the table to be formally admitted to the international pharmaceutical inspection treaty organization of the main members.

Table-2. GDP WHO, EU and Taiwan common criteria

WHO (2017)	Taiwan	EU 2017
1 Introduction	1 Scope	1 Quality
2 File scope	2 Quality system	2 Personnel service
3 Definitions	3 Personal	3 Workplaces
4 General Principles	4 Document	4 Document
5 Medicinal products for human use distribution regulations	5 Premise and equipment	5 Jobs
6 Organization and management	6 Operation	6 Complain
7 Persons	7 Returns, Complaint, and recalls	7 Outsourcing jobs
8 Quality Systems	8 Self inspection	8 Self Check
9 Workplaces, warehousing and storage operations		9 Transport
10 Vehicles and equipment		10 Final provisions
11 Container and labels		
12 Sending and receiving		
13 Transport		
14 Files		
15 Repackaging and relabeling		
16 Customer complaints		
17 Recall		
18 Product Return		
19 Imports		
20 Contract activities		
21 Self-Audit		

Source: this study

There is no particular distribution's GDP for active pharmaceutical ingredients(API) specifications, the manufacturer's criteria for API GMP part II / ICH Q7 guideline covers only a part of GDP. European commission as the first binding document, specifications and scope of GDP on drug internationally shown in table 3.

Table-3. API GDP implementation of contents

EU 2013	World Health Organization (2013)	IPEC Europe (2018)	Active Pharmaceutical Ingredients Committee (2014)
1 Scope	1 Introduction	1 Quality	1 quality system
2 Quality System	2 General considerations	2 organizational and personnel	2 organizational and personnel
3 Personnel	3 Definitions	3 workplace	3 workplace
4 File Management	4 Quality Management	4 warehousing and storage operations	4 warehousing and storage operations
5 Regulations	5 organizational, personnel	5 device	5 device
6 Program	6 workplaces	6 File Management	6 File Management
7 records	7 Storage, warehousing	7 repackaging and relabeling	7 repackaging and relabeling
8 workplaces, equipment	8 File Management	8 customer complaints	8 customer complaints
9 receives	9 repackaging, relabeling	9 recall	9 recall
10 Storage	10 customer complaints	10 Product Return	10 Product Return
11 Transport	11 Recall	11 unqualified products	11 unqualified products
12 Information transfer	12 Product Return	12 shipping	12 shipping
13 Product Return	13 Unqualified products	13 contract activities	
14 customer complaints and recalls	14 shipping		
15 Self-Audit	15 contract activities		

Source: IPEC Europe (2018); The European Commission (2013); WHO (2013); APIC (2014) this study

Table 4 shown the content and scope of the implementation on pharmaceuticals GDP news transmission and substandard goods processing operations, other pharmaceuticals and GDP is roughly the identical content rules (APIC, 2014).

Table-4. Content and scope of the implementation

Organization	
WHO	Specification applies to pharmaceutical sales starting at the company until all aspects of personnel and the final consumer, including all participants, such as pharmaceutical manufacturers and wholesalers, as well as brokers, suppliers, vendors in the medicinal products trade and the sales process logistics companies, transportation companies and transportation agencies and their employees. Staff of government agencies, regulatory bodies, international procurement agencies, donor agencies, certification bodies and other relevant agencies should consider the relevant sections of the specification.
EU	Distribution means comprising procurement, import, storage, supply or export activities.
IPEC	Applies to all steps of the supply chain and distribution
APIC	Distribution means comprising procurement, import, storage, supply or distribution of export activity or a sender refers to the business or part of the transmission, such as (re) processors, (re) packer, transport and warehousing company, contract agents, brokers, traders, other than the original manufacturer's suppliers.

Source: IPEC Europe (2018); TEC (2013); WHO (2013); APIC (2014) this study

WHO, EU, China, Singapore, Malaysia, United Kingdom, Australia, Canada and the United States have developed an excellent marketing norms medicinal products regulations to ensure that drugs in transit storage, transport and distribution of drugs can maintain quality and protect the public pharmaceutical safety. WHO countries in the world began to pay attention to GDP its purpose is to make sure that the medicinal products quality and package integrity to be maintained, medicinal products for human use from the process stream after leaving the factory, each stage has risks, shipping industry criteria to follow GDP goods transportation, so the person can reduce damage and things caused, even if there is an abnormal event occurs, can follow GDP documented traceability links in question and effective damage control, function and value of GDP lies in avoiding abnormal occur, can be traced back flow of drugs and effective control abnormal situation further expansion.

3. RESEARCH METHOD

3.1. Delphi Method

This study applied Delphi methods to establish the criteria for the logistics outsourcing managers in pharmaceutical industry. Since pharmaceutical industry has been less research and explore outsourcing in logistics managers of logistics service criteria, this study uses Delphi methods to understand the operation of the industry case mode, construct a suitable logistics service standard this case company, the research methods will be divided into four sections described below. First, the data collection specification is currently relevant international health organizations have been enacted, such as the WHO, PIC/S, EU, Taiwan, as well as by the relevant literature, periodicals, expert opinions, books, government regulations, etc., and many collect information will be classified information, organize, develop a selection process. The study will design a questionnaire Delphi method to establish the selection procedures for literature search, expert-depth interviews, and GDP norm design of the first phase of the questionnaire, semi-open structure questionnaire distributed to fill the expert, analyzed by finishing the first phase of the returned questionnaires, the aggregate of the expert opinions, the modifications or additions in the second stage questionnaires, structured questionnaire survey conducted in the second phase. If consensus cannot be reached, according to the results of the questionnaire again after finishing the analysis, and then proceed to revise the questionnaire survey of the third phase.

3.2. Questionnaire Design

The medicinal products GDP gather relevant job specification is currently the world health organization has been enacted and EU gathering information will be classified information, organize, develop selection criteria. Delphi method to integrate the views of groups of experts to seek logistics service standards for the industry and Delphi method selection panel members and senior management executives of the company will be the case, the senior professionals, industry experts contract group list, through the perspective of different levels of workers to view logistics service standards. In this study, three indicators taken in the establishment of a list of experts and the participation of expert willingness, expertise and diverse representation. Reliability and validity of expertise and diverse representation of the results in the questionnaire can improve the recovery rate of Dalkey (1969) that when a member of the experts. Delphi method at least 10 experts can be reduced to a minimum error. Therefore, this case study from the company, with industry experts selected 10 members of the expert group.

3.3. Delphi Questionnaire Implementation

The academics and industry experts, and experts aggregated comments to provide the logistics industry service criteria, the consensus. The first step, experts and professors to discuss and determine the number of candidates and the expert group includes pharmaceutical industry, academia advanced in related fields. The main criteria of providing increased logistics service for the preliminary. One expert from air freight forwarder. One professor from university. One sales executive from the pharmaceutical company. In this study (GDP, 2018)(Guide on the principals of good distribution practice of active substances for medicinal products for human use) (PI 041-7) and previous studies established on medicinal products criteria on logistics service provider were divided into eight factors and 56 criteria, as shown in Table 5.

4. RESEARCH RESULTS

4.1. Initial analysis

The first stage of the investigation to review the validity of the questionnaire. The first phase three questionnaire issued and returned.

Table-5. Medicinal products logistics service criteria

Factors	Logistics service criteria	References
Quality	Ensure the consistency of drug delivery	IPEC Europe (2018)
	Ensure packaging integrity	GDP (2018)
	Ensure that the drug is stored in an appropriate place	GDP (2018)
	Ensure the delivery is zero error	WHO (2013)
	Ensure the correctness of transport related documents	GDP (2018)
	Drugs can ensure timely completion of customs clearance procedures	IPEC Europe (2018)
	Provide professional and quality service personnel	WHO (2011)
Freight	Offer competitive prices	WHO (2011)
	Flexible negotiation of freight	WHO (2011)
	Proactive notification freight ups and downs trend for managers to make appropriate arrangements for shipping	Meng (2014)
Service	Providing exclusive service window	Meng <i>et al.</i> (2010)
	Fast processing and response to emergency cases	IPEC Europe (2018)
	Speedy processing of claims	APIC (2014)
	Still in accordance with the commitments agreed to make arrangements when faced with unexpected volume	Meng <i>et al.</i> (2010)
	Service can be flexible to meet customer needs and time	IPEC Europe (2018)
	Handling customer complaints and assist in the investigation of cases of customer complaints	Meng <i>et al.</i> (2010)
	From time to time provide new or changed regulations ordinance	Meng (2014)
	Establish global locations, able to quickly deal with matters related to arrival of goods at destination	Meng <i>et al.</i> (2010)
	Provide climate and packing group advisory services, such as local climate conditions and on packaging and storage recommendations	Meng <i>et al.</i> (2010)
Delivery	Ensure drug safety and on-time delivery	IPEC Europe (2018)
	Delivery of real-time tracking and response	IPEC Europe (2018)
	During the peak season to ensure that accommodation provided without problems	GDP (2018)
	Deviation in the course of delivery conditions immediately report	GDP (2018)
	Deviation event review and corrective action plan to provide transport services	GDP (2018)
	Refrigerated or other temperature-controlled goods to be transported should be provision of process temperature log	GDP (2018)
	Providing the best delivery route planning	Meng <i>et al.</i> (2010)
	Assistance and coordination with the shipping validation activity plan	GDP (2018)
Document and human resources	Drug delivery processes files need to be saved properly and could date back	GDP (2018)
	GDP/GMP specification of compliance document management, file have to be kept for more than 7 years	GDP (2018)

	Delivery of relevant documents should be made immediately and get back	Meng <i>et al.</i> (2010)
	Sufficient manpower, so that the various services are not interrupted	GDP (2018)
Equipment	Provides reliable transport vehicles, transport vehicles as box-shaped and lockable control	GDP (2018)
	Refrigerated transport and storage are required to undergo efficient validation	GDP (2018)
	Refrigerated vehicle temperature monitoring devices and alerting devices	GDP (2018)
	Specification for transport vehicle, regular maintenance	GDP (2018)
	Refrigerated transport vehicles are periodic calibrated	GDP (2018)
	Temperature warehouse are periodic calibrated	GDP (2018)
	Transportation vehicles cleaning procedures	GDP (2018)
	Ensure that storage of the workplace environment is clean	GDP (2018)
	Technology	With exception handling capabilities
Provide written procedures for processing jobs abnormal conditions		GDP (2018)
With a dangerous goods expertise and skills in handling		GDP (2018)
Expertise in High potency / High Toxicity drugs		GDP (2018)
Emerging-market delivery route planning		GDP (2018)
Transport capacity for risk assessment		GDP (2018)
Drug storage conditions and other transport-related GMP/GDP of knowledge		(GDP, 2018)
Reverse logistics capacity, able to handle rejection and recalls of pharmaceutical products		GDP (2018)
Certification and training	Workers receive the necessary GMP / GDP Training and regular training	APIC (2014)
	Acquired Partners in Protection (PIP) Certification	APIC (2014)
	Obtain United States Business Coalition against terrorism (C-TPAT) certification	IPEC Europe (2018)
	Obtain Authorized Economic Operator (AEO) certification	IPEC Europe (2018)
	Drug distribution has excellent specification (GDP) Blue-chip vendors	IPEC Europe (2018)
	Have a safe handling of dangerous goods training certificate	Meng (2014)
	Public transport of dangerous goods have professional staff training certificate	Meng (2014)
	Workers should receive High potency/Toxicity drug safety training	WHO (2013)
Obtain air freight forwarders license, corporate license, the business registration certificate	Meng <i>et al.</i> (2010)	

Source: this study

Table-6. First phase of three experts' comments and suggestions

Logistics service criteria	Expert number	Comments and suggestions
Proactively notify freight change trend for managers to make appropriate arrangements for shipping	1	Shipment changes, vulnerability factors of the environment contain, the trend is not easy to estimate, unrealistic, suggested deleting
Proactively notify freight change trend for managers to make appropriate arrangements for shipping	2	Shipment changes, in fact, is not easy to forecast trends
Adequate staffing, so that the service is not interrupted	1	Air cargo logistics industry as a service industry, this is the basic service requirements, without the inclusion
Adequate staffing, so that the service is not interrupted	2	Air cargo logistics industry as a service industry, this is the basic service requirements
Dealt promptly and respond to emergencies	1	The basic service does not require special consideration
Dealt promptly and respond to emergencies	2	Basic service
Airfreight forwarders have a license, company license, business registration certificate	1	Opening a company must have licenses, no need to list them
Airfreight forwarders have a license, company license, business registration certificate	2	Necessary basic business license
Airfreight forwarders have a license, company license, business registration certificate	3	Opening a company must have licenses, no need to list them
With exception handling capabilities	1	Suggested merging to provide written procedures for processing jobs abnormal conditions
With exception handling capabilities	2	Suggested merging
With exception handling capabilities	3	merging to provide written procedures for processing jobs abnormal conditions
Service can be flexible to meet customer needs and time	1	To meet customer demand for the most basic service attitude, no need to be included
Service can be flexible to meet customer needs and time	2	Basic service attitude
Provide professional and quality service personnel	1	The most basic services in logistics industry, no need to be included
Provide professional and quality service personnel	2	Basic service, no need to be included
Provide professional and quality service personnel	3	The most basic services in logistics industry, no need to be included
Transport related documents should be made immediately and retrieved	1	Basic service, no need to be included
Transport related documents should be made immediately and retrieved	2	Basic service
Ensuring the delivery of zero mistakes delivery	1	The most basic services in logistics industry, no need to be included
Ensuring the delivery of zero mistakes delivery	2	Basic services, advice on contract constraints
The process of document delivery of medicine need to be stored properly and available dates back	1	Files transported by air mail will be retained for 2 years, no need to be included
The process of document delivery of medicine need to be stored properly and available dates back	2	Files transported by air mail will be retained for 2 years, no need to be included
Ensure drug safety and on-time delivery destination	1	Deliver to destination on time
Ensure drug safety and on-time delivery destination	2	Change to deliver to destination on time
Customer complaints handling customer complaints and assist in the investigation of cases	1	To handle customer complaints quickly
Customer complaints handling customer complaints and assist in the investigation of cases	2	Handle customer complaints quickly

Customer complaints handling customer complaints and assist in the investigation of cases	3	Amended to deal with customer complaints quickly
According to the contract agreed to make arrangements when faced with unexpected shipments	1	Able to arrange accommodation for the face of the sudden increase in shipments
According to the contract agreed to make arrangements when faced with unexpected shipments	2	Able to arrange accommodation for the face of the sudden increase in shipments
According to the contract agreed to make arrangements when faced with unexpected shipments	3	Able to arrange accommodation for the face of the sudden increase in shipments
Deviation from the event to review and provide a shipping corrective action plan	1	Delay event and provide a remedy
Deviation from the event to review and provide a shipping corrective action plan	2	Delay event and provide a remedy
Provide written procedures for processing jobs abnormal conditions	1	Provide written procedures for emergency processing jobs
Provide written procedures for processing jobs abnormal conditions	2	Providing emergency contingency processing operations written procedures
Providing climate and packing group counseling services, such as local climatic conditions, and give advice on the packaging and storage	1	Provide climate and packing consulting services
Providing climate and packing group counseling services, such as local climatic conditions, and give advice on the packaging and storage	2	Provide climate and packing consulting services
Immediately report transit process deviation	1	Immediately report transit process deviation
Immediately report transit process deviation	2	Immediately report transit process deviation
Flexible negotiation of freight	1	Shipment bargaining flexible
By setting up global service base, we can quickly deal with matters related to cargo arrival destinations	1	By setting up a global service locations
By setting up global service base, we can quickly deal with matters related to cargo arrival destinations	2	By setting up a global service locations
Ensure the integrity of pharmaceutical packaging	1	Pharmaceutical packaging integrity
Ensure the integrity of pharmaceutical packaging	2	Pharmaceutical packaging integrity
Drugs can ensure consistency of delivery	1	Drugs can deliver the consistency
Drugs can ensure consistency of delivery	2	Drugs can deliver the consistency
Drugs can ensure timely completion of customs clearance procedures	1	Drugs on time to complete clearance procedures
Drugs can ensure timely completion of customs clearance procedures	2	Drugs on time to complete clearance procedures
To ensure that the drugs are stored in the appropriate place	1	Drugs are stored at room temperature location
To ensure that the drugs are stored in the appropriate place	2	Drugs are stored at room temperature location
Refrigerated transport or other product should provide the temperature control of the temperature record	2	Adjusted to file facets
Refrigerated transport or other product should provide the temperature control of the temperature record	3	Add to document management facets
Assist with the implementation and delivery of efficiency programs to verify the correct	2	Adjustments to the equipment facets
Assist with the implementation and delivery of efficiency programs to verify the correct	3	Add to equipment facets

Source: this study

The questionnaires were recovery expert review members proposed to delete, modify, adjust the comments archive as shown in Table 6 shows the results of the first stage of three experts' comments and suggestions collated as the second phase of the survey questionnaire.

Remove a total of 11 criteria, including change initiative shipment trends notification for managers to make appropriate arrangements for the shipment has 2 experts believe that freight changes, in fact, not easy to do trend estimates, proposed to delete; other criteria to remove items belonging to the experts believe that the most basic of the international logistics services and service attitude, and the international logistics industry a fully competitive market, all with a full range of logistics service and to meet the spirit and the fulfillment of the needs of the industry, it should not be included in consideration of logistics service criteria were deleted on the basis of a vote frequency 2 times. Adjust two criteria of refrigerated transport or other temperature control products should provide the recorded temperature fortune and assist with the implementation and verification ensure efficient transport plan. Two expert advice adjusted to document management and device dimensions, more in line with the actual situation, and therefore two logistics service criteria within the exclusive needs of the pharmaceutical industry. Two logistics service criteria were proposed adjustments were each recommendation 2 times, the opinions of experts who have reviewed converge. Wherein an expert reviewer proposed to simplify the eight factors to international logistics service provider criteria and manager of logistics outsourcing customized services criteria will then survey the second stage, so expert reviewers' viewpoints and then express their views. Three expert reviewers all agreed to simplify factors and questionnaire in the next phase of its criteria will be changed to international logistics provider criteria and drug logistics outsourcing client satisfaction.

4.2. The Criteria Degree of Importance and Satisfaction Analysis

The third phase of both criteria degrees of importance and satisfaction which evaluated by pharmaceutical industry logistics outsourcing client satisfaction analysis, and data were analyzed and aggregated, if necessary, as the main basis for the next phase of the questionnaire. There are 19 criteria evaluated by the expert members of the importance and satisfaction criteria project evaluation results are shown in Table 7 and 8.

Table 9 shows 13 importance criteria for the mean degree of greater than 4.5 and the rest of the criteria are also of importance and expert panel are considered 19 criteria are important. The 13 logistics service satisfaction items reached its satisfied; there are six criteria for their logistics service satisfaction to provide the competitive price, shipment deliberations of elasticity, customer complaint quickly add or change from time to time to provide the relevant laws and regulations, transport situation and respond to real-time tracking, delay event and provide a remedy.

On table 9 of standard deviation of criteria its importance less than 1, indicating a small degree views discrete expert group. The standard deviation of all logistics service satisfaction is less than 1, indicating a small degree views discrete expert group members. The level of importance of the criteria quartile deviation are less than 0.6, the display between the views of the panel members are highly consensus. The logistics service satisfaction quartile deviation less than 0.6, the display between the views of the panel are highly consensus.

Table-7. Importance degree of international logistics provider

Item e	Guidelines Name	Frequency distribution					Majority	Average	Standard deviation	Quartile deviation
		5 Points	4 Points	3 Points	2 Points	1 Points				
1	Consistency of Delivery	6	4	0	0	0	5	4.6	0.52	0.50
2	Pharmaceutical packaging integrity	8	2	0	0	0	5	4.8	0.42	0.00
3	Drugs are stored at room temperature	8	2	0	0	0	5	4.8	0.42	0.00
4	The correctness of the delivery of relevant documents	8	2	0	0	0	5	4.8	0.42	0.00
5	Drug clearance procedures can be completed on time	5	5	0	0	0	4	4.5	0.53	0.50
6	Provide competitive prices	1	7	2	0	0	4	3.9	0.57	0.00
7	Flexible negotiation of freight	1	7	2	0	0	4	3.9	0.57	0.00
8	Provide exclusive service window	3	6	1	0	0	4	4.2	0.63	0.38
9	When faced with a sudden increase in volume can arrange accommodation	5	5	0	0	0	5	4.5	0.53	0.50
10	Complaints dealt with promptly	6	4	0	0	0	5	4.6	0.52	0.50
11	From time to time provide new or changed regulations ordinance	2	4	4	0	0	4	3.8	0.79	0.50
12	Establish global locations	2	6	2	0	0	4	4	0.67	0.00
13	Provide climate and packing consultancy services	2	7	1	0	0	4	4.1	0.57	0.00
14	On time delivery	6	4	0	0	0	5	4.6	0.52	0.50
15	Delivery of real-time tracking and response	6	4	0	0	0	5	4.6	0.52	0.50
16	During the peak season to ensure that accommodation provided without problems	6	4	0	0	0	5	4.6	0.52	0.50
17	When the delivery is delayed will report immediately	5	5	0	0	0	5	4.5	0.53	0.50
18	When delayed will provide a back-up plan	5	5	0	0	0	5	4.5	0.53	0.50
19	Providing the best delivery route planning	6	4	0	0	0	5	4.6	0.52	0.50

Source: this study

Table-8. Satisfaction degree by medicinal products logistics outsourcing client

Item	Guidelines Name	Frequency distribution					Majority	Average	Standard deviation	Quartile deviation
		5 Points	4 Points	3 Points	2 Points	1 Points				
1	Consistency of Delivery	1	8	1	0	0	4	4.0	0.47	0.00
2	Pharmaceutical packaging integrity	0	8	2	0	0	4	3.8	0.42	0.00
3	Drugs are stored at room temperature	1	6	2	1	0	4	3.7	0.82	0.38
4	The correctness of the delivery of relevant documents	2	5	3	0	0	4	3.9	0.74	0.38
5	Drug clearance procedures can be completed on time	2	7	0	1	0	4	4.0	0.82	0.00
6	Provide competitive prices	0	3	7	0	0	3	3.3	0.48	0.38
7	Flexible negotiation of freight	0	2	8	0	0	3	3.2	0.42	0.00
8	Provide exclusive service window	1	5	4	0	0	4	3.7	0.47	0.50
9	When faced with a sudden increase in volume can arrange accommodation	1	6	2	1	0	4	3.7	0.82	0.38
10	Complaints dealt with promptly	1	2	5	2	0	3	3.2	0.92	0.38
11	From time to time provide new or changed regulations ordinance	0	1	9	0	0	3	3.1	0.32	0.00
12	Establish global locations	1	4	5	0	0	3	3.6	0.70	0.50
13	Provide climate and packing consultancy services	1	4	5	0	0	3	3.6	0.70	0.50
14	On time delivery	3	6	1	0	0	4	4.2	0.63	0.38
15	Delivery of real-time tracking and response	0	3	5	2	0	3	3.1	0.74	0.38
16	During the peak season to ensure that accommodation provided without problems	1	4	5	0	0	3	3.6	0.70	0.50
17	When the delivery is delayed will report immediately	0	6	3	1	0	4	3.5	0.71	0.50
18	When delayed will provide a back-up plan	0	5	3	2	0	4	3.3	0.82	0.50
19	Providing the best delivery route planning	1	3	6	0	0	3	3.5	0.71	0.50

Source: this study

Table-9. Importance and satisfaction of mean, standard deviation, and quartile deviation

Importance	Average (μ)	Determine criteria	Importance	Quantity	
		$\mu \geq 4.5$	Very Important	13	
		$3.5 \leq \mu < 4.5$	Important	6	
		$2.5 \leq \mu < 3.5$	Common	0	
		$1.5 \leq \mu < 2.5$	Unimportant	0	
		$\mu < 1.5$	Very Unimportant	0	
Satisfaction level	Standard deviation (σ)	Determine criteria	Dispersion degree	Quantity	
		$\sigma > 1$	Dispersion degree is big	0	
		$\sigma < 1$	Dispersion degree is small	19	
		Quartile deviation (Q)	Determine criteria	Consensus degree	Quantity
			$Q \leq 0.6$	Consensus degree is high	19
	$1 \leq Q < 0.6$		Consensus degree is moderate	0	
	$Q > 1$		Consensus degree is low	0	
	Average (μ)	Determine criteria	Satisfaction degree	Quantity	
			$\mu \geq 4.5$	Very Satisfied	0
			$3.5 \leq \mu < 4.5$	Satisfaction	13
			$2.5 \leq \mu < 3.5$	Common	6
			$1.5 \leq \mu < 2.5$	Dissatisfied	0
		$\mu < 1.5$	Very dissatisfied	0	
Standard deviation (σ)		Determine criteria	Dispersion degree	Quantity	
		$\sigma > 1$	Dispersion degree is big	0	
		$\sigma < 1$	Dispersion degree is small	19	
Quartile deviation (Q)		Determine criteria	Consensus degree	Quantity	
		$Q \leq 0.6$	Consensus degree is high	19	
		$1 \leq Q < 0.6$	Consensus degree is moderate	0	
		$Q > 1$	Consensus degree is low	0	

Source: this study

Two tables of 10 and 11 shown 25 criteria of medicinal products logistics outsourcing client by 10 experts of both importance and satisfaction evaluation results.

On table 12 on mean of importance and satisfaction level of 10 experts to assess 25 criteria. Just one criteria which mean of less than 3.5, up ordinary level are refrigerated transport equipment and warehouses subject to ensure efficient verification, refrigerated trucks have temperature monitoring equipment and alarm devices, storage of goods to ensure the workplace environment clean, has the safe handling of dangerous goods training certificate, mean on four criteria is greater than (or equal to) 4.5, up to the extent of very important; the rest of the criteria also reached important level, experts are considered 19 criteria are important.

In this criteria to provide reliable transport vehicles, transport vehicles and car-shaped lockable control, to ensure that the goods of the deposit of the workplace environment clean, dangerous goods have the expertise and ability to handle, have the ability to transport risk assessment, have the ability to reverse logistics management, can effectively deal with rejection and recalled medicinal products, five criteria to the extent of satisfied; the other 20 the mean value between 2.5 to 3.5, only of ordinary level. All the criteria of standard deviation of the importance and satisfaction are less than 1. Only one criteria of the implementation of efficient transport plan to verify the correct its quartile deviation greater than 0.6. Up to moderate importance are other criteria which quartile deviation less than 0.6. The panels for advice criteria is of still a high degree of consensus. All of the criteria of satisfaction with quartile deviation are less than 0.6, the display between panel comments of having a high degree of consensus.

Table-10. Importance evaluation results by 10 experts

Item number	Criteria	Frequency distribution					Majority	Mean	Standard deviation	Quartile deviation
		5	4	3	2	1				
1	In line with GDP / GMP norms of the document management approach, the file must be saved for more than seven years	3	5	2	0	0	4	4.1	0.74	0.38
2	With the implementation of transport efficiency programs to verify the correct	3	4	3	0	0	4	4	0.82	0.75
3	Provide reliable transport vehicles, transport vehicles for the car-shaped and can be locked control	4	5	1	0	0	4	4.3	0.67	0.5
4	Refrigerated transport and storage facilities subject to ensure efficient verification	6	3	1	0	0	5	4.5	0.71	0.5
5	Refrigerated trucks have temperature monitoring equipment and alarm device	6	3	1	0	0	5	4.5	0.71	0.5
6	Vehicle regular maintenance specifications	3	7	0	0	0	4	4.3	0.48	0.38
7	Refrigerated transport vehicles regularly corrected plan	2	8	0	0	0	4	4.2	0.42	0
8	Periodic calibration temperature warehouse transport	4	6	0	0	0	4	4.4	0.52	0.5
9	Vehicle cleaning program operating procedures	3	6	1	0	0	4	4.2	0.63	0.38
10	Ensure clean workplace environment of the deposit of the goods	6	4	0	0	0	5	4.6	0.52	0.5
11	Provide emergency processing jobs have written procedures	4	6	0	0	0	4	4.4	0.52	0.5
12	The expertise and dangerous goods handling capacity	4	6	0	0	0	4	4.4	0.52	0.5
13	With high potency/high toxicity of drugs expertise and processing capabilities	5	3	2	0	0	5	4.3	0.82	0.5
14	Emerging markets (Southeast Asia) transport route planning with transport risk assessment capabilities	1	3	6	0	0	3	3.5	0.71	0.5
15	With transport risk assessment capabilities	4	4	2	0	0	5	4.2	0.79	0.5
16	Possess the GMP/GDP related transport and storage professional knowledge	3	7	0	0	0	4	4.3	0.48	0.38
17	With reverse logistics processing capability, can effectively deal with rejection and recalled drugs	5	4	1	0	0	5	4.4	0.7	0.5
18	Workers receive the necessary GMP / GDP training and regular training	2	7	1	0	0	4	4.1	0.57	0
19	Obtain oversea partners in protection (RIP) certification	0	4	6	0	0	3	3.4	0.52	0.5
20	Obtain united states trade partnership against terrorism (C-TPAT) certification	0	4	6	0	0	4	3.8	0.63	0.38
21	Obtain authorized economic operator (AEO) certification	3	5	2	0	0	4	4.1	0.74	0.38
22	Obtain Drug GDP blue-chip vendor	4	6	0	0	0	4	4.4	0.52	0.5
23	Obtain dangerous goods safety management training certificate	5	5	0	0	0	5	4.5	0.53	0.5
24	Obtain public transport of dangerous goods professional training certificate	3	7	0	0	0	4	4.3	0.48	0.38
25	Workers should accept the high potency/high toxicity safe handling of drugs training	4	4	2	0	0	5	4.2	0.79	0.5

Source: this study

Table-11. Satisfaction evaluation results by 10 experts

Item	Criteria	Frequency distribution					Majority	Mean	Standard deviation	Quartile deviation
		5	4	3	2	1				
1	In line with GDP / GMP norms of the document management approach, the file must be saved for more than seven years	0	0	9	1	0	3	2.9	0.32	0
2	With the implementation of transport efficiency programs to verify the correct	0	0	9	1	0	3	2.9	0.32	0
3	Provide reliable transport vehicles, transport vehicles for the car-shaped and can be locked Control	2	8	0	0	0	4	4.2	0.42	0
4	Refrigerated transport and storage facilities subject to ensure efficient verification	0	0	9	1	0	3	2.9	0.32	0
5	Refrigerated trucks have temperature monitoring equipment and alarm device	1	0	8	1	0	3	3.1	0.74	0
6	Vehicle regular maintenance specifications	0	0	9	1	0	3	2.9	0.32	0
7	Refrigerated transport vehicles regularly corrected plan	0	0	9	1	0	3	2.9	0.32	0
8	Periodic calibration temperature warehouse transport	0	0	9	1	0	3	2.9	0.32	0
9	Vehicle cleaning program operating procedures	0	0	9	1	0	3	2.9	0.32	0
10	Ensure clean workplace environment of the deposit of the goods	0	5	5	0	0	3	3.5	0.53	0.5
11	Provide emergency processing jobs have written procedures	0	0	9	1	0	3	2.9	0.32	0
12	The expertise and dangerous goods handling capacity	0	5	5	0	0	4	3.5	0.53	0.5
13	With high potency/high toxicity of drugs expertise and processing capabilities	0	0	9	1	0	3	2.9	0.32	0
14	Emerging markets (Southeast Asia) transport route planning with transport risk assessment capabilities	0	2	8	0	0	3	3.2	0.42	0
15	With transport risk assessment capabilities	1	4	5	0	0	3	3.6	0.7	0.5
16	Possess the GMP/GDP related transport and storage professional knowledge	0	0	9	1	0	3	2.9	0.32	0
17	With reverse logistics processing capability, can effectively deal with rejection and recalled drugs	1	5	4	0	0	4	3.7	0.67	0.5
18	Workers receive the necessary GMP / GDP training and regular training	0	0	10	0	0	3	3	0	0
19	Obtain overseas partners in protection (RIP) certification	0	0	10	0	0	3	3	0	0
20	Obtain United States Trade Partnership Against Terrorism (C-TPAT) certification	0	0	10	0	0	3	3	0	0
21	Obtain Authorized Economic Operator (AEO) certification	0	3	7	0	0	3	3.3	0.48	0.38
22	Obtain drug GDP blue-chip vendor	0	2	7	1	0	3	3.1	0.57	0
23	Obtain dangerous goods safety management training certificate	0	2	8	0	0	3	3.2	0.42	0
24	Obtain public transport of dangerous goods professional training certificate	0	1	9	0	0	3	3.1	0.32	0
25	Workers should accept the high potency/high toxicity safe handling of drugs Training	0	0	9	1	0	3	2.9	0.32	0

Source: this study

Table-12. Mean, standard deviation and quartile deviation of importance and satisfaction

		Determine criteria	Importance	Quantity	
		Importance	Mean (μ)	$\mu \geq 4.5$	Very Important
$3.5 \leq \mu < 4.5$	Important			20	
$2.5 \leq \mu < 3.5$	Common			1	
$1.5 \leq \mu < 2.5$	Unimportant			0	
$\mu < 1.5$	Very unimportant			0	
Standard deviation (σ)	Determine criteria		Dispersion degree	Quantity	
	$\sigma > 1$		Dispersion degree is big	0	
	$\sigma < 1$		Dispersion degree is small	25	
Quartile deviation (Q)	Determine criteria		Consensus degree	Quantity	
	$Q \leq 0.6$		Consensus degree is high	24	
	$1 \leq Q < 0.6$		Consensus degree is moderate	1	
	$Q > 1$		Consensus degree is low	0	
Satisfaction	Mean (μ)		Determine criteria	Satisfaction degree	Quantity
			$\mu \geq 4.5$	Very satisfied	0
			$3.5 \leq \mu < 4.5$	Satisfaction	5
		$2.5 \leq \mu < 3.5$	Common	20	
		$1.5 \leq \mu < 2.5$	Dissatisfied	0	
	Standard deviation (σ)	Determine criteria	Dispersion degree	Quantity	
		$\sigma > 1$	Dispersion degree is big	0	
		$\sigma < 1$	Dispersion degree is small	25	
	Quartile deviation (Q)	Determine criteria	Consensus degree	Quantity	
		$Q \leq 0.6$	Consensus degree is high	25	
		$1 \leq Q < 0.6$	Consensus degree is moderate	0	
		$Q > 1$	Consensus degree is low	0	

Source: this study

The third stage by the mean degree of importance and satisfaction with the standard deviation and quartile deviation survey results show a consistent consensus expert group on the importance and satisfaction. Observed from table 13 to drop in the importance and satisfaction between belonging to very important on 13 criteria, the degree of satisfaction from the 13 criteria that did not very satisfied. Six criteria belonging to important of its corresponding logistics service satisfaction and only if the three criteria of satisfaction and the other three as common.

From Table 14 shown importance and satisfaction survey found four criteria are very important but corresponds one only of satisfaction and remaining three to normal satisfaction. The 20 criteria are important which corresponds only four of the same score satisfied and the remaining 16 satisfaction criteria are all ordinary.

Table-13. Importance of logistics service satisfaction table

Item	Criteria	Importance				Service Satisfaction			
		Majority	Mean	Standard deviation	Quartile deviation	Majority	Mean	Standard deviation	Quartile deviation
2	Pharmaceutical packaging integrity	5	4.8 *****	0.42	0.00	4	3.8 *****	0.42	0.00
3	Drugs are stored at room temperature	5	4.8 *****	0.42	0.00	4	3.7 *****	0.82	0.38
4	The correctness of the delivery of relevant documents	5	4.8 *****	0.42	0.00	4	3.9 *****	0.74	0.38
1	Consistency of Delivery	5	4.6 *****	0.52	0.50	4	4.0 *****	0.47	0.00
10	Complaints dealt with promptly	5	4.6 *****	0.52	0.50	3	3.2 ****	0.92	0.38
14	On time delivery	5	4.6 *****	0.52	0.50	4	4.2 *****	0.63	0.38
15	Delivery of real-time tracking and response	5	4.6 *****	0.52	0.50	3	3.1 ****	0.74	0.38
16	During the peak season to ensure that accommodation provided without problems	5	4.6 *****	0.52	0.50	3	3.6 *****	0.70	0.50
19	Providing the best delivery route planning	5	4.6 *****	0.52	0.50	3	3.5 *****	0.71	0.50
5	Drug clearance procedures can be completed on time	4	4.5 *****	0.53	0.50	4	4.0 *****	0.82	0.00
9	When faced with a sudden increase in volume can arrange accommodation	5	4.5 *****	0.53	0.50	4	3.7 *****	0.82	0.38
17	When the delivery is delayed will report immediately	5	4.5 *****	0.53	0.50	4	3.5 *****	0.71	0.50
18	When delayed will provide a back-up plan	5	4.5 *****	0.53	0.50	4	3.3 ****	0.82	0.50
8	Provide exclusive service window	4	4.2 *****	0.63	0.38	4	3.7 *****	0.67	0.50
13	Provide climate and packing consultancy services	4	4.1 *****	0.57	0.00	3	3.6 *****	0.70	0.50
12	Establish global locations	4	4 *****	0.67	0.00	3	3.6 *****	0.70	0.50
6	Provide competitive prices	4	3.9 *****	0.57	0.00	3	3.3 ****	0.48	0.38
7	Flexible negotiation of freight	4	3.9 *****	0.57	0.00	3	3.2 ****	0.42	0.00
11	From time to time provide new or changed regulations ordinance	4	3.8 *****	0.79	0.50	3	3.1 ****	0.32	0.00

Source: this study
 ***** Very Important & Very Satisfied
 ***** Important & satisfied
 **** Common & Common
 *** Unimportant & Unsatisfied
 ** Very unimportant & Very unsatisfied

Table-14. Importance and satisfaction survey

Item	Criteria	Importance				Logistics service Satisfaction					
		Majority	Mean	Standard deviation	Quartile deviation	Majority	Mean	Standard deviation	Quartile deviation		
10	Ensure clean workplace environment of the deposit of the goods	5	4.6	*****	0.52	0.5	3	3.5	*****	0.53	0.5
4	Refrigerated transport and storage facilities subject to ensure efficient verification	5	4.5	*****	0.71	0.5	3	2.9	***	0.32	0
5	Refrigerated trucks have temperature monitoring equipment and alarm device	5	4.5	*****	0.71	0.5	3	3.1	***	0.74	0
23	Obtain dangerous goods safety management training certificate	5	4.5	*****	0.53	0.5	3	3.2	***	0.42	0
8	Periodic calibration temperature warehouse transport	4	4.4	*****	0.52	0.5	3	2.9	***	0.32	0
11	Provide emergency processing jobs have written procedures	4	4.4	*****	0.52	0.5	3	2.9	***	0.32	0
12	The expertise and dangerous goods handling capacity	4	4.4	*****	0.52	0.5	4	3.5	*****	0.53	0.5
17	With reverse logistics processing capability, can effectively deal with rejection and recalled drugs	5	4.4	*****	0.7	0.5	4	3.7	*****	0.67	0.5
22	Obtain GDP blue-chip vendor	4	4.4	*****	0.52	0.5	3	3.1	***	0.57	0
3	Provide reliable transport vehicles, transport vehicles for the car-shaped and can be locked control	4	4.3	*****	0.67	0.5	4	4.2	*****	0.42	0
6	Vehicle regular maintenance specifications	4	4.3	*****	0.48	0.38	3	2.9	***	0.32	0
13	With high potency/high toxicity of drugs expertise and processing capabilities	5	4.3	*****	0.82	0.5	3	2.9	***	0.32	0
16	Possess the GMP/GDP related transport and storage professional knowledge	4	4.3	*****	0.48	0.38	3	2.9	***	0.32	0
24	Obtain public transport of dangerous goods professional training certificate	4	4.3	*****	0.48	0.38	3	3.1	***	0.32	0
7	Refrigerated transport vehicles regularly corrected plan	4	4.2	*****	0.42	0	3	2.9	***	0.32	0
9	Vehicle cleaning program operating procedures	5	4.2	*****	0.63	0.38	3	2.9	***	0.32	0.5
15	With transport risk assessment capabilities	5	4.2	*****	0.79	0.5	3	3.6	*****	0.7	0
25	Workers should accept the high potency/high toxicity safe handling of drugs training	5	4.2	*****	0.79	0.5	3	2.9	***	0.32	0
1	In line with GDP / GMP norms of the document management approach, the file must be saved for more than seven years	4	4.1	*****	0.74	0.38	3	2.9	***	0.32	0
18	Workers receive the necessary GMP / GDP training and regular training	4	4.1	*****	0.57	0	3	3	***	0	0
21	Obtain authorized economic operator (AEO) certification	4	4.1	***	0.74	0.38	3	3.3	***	0.48	0.38
2	With the implementation of transport efficiency programs to verify the correct	4	4	*****	0.82	0.75	3	2.9	***	0.32	0
20	Obtain United States Trade Partnership Against Terrorism (C-TPAT) certification	4	3.8	*****	0.63	0.38	3	3	***	0	0
14	Emerging markets (Southeast Asia) transport route planning with transport risk assessment capabilities	3	3.5	*****	0.71	0.5	3	3.2	***	0.42	0
19	Obtain oversea partners in protection (RIP) certification	3	3.4	***	0.52	0.5	3	3	***	0	0

Source: this study

5. CONCLUSIONS

5.1. Interpretations of Finding

This study investigated the logistics services provided by the international logistics providers, formulation optimization of transport logistics outsourcing logistics service criteria set managers, the validity of an expert to find the logistics customized logistics service criteria of pharmaceutical raw materials so that participation in transport activities in the people, processes, files, and device management requirements to follow criteria to promote compliance with the medicinal products delivery of pharmaceutical distribution specification. International logistics provider offers medicinal products transport and storage is as a general commodity distribution and storage this mode of operation hidden many of the risks such as pharmaceutical quality changes, medicinal products packaging damage, cargo loss and other risks. Logistics industry should understand GDP specifications and have a more positive response and support. Since the international logistics service provider configuration perspective when the degree of importance and satisfaction in the survey found that the group of experts agreed that the 19 criteria are very important. According to 13 service satisfaction results in the criteria of the logistics industry that has not been very satisfied by client. Six criteria belonging to important of its corresponding logistics service satisfaction only receive satisfaction and normal in this criteria of the international logistics industry still further enhance their ability to communicate and services and those who need. The criteria based on GDP specifications and customer needs arising from the criteria, the criteria for the pharmaceutical industry of customized, on the degree of importance and logistics service satisfaction survey found that there are four criteria the level of importance as very important corresponds the logistics service satisfaction.

There are 20 criteria for the level of importance as important, which corresponds to the logistics service satisfaction, four reached only satisfactory, the remaining 16 as ordinary. Therefore, logistics industry to provide implementation of the marketing concept of GDP to take the initiative to provide attention GDP norms that demand-side and supply-side consistency awareness in order to achieve the best services. Expert review after the second stage the development of two levels providing the logistics industry service criteria and outsourcing customized logistics service criteria. The third stage of importance and satisfaction surveys to provide logistics industry service criteria. There are 13 criteria as very important which corresponds to service satisfaction is ordinary. There are six criteria belonging to important which corresponds to the degree of satisfaction is ordinary. The findings shown importance and satisfaction is there is a gap of. The four criteria of importance shown as very important which corresponds to the logistics service satisfaction, only one of satisfaction and the remaining three to ordinary. There are 20 criteria for its the degree of importance as important, which corresponds to the logistics service satisfaction only four reached only satisfactory and the remaining 16 as ordinary. Observed logistics providers lack of GDP norm concept resulting in services on the demand difference.

5.2 Managerial Implications

The pharmaceutical industry is required to adapt to the rapidly changing market to respond quickly to fight aging and the rapid introduction of products in order to win business opportunities, so the selection of professional and competitive logistics industry. The logistics service value of air cargo logistics provider (ACLP) affects the outsourcing firm's logistics perception, consequent behavior and partnership selection. The importance of these logistics criteria has led to a growing body of research to define essential characteristics of service value (Meng, 2014). In addition to guarantee a good quality is vital to the human health and life safety from the factory to the circulation of any link does not allow errors. Pharmaceutical logistics management should cover the complete product life cycle. In order to protect the quality and efficacy, should follow each link has its criteria such as manufacturing follow pharmaceutical good manufacturing practice follow good medicinal products stored jobs, logistics and transport medicinal products to follow good distribution practice. Export business throughout oversea belong to the high price of medicinal products and having the time delivery limit and restrictions to preserve the

environment so the international transport become the main mode. Meng *et al.* (2010) proved that the service criteria of air cargo logistics providers (ACLP) affect the outsourcing firm's logistics perception, consequent behavior and partnership selection. Medicinal products storage and transportation process in global distribution, product quality by external environmental factors of risk increases, and therefore cannot ensure the quality and consistency of medicinal products for human use manufactured when, the pharmaceutical manufacturer to arrange transport plan must consider more factors. Pharmaceutical product in the logistics process any little mistake such as damage to cargo and delays in delivery time on the shipping process often accompanied by customer complaints and customer claims resulting in loss of business and reputation on the financial.

Taiwan government already announced the GDP draft in 2014 but the entire domestic physical distribution correlation entrepreneur, international logistics industry lacks this GDP standard concept in Taiwan. This paper suggests that international transport procedure is complex and difficult to control, which increases the risk of the drugs transportation; the government should integrate the international logistics industry as the GDP counseling subjects to force international logistics industry to plan the work flow early or to build the associated hardware and software equipment to improve the overall quality of international transport to expanding competitiveness. In this study, through data collection experience and GDP aggregate specification expert group build a set of logistics service criteria for the pharmaceutical industry in the logistics criteria to provide international logistics industry into the pharmacy industry to shorten or reduce the barriers to entering current international medicinal products market to create high profit competitive environment.

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