

Chapter 72

The Ways for Improving the Operations of Hospital Industry: The Case in Macau

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Abstract Macau is one of the well-known tourism-dominated urban cities with high population density and limited natural resources. To maintain the reputation of tourism industry and cope with expanding public service demand, such as hospital service, hospital industry is now looking for solutions to enhance the service quality and efficiency. This paper proposes analysis and suggestions towards the improvement of operations activities in Macau's hospital industry. The analysis covers the impact of economic growth, employee distribution, population growth, current scale of hospital and infrastructure in Macau. Discussion about the suitability of adopting third party logistics at certain logistics activities is also conducted. Through the research contributions, it is expected that the globalized concept of "leisure and tourism oriented city" can be realized in Macau.

Keywords Macau · Hospital · Casino · Logistics · Supply chain management · Information system

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72.1 Introduction

As being a tourism and gambling oriented urban city, Macau is now suffering from the urban planning and public service demand problem. After the Macau government released the gambling market at 2002, more than 17 casinos coming from different countries have opened in Macau (The Statistics and Census Service 2012). These casinos not only provide gambling activities, but also offer multiple entertainment activities like international drama and exhibition infrastructures. Thus, the infrastructure developed by casinos does help the attraction of tourists. In recent years, the casino industry has provided significant contribution towards the growth of Macau's economic as well as tourism industry. Nevertheless, the economic growth does trigger number of environmental and public health problems, particularly the growing demand of hospital services. The increasing numbers of vehicle users and tourists, logistics movement of goods to casinos and public transport have further deteriorated the living environment and the health of public citizens. Power, industry and transport are the three major sectors responsible for fossil-fuel-related CO₂ emission in each country in the world (Timilsina and Shrestha 2009). The vehicles that are powered by gasoline and diesel fuel, emit the vast majority of pollutants. Tang and Wang (2007) have conducted a study about the traffic-induced air quality and noise problems into different urban areas in Macau. They found that the greater street canyon effects in the historical urban areas, the higher the carbon monoxide concentration is generated by the vehicles. Thus, air pollution problem does affect the development of a local tourism industry, and more importantly, create health implication problems of Macau's citizens, including increase of public health care costs and loss of productivity.

In views of the importance of economic growth and public health care concern, hospital industry presents a great demand for further enhancing the hospital services' quality and reducing the cost of service. The objectives of this paper include (i) Review current logistics practices in hospital, the way of cutting logistics costs, information system support and coordination; (ii) Identify the current situation of hospital and potential development of hospital industry; (iii) Address feasible solutions towards the operations improvement of hospital industry. This paper is organized as follows: A review of logistics activities in hospital is provided in Sect. 72.2. Section 72.3 conducts the background study about the hospital industry in Macau. The factor analysis about the operations improvement of hospital industry in Macau is conducted at Sect. 72.4. Finally, a conclusion is presented in Sect. 72.5.

72.2 Logistics Activities in Hospital

Similar to other industries, hospital operations such as material management, food and medical supply are relied on using the supply chain concept to manage. Liao and Chang (2011) identify certain factors that affect overall supply chain of the

hospital's logistics system including (i) Safety stock. (ii) Lead time. (iii) Transportation capacity. The hospital management is required to keep reviewing these logistics functions, classifying value added and non-valued added activities, and identifying the costs associated with these activities thereby decreasing non-valued added activities (Aptel and Pourjalali 2001).

The logistics department of the hospital supports three internal logistics activities including (1) drug distribution, (2) food service and laundry, and (3) supply and processing of sterilized items in hospital. At first, with regard to the drug distribution, (Fineman and Kapadia 1978) identify three models of drug distribution, Model 1: direct delivery to medical department through central warehouse. Model 2 is the semi-direct delivery via the warehouses of the medical department. The final model is direct delivery via daily replenishment of small medical department storage facilities.

Food service and laundry is the second type of logistics activities, in general, these activities are run internally so as to better control the quality of food and products. If these activities are subcontracted, hospital usually awards the activities to service providers who have certification. The job duty of logistics department is to control and evaluate the service providers (Aptel and Pourjalali 2001). The assessing criteria include the food quality, hygiene control and cost efficiency. Supply and processing sterilized items in hospital is the final type of logistics activities. These logistics activities are referred to handling and storing sterilized items. The sterilization processes include decontamination, washing, rinsing and packaging. Sterilization of hospital surgical and medical treatment supplies is to ensure instruments and equipment to be clean and with acceptably low level of microbial and viral infectious agents (Fineman and Kapadia 1978). These sterilized items are required special logistics handling and storage in order to avoid contamination. The level of special logistics handling and storage is subject to three categorized items including (Fineman and Kapadia 1978) 1. Critical items-item is introduced into the body such as hypodermic syringes. 2. Semi-critical items-item is introduced into body openings such as anaesthesia equipment, cystoscopes, thermometers,..., etc. 3. Non-critical items- item only contacts with intact skin, such as water bottles and ice bags. Given the special logistics handling and storage may require additional manpower and equipment cost, the way how to minimize the inventory and replacement stock of sterile items as well as the storage method is the major practice for this kind of logistics activities.

72.3 The Hospital Industry in Macau

Since 2012, Macau Government has opened its gaming industry which awarded six gaming concession and sub-concessions to companies based in Las Vegas (Wynn Resorts, Las Vegas Sands, and MGM Mirage) and Hong Kong (Galaxy Casino and Melco Crown), the economic is dramatically reformed to gaming-led tourism and recorded a substantially growth in recent year (Tang and Sheng 2009).

There are around 44,806 citizens who are working in the gaming industry of Macau which is equivalent to 11 % of the total employed population (The Statistics and Census Service 2012). The numbers of employees working in the gaming industry have been increased more than 47 % as compared with the figure recorded in 2004. The casino gaming industry is one of the economic pillars to support the local economy. The gaming industry contributes \$18.6 billion, which is accounted for 77 % of government revenues DSEC: Employed Population by Industry, Retrieved April 20 2012). Despite the gaming industry sector brings the huge economic benefit to Macau, many casino employees have suffered from potential health problems in which they are exposed to second hand smoke (SHS) at work (Chan et al. 2012). Most of the casinos allow smoking, it is known that smoking can cause cancer, the types of cancer include lungs, larynx, esophagus, mouth, kidney and pancreas (U.S. Department of Health and Human Services: The Health Consequences of Smoking: A Report of the Surgeon General. Centers for disease control and prevention, National center for chronic disease prevention and health promotion, Atlanta, GA 2004). The second-hand smoking has the same impact to health problems and can also cause cancer of lungs as direct smoking (Cormany and Baloglu 2011). Currently, there are two public hospitals, Hospital Conde S. Januário Hospital Centre (CHCSJ) and Macau University of Science and Technology Hospital, and one private hospital, Hospital Kiang Wu providing a total of 1,172 beds in 2010. It is believed that the increasing number of new admissions will further increase the operating cost as well as medical material cost of the hospital operations budgets. Thus, to allow focus on medical treatment and improve the operation efficiency, the re-engineering and streamlining of some non-medical treatment activities such as supply chain and logistics are therefore taken as the major priority of the top management.

72.4 Suggestions of Improving Hospital Operations

72.4.1 Outsource of Logistics Activities

To cope with the expansion of logistics services demand and concentrate on the core competence, many industries have already outsourced their logistics functions to third party logistics providers. Lieb and Bentz (2005) address the growth of third party logistics (3PL) industry due to increased globalization, pressure to reduce cost and enhance the performance achievement. Koh and Tan (2005) state that the annual growth in 3PL industry in China has been increased 25 % on average, leading the U.S. (10–15 % annual 3PL growth). The distinctive advantages of 3PL providers include improve customer service, respond to competition and asset elimination (Handfield and Nichols 1999). Despite outsourcing logistics to 3PL shows the numerous potential, the research done by Sahay and Mohan

(2006) argues that nearly 55 % of the companies terminated the relationship with 3PL after 3–5 years. The reasons are due to the perception of the 3PL users are uncertain about the service levels and unrealistic expectation (Lambert et al. 1999). Further, Zhang et al. (2005) state that 3PL providers have to respond to changing customer needs. In order to do so, the establishment of performance measurement to evaluate 3PL providers is necessary.

Refer to the logistics outsourcing in hospital, research studies conducted by Aptel and Pourjalali (2001) show that food services and laundry services in certain U.S. and France hospitals have been outsourced to service providers which owned relevant certification. Apart from outsourcing the food and laundry services, outsourcing the medical related logistics activities shows the potential for the cost reduction of inventory. In fact, the medical material cost nearly consumes about 30 % of total hospital operations cost (Tung et al. 2008). Another advantage of outsourcing medical logistics activities is to help improve the usage of space. Due to limited supply of land use in Macau, outsourcing the medical storage areas allows better utilization of land use such as increasing the number of beds. Hospital management is therefore suggested to cooperate with 3PL providers to develop a long term partner relationship by establishing a series of performance indicators as well as standard operations procedures in order to better align the service level and expectation.

72.4.2 Development of E-health Information Management System

To control the hospital resources utilization and coordinate the information flow between supply chain parties in a hospital is another direction to cut cost and achieve competitive advantage in the medical sector. Many research studies proved the contributions of information systems towards the cost minimization and operational efficiency improvement. Gilbert (2001) addresses the value of an e-health system for reducing the procurement cost in hospital. More and Mcgrath (2002) clarify the e-health system is a kind of information and communication technology to help hospital management in decision-making, record and storage of relevant data of various supply chain participants including suppliers, hospitals and patients. Merode et al. (2004) try to review the potential of using the enterprise resource planning system (ERP) to support hospital management. In order to respond to the non-deterministic processes such as stochastic demand of front line patient services, visualizing the resources status and short term planning are essential in hospital. Anoraganingrum and Eymann (2009) advocate the application of radio frequency identification system (RFID) to improve the hospital efficiency. They propose using a RFID system to improve the performance of sterilization and equipment monitoring.

72.5 Conclusion

The substantial growth of economy and the development of gambling market in Macau has brought side effects of health problem to workers in casinos. In views of the importance of economic growth and public health care concern, the development of hospital industry shows a great potential value for the general public. Currently, there are three hospitals in Macau, and it is expected that the increased demand of the public health care will trigger the concerns of hospital management regarding operation efficiency enhancement and cost reduction of medical materials. Therefore, streamlining the supply chain and improving logistics activities in hospital industry is essential. The feasible suggestions for the development of hospital industry and improvement of the operations are summarized as follows:

Cooperate with external service providers in order to better concentrate on the core competence of hospital management. A long term partner relationship is suggested to develop between hospital and service providers through establishing a series of performance indicators as well as standard operations procedures in order to better align the service level and expectation.

Develop an e-health information system to improve the operation efficiency and inventory control of medical materials. The selection of information systems includes e-health, ERP and RFID systems. Different information systems show the potential value for improving the hospital efficiency and reducing costs. Nevertheless, the cost and benefit analysis, investment payback of information technology (IT) and influences of IT implementation towards the hospital industry are other important topics that the hospital management should not omit when adopting these technologies and systems.

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