Industry System Integration of Drug Distribution on Pharmaceutical Installation Based on Supply Chain Management

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Abstract. Supply Chain Management (SCM) requires all sectors to collaborate, coordinate, communicate and exchange information to improve inter-sector productivity. It takes information technology and supply chain concepts to integrate all sector activities involved such as, in the health field such as clinics and health services. System integration will create good communication and exchange of information, and data availability will be fulfilled. This research will try to offer information technology in the form of integration system by using SCM concept to improve management performance; this research focuses on pharmaceutical warehouse operational activities in the way of distribution and management of drugs. Delivery of LPLPO by Clinic, Monitoring of transactions by Public Health Office. This activity is an SCM practice that requires connected entities to view the same data without disrupting the independence of each sector. System design using the waterfall method. The system will be built with PHP programming and MySQL database. Testing system using Xampp 6.2 server with black box method, testing is done by requesting pharmacy installation officer to use the system. The results of the system test show that the performance in the internal control section helps management in looking at the stock situation, the type of drug demand, and the trend of existing disease patterns in the community. Data visualization is also helpful in determining health intervention decisions and policies. This has opened the eyes of management to the importance of information technology. Finally, this research becomes a recommendation to the pharmaceutical installation management to use information technology in operational activities

Keywords: management system, supply chain, integration system, pharmacy installation

1. Introduction
The company's management always wants to increase productivity and performance improvement; this can be the optimization of time, location, and quantity of product flow. A company must be able to establish cooperation with other companies to form a network of activities both production and distribution of a company to another company. At the managerial level will undoubtedly want the
industry management carefully and flexible. The concept of Supply Chain Management (SCM) able to support the business needs of both internal and external [1], and allows for collaboration and coordination among the companies involved [1][2] in order to maximize the SCM concept, information technology engagement will become a necessity, information technology can lead to supply chain growth as it enables companies to collaborate and compete [3]. Information technology is an integrated system [2] that enables communication and information exchange in practice in the field [4] can be key to reducing operational costs [5]. Therefore, information technology and SCM strategy can create significant changes to company performance [3], implementation of information technology in practice SCM is an innovative solution [6].

Technology that can support supply chain operations is leading to increased productivity, distribution management, and warehousing activities in supply chain networks and companies can interact with all their partners in the supply chain. In logistics systems or supply chain practice it needs optimization and a significant revolution in the use of information technology to support business processes. Various information technologies have been adopted by different companies in the supply chain [3]. Accessibility on mobile devices has been done to support business processes. Information technology in the form of the most widely used website portal [7]. Not only the implementation of the website but in playing an important role that connects all aspects of the supply chain is the system of integration [1][8][9].

SCM practices in the field of health such as pharmaceutical installations in the form of procurement, management, distribution of drugs and this section require the exchange of information between sectors [10]. Although pharmaceutical companies have not yet implemented best practices from the SCM model [11]. However, the integration system can be applied to address some of the problems in internal pharmaceutical installations. The focus of the use of information technology focused on the operational implementation of the supply chain by pharmaceutical warehouses [12]. System integration strongly supports the practice of supply chain management (SCM) carried pharmacy [1], the primary integration systems involving all areas of health. This technology is used for data management of drug use [13] as well as being a medium of communication on demand and distribution of drugs [14]. Pharmacy Installation manages a lot of data and performs document analysis with manual processes; this process can only ensure completeness Data but not for accuracy of data so that data validation will be highly questionable [15]. Operational pharmacy installations are connected with the clinic and are under the coordination of the public health office. This activity is done as the company involved in the supply chain system.

This research will design an integrated system for drug distribution by pharmaceutical installations. The focus of research on the operation of pharmaceutical installations in the form of procurement, management, and distribution of drugs. Pharmaceutical warehouse operational activities will be linked to clinic and health services, the integration system will create communication and exchange of information very well, and the availability of data will be fulfilled. This research will be a recommendation to pharmaceutical installation management that can be useful to assist management in making decisions to intervene health policy, better service delivery along with the improvement of operational performance and communication relationship between long-term sectors.

2. Proposed Method
This research used LPLPO data (Demand Sheet and Drug Use Report) 17 clinics of Mamasa District. Each clinic had diverse drug demands, but each clinic had one or more of the most common and often requested medicines due to high levels of people's consumption needs. The most frequent and frequently required types of drugs can be considered to determine the trend of disease patterns in the community. This data will be processed in the system integration is so constructed that can be monitored in real time the level of use of drug types and patterns of existing diseases in the community.
For the table of drug data, we made the grouping into five sections based on the type of disease. These five sections will later become data control for the health department to be able to manage the development of disease patterns. Current disease trend data can be seen in Table 1.

Table 1. Data trends in pattern diseases

| Type               | Demand | Spending | Stock |
|--------------------|--------|----------|-------|
| General & Tooth    | 23     | 43       | 23    |
| KIA & Nutrition    | 34     | 23       | 23    |
| TB & Leprosy       | 45     | 43       | 32    |
| Malaria & filariasis | 21    | 32       | 23    |
| Immunization       | 23     | 12       | 32    |

**Figure 1.** Data graph of disease pattern trend (Source: Pharmaceutical Installation)

Drug requirements were grouped by type of disease. Data on drug demand, use and stock was the results of the overall recapitulation of drugs used for each kind of disease. The high use of drugs was a description of the tendency of disease patterns in the Clinic.

2.1. Company feature

An integrated system model was adopted from PT. Enseval Putera Megatradinng Tbk. Makassar, which had implemented an integration system for supply chain practices and had successfully improved and improved the company's performance. LPLPO from 17 Clinics that routinely apply to pharmaceutical warehouses was a significant source of data managed by pharmaceutical installations. To maximize internal control function in the system, we refered to the district health office functionality that served as the oversight of drug distribution, drug demand, and drug management.

2.2. Expert system

The design of system integration used waterfall method which included requirement analysis, system analysis, design, development, and testing. Testing process used black box testing model and involved several pharmaceutical warehouse staff as end users. End-user engagement was intended to ensure that the system meets the needs of users. For system requirement analysis, we were based on a standard procedure flow running on the pharmaceutical storehouse as shown in Figure 2. Flow-based file system (manual procedure) was the initial support to computerize the manual process systematically [16]. This was the analysis phase to identify the needs of the system.
3. Results

A website portal framework can simplify the distribution process and reduce the involvement of intermediaries. A website with the ability to present accurate information about fish products, fish prices, fish weight and location of ponds will help farmers in marketing their crops. The website can accommodate data from many sources, more than one farmer so that visitors such as industry, restaurants or end consumers can see the different types of fish and different fish farmers or suppliers. This system certainly adds to the quality of the information.

3.1. Development of new product

The innovation of information technology had been offered in the Field of Health which applied supply chain practice in operational activities. A new product in which the sector involved should work together to improve management performance in each segment of the health sector, such as a clinic, pharmacy installations, and health offices. New product in the form of the integrated computerized system by utilizing internet facility and database server with the intention of optimizing SCM practice in each sector. This integration system will assist management in running operational activities with highly coordinated and informative.

3.2. Construction

The feature system from each sector had been shown in Figure 3. The system was referred to as technical and relationship-based activity of each sector. This relationship was a significant factor in the construction of the supply chain. Fig. 3 explained a framework system of the construction supply chain. The framework emphasizes improving the integration of the supply chain.
Figure 3. Construction system integration of supply chain practices

Figure 3 explained bring LPLPO Health Centre can ask the pharmacy online. The LPLPO submission will be pressed within the server data which in turn will be accessible and controlled by the Health Department and verify the LPLPO, as appropriate between the previous request, the stock and the plan of need. The verification results will be returned to the clinic and forwarded to the pharmaceutical installation. Up here health center can see the data verification results of the Health Office while the Installation will prepare a package of drugs and then schedule the distribution to clinic requesters. The clinic and health department can access the remaining stock of medicines in pharmaceutical installation. Stakeholders of the health agency can observe the distribution of drugs as a form of control (internal control).

This system provided a data visualization that helps the health department's management to determine the decision by viewing and monitoring the trend of common disease patterns in the community. System interface can be seen in Figure 4.

3.3. Decision support

The graph presented in the system was sourced from clinical drug demand data. The system can be strategic decision-making tools to help the management of knowledge to define the pattern of diseases and make sure about the planning of public health intervention.

3.4. Risk management

Management performance in every sector will demand the availability of an adequate internet network. If not met and the system will still be used it can cause delays in the process of data transfer so that information becomes obstructed.

3.5. Recommendation management

The product was a continuous learning process. It had been shown that the system integrates with supply chain concept was a tool for performance and service improvement in a public health sector. Although in the end, every sector will be interested in the implementation and study of information technology, its use and success will still be weak if not supported by good internet service. This research could be a recommendation to use as a supplementary administration or as a form of strategy to map the needs and determine health policy interventions.
4. Conclusion
Integrate the proposed system when implemented then enable improved performance in all sectors involved in the health field, improved management performance influence on financial or operational costs reduction. The clinic can know the dissemination of information about the stock of pharmaceutical stock in the pharmaceutical warehouse in real time, so the clinic can apply LPLPO which referred to the amount of pharmaceutical warehouse stock. The health service that functions as a supervisory function will get a report on the amount of drug stock. Additionally, this technology offered a new way to make health policy intervention decisions by looking at the data visibility of the pattern of diseases occurring in the community based on the most requested and distributed types of drugs. Increased management performance allows for an impact on financial or operating costs. Because the implementation of this system was very dependent on the availability of internet services, then there was the potential for obstacles, but if the internet service solutions can be met, then this system becomes a source of competitive advantage for each sector. Integration of this system will maintain the independence of each sector thought it was connected with several entities in one database server.

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