

ABC/XYZ Analysis for Kanban System Implementation in Pharmaceutical Supply Chain: A Case of Ethiopian Pharmaceutical Supply Agency

Asrat Mekonnen Gobachew, Addis Ababa University, Ethiopia

Daniel Kitaw, Addis Ababa University, Ethiopia

Eshetie Berhan, Addis Ababa University, Ethiopia

Hans-Dietrich Haasis, University of Bremen, Germany

ABSTRACT

The purpose of this study is to show how the implementation of the Kanban system based on ABC/XYZ analysis helps in improving the inventory management system in the supply chain where there is a lack of proper inventory management. Ethiopian pharmaceutical supply agency's distribution network is taken as a case to show the significance of the Kanban system. Monthly data for one year is collected and is accompanied by primary data obtained from direct observation and discussion with the company's management staff. ABC, XYZ, and ABC/XYZ matrix analyses were performed to determine items to be considered in Kanban implementation. By analysis, it is shown that the Kanban system can improve inventory-related costs by about 75%. While the Kanban system is rarely implemented in the pharmaceutical sector so far, it is understood in this study that it can bring improvements in the sector if properly implemented. Though it is shown by analyzing data on how the Kanban system can improve inventory-related costs, it is imperative to practically implement it for validation of its effectiveness.

KEYWORDS

ABC/XYZ Analysis, Inventory Management, Kanban System, Pharmaceutical Supply Chain

INTRODUCTION

Health care provision is generally designed to serve a longstanding role in delivering high-quality services at the point of use. To provide a required service, the health care sector needs a huge investment that should constantly improve as it is associated with human life. The availability of pharmaceutical and medical supplies through the pharmaceutical supply chain is a matter of life or death to the patients (Abukhousa et al. 2014). When the healthcare and pharmaceutical sector functions properly, more patients will be taken care of and more lives will be saved which results in improved quality of life of the society (Tetteh 2009). For this reason, the need for improving the provision of health care services through enhancing the quality of service, and patient safety and satisfaction is now highly required (Papalexi, Bamford, and Dehe 2016). However, health-care organizations have been required to be more effective using the same or similar levels of resource (Papalexi, Bamford, and Dehe 2016), which is a huge setback to the health care sector and it is more challenging especially in developing

DOI: 10.4018/IJISSCM.2021070104

countries like Ethiopia in which health care sector functions with a very limited resource. To cope up with this challenge, they are looking for cost-saving, waste elimination, and better services through implementing innovative programs such as lean philosophy (Papalexi, Bamford, and Dehe 2016) which is still challenging for the countries like Ethiopia where the scarce resource is not properly managed.

As the fundamental aims behind the lean philosophy are cost reduction, quality improvement, and faster delivery via waste elimination and employee empowerment (Abdulmalek, Rajgopal, and Needy 2006), it can hugely help healthcare provision which is under restricted resource to improve its services. Lean application in healthcare focuses on quality of service to the patient and considers cost and satisfaction of the patient as the key performance indicators of the healthcare system (Spagnol, Min, and Newbold 2013; S. Kumar and Chakravarty 2015). JIT is one of the lean tools (Jorge Luis García-Alcaraz 2016) which specifically focuses on waste reduction (Spagnol, Min, and Newbold 2013). Kanban is one of the most popular tools of JIT, and it is useful to enhance visibility and inventory control systems at different stages in the supply chain (Jorge Luis García-Alcaraz 2016). Kanban can also improve the predictability and stability in inventories and help to reinforce supply chain responsiveness (Kwabena Tetteh 2008). It is stated in the research work of (Papalexi, Bamford, and Dehe 2016) that ABC analysis and the Kanban system are some of the tools to achieve lean objectives. It is also indicated in a webpage published work of (Marion 2020) that Kanban system is a scheduling system that is used in lean processes and just-in-time inventory replenishment programs to help companies improve their production and reduce their overall inventory.

In Ethiopia, more than 80% of pharmaceutical products are supplied to the market by Ethiopian Pharmaceutical Supply Agency (EPSA) with the assistance of different storage and distribution chains. The agency has nineteen regional warehouses through which pharmaceutical products are supplied to health facilities (EPSA 2018a). The government expends a lot of money to purchase, store, and distribute the products to provide the pharmaceutical items to patients. In doing this, EPSA faces a lot of problems starting from order receiving to delivery. Health facilities place an order by sending a request letter accompanied by an attachment having a list of pharmaceutical supplies they require. Order processing based on such information makes it vulnerable to make errors which leads to inappropriate data during purchase requisition and it is also time-consuming. It also results in purchase delay, delivery delays, even sometimes wrong deliveries which ultimately create problems at the original place of service. There are also problems during inventory management in the agency's warehouses; there is a vast amount of useless stock in the inventory while there is a lack of other drugs at health facilities, there is limited space to stock drugs whereas some drugs expire while in-store (EPSA 2018b). To be effective, therefore, the agency has to go for the implementation of different improvement programs. In this work, Kanban system is considered as an improvement tool. Kanban system is introduced as a tool to avoid unnecessary inventory in stock, specifically, in the main warehouse and regional warehouses, and also to ease communication among the nodes in the pharmaceutical distribution chain. And in the research the following questions are answered: (i) How can a Kanban system be implemented? (ii) How Kanban system can be used to reduce inventory (cost) and improve efficiency in the PSC?

The remainder of this report is organized as follows. Section 2 focuses on the review of related literature. Section 3 discusses the methodology employed. In section 4 data collection and analysis approaches employed are discussed. Kanban system implementation is described and shown in section 5. The results are discussed in section 6. Discussion is made in section 7 and the conclusion and future research directions are finally sketched in section 8.

14 more pages are available in the full version of this document, which may be purchased using the "Add to Cart" button on the publisher's webpage: www.igi-global.com/article/abcxyz-analysis-for-kanban-system-implementation-in-pharmaceutical-supply-chain/286633

Related Content

The Firm Boundary Decision for Sustainability-Focused Companies

Ozan Özcanand Kingsley Anthony Reeves (2011). *International Journal of Applied Logistics* (pp. 49-68).

www.irma-international.org/article/firm-boundary-decision-sustainability-focused/54714

Construction of a Relational Leadership Model Based on a Two-Stage Least Square Method and an Investigation on the Interaction Among the Factors in the Model

Shubing Guo, Xueli Zhanand Junhai Ma (2018). *International Journal of Information Systems and Supply Chain Management* (pp. 14-30).

www.irma-international.org/article/construction-of-a-relational-leadership-model-based-on-a-two-stage-least-square-method-and-an-investigation-on-the-interaction-among-the-factors-in-the-model/193661

Information Sharing in Supply Chain Systems

Lynn M. Battenand Ron Savage (2006). *Global Integrated Supply Chain Systems* (pp. 67-82).

www.irma-international.org/chapter/information-sharing-supply-chain-systems/19236

The Role of Supply Chain Innovation for New Normal on the Relationship between SCM Practices and SMEs Performance

Inda Sukati, Ali Mohsin Salim Ba Awainand Raghed Ibrahim Ismaeel (2023). *International Journal of Information Systems and Supply Chain Management* (pp. 1-15).

www.irma-international.org/article/the-role-of-supply-chain-innovation-for-new-normal-on-the-relationship-between-scm-practices-and-smes-performance/321950

Constructing a Resilient Distribution System Using Cabotage: Building a Resilience Delivering

Edison Puma-Ayasta, Jorge M. Young Lores, Carmen E. Cueto-Cachay, Aranzazu J. Caballero-Quispe, Christian A. Tinoco-Cortez, Claudia L. Espinoza-Contreras and Miguel J. Huamani Bravo (2019). *Handbook of Research on Urban and Humanitarian Logistics* (pp. 277-288).

www.irma-international.org/chapter/constructing-a-resilient-distribution-system-using-cabotage/231977