

Information Technologies for Humanitarian logistics and supply Chain Management in Zimbabwe

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Abstract

The use of information technology (IT) is highlighted as vital in modern complex logistics and supply chains. It still remains that the number of studies on the relationship between IT and logistics is still quite limited. Based on empirical data from Humanitarian logistics organizations this research outlines a classification of the ways in which organizations use IT in Humanitarian Logistics, and also tries to explain the drivers for these different utilization types. Research findings highlighted that, the use of IT for Humanitarian Logistics matters can be separated into, transaction processing, supply chain planning and collaboration, and order tracking and delivery coordination. But the drivers for humanitarian technology logistics also differ from one matter to the next. The study mainly used primary data collection method including a survey and interview.

Keywords

Information technology, Supply chain collaboration, Information sharing, Inter-organizational systems,

INTRODUCTION

The key to any successful health system is the supply of medicines, availability of essential commodities and equipment to enable testing, treatment, care and support. The Logistics and Supply Chain of HIV/AIDS related commodities generally is governed by the Ministry of Health and Child Welfare of Zimbabwe and the Medicines Control Authority of Zimbabwe. Most NGOs distribute the commodities to the countries' district and provincial hospitals and clinics. Patients would then collect the drugs from these hospitals and clinics. The utilisation of information technology (IT), in turn, is considered an imperative requirement for managing these networks, and has been associated with significant supply chain efficiency improvements (e.g. Lee and Billington, 1992; White and Pearson, 2001). Although the importance of IT for efficient SCM is widely acknowledged, empirical research assessing how IT is in practice used for the purposes of SCM is narrow. More specifically, majority of the prior research has focused either on modeling the benefits of interorganizational information technologies and information sharing, or on assessing the impact of specific technologies on supply chain efficiency. Consequently, the actual uses of IT in supply chain management as well as the reasons for using IT in a specific way still remain unclear. Due to these identified limitations in the previous literature we address the following research problem: "How and for what purposes do companies use information technology in supply chain management?" The paper is structured as follows. First, the previous literature discussing the use of IT in SCM is reviewed. Second, the research design is presented, followed by the presentation of the findings of the study. Finally, in the last two sections, the main findings are summarized and discussed and the concluding remarks are drawn.

EXISTING LITERATURE RELEVANT TO THE STUDY

Scientists have mostly concentrated on trying to implement and introduce humanitarian logistics and supply chain management to Humanitarian organizations in trying to make their efforts quicker, efficient and cost effective such researchers include, Clark and Cullin [2], Thomas [19], Van Wassenhove [27], Kleindorfer and Van Wassenhove [9], Thomas and Mizushima [20], Tomasini and Van Wassenhove [22], Thompson [21]. Others suggest Supply Chain Analytics for Humanitarian Logistics Transformation [16] and also focuses on the important role of humanitarian logistics, Networks for Africa in support for the implementation of the Millennium Development Goals.

Definition of terms

SCM alludes to the practices and procedures going for successful and effective flow of materials and data between an organization and its prompt providers. First, recent empirical studies have shown that management and integration of supply chains only rarely extends beyond the first tier suppliers and customers (e.g. Frohlich and Westbrook, 2001). Second, this definition compares to the discernment our case organizations have on SCM. With respect to IT frameworks, while talking about the utilization of IT in SCM, we allude to the utilization of interorganizational frameworks that are utilized for data sharing or potentially handling crosswise over hierarchical limits. Hence, other than inner IT frameworks, for example, Undertaking Asset Arranging frameworks, we likewise avoid distinguishing proof advances, for example, RFID from the extent of this study.

METHODOLOGY AND RESEARCH DESIGN

The research survey was conducted in Zimbabwe. Most NGOs and other Organizations with their Zimbabwean head offices for in Harare were surveyed. Participation was voluntary, allowing all willing organizations to participate in the survey. This minimized the element of bias in the sample of respondents. The sampling procedure by its nature was assumed to be random. Research involved administering questionnaires, conducting interviews and meetings with the relevant managerial, supply chain or logistics staff at head offices of willing organisations to identify and document weak points in the logistics and supply chain of HIV/AIDS commodities. 150 Questionnaires were distributed and 105 responses were recorded. Secondary data was also gathered so as to identify strengths and existing capacity in the HIV and AIDS commodity management, and determine improvements required.

Research Constructs

Types of IT use in SCM, refers to the ways in which companies employ IT for the purposes of SCM. Based on prior research discussed above, three different types of IT use in SCM – transaction processing, supply chain planning and collaboration, and order tracking and delivery coordination – were identified and chosen to represent the first construct. The first type of IT use, *transaction processing* stands for the use of IT for increasing the efficiency of repetitive information exchanges between supply chain partners. In this type of IT use the exchanged information is typically related to such tasks as order processing, billing, delivery verification, generating and sending dispatch advices, and producing order quotes. The second type of IT use, *supply chain planning and collaboration*, represents the use of IT for sharing planning-related information such as demand forecasts and other demand information, inventory information, and production capacity information, with the intention of increasing the effectiveness of the supply chain. Finally, the third type of IT use in SCM, *order tracking and delivery coordination*, refers to the monitoring of individual orders or shipments, which may consist of components or final products, with the aim of coordinating their delivery or conveying timely information of their location.

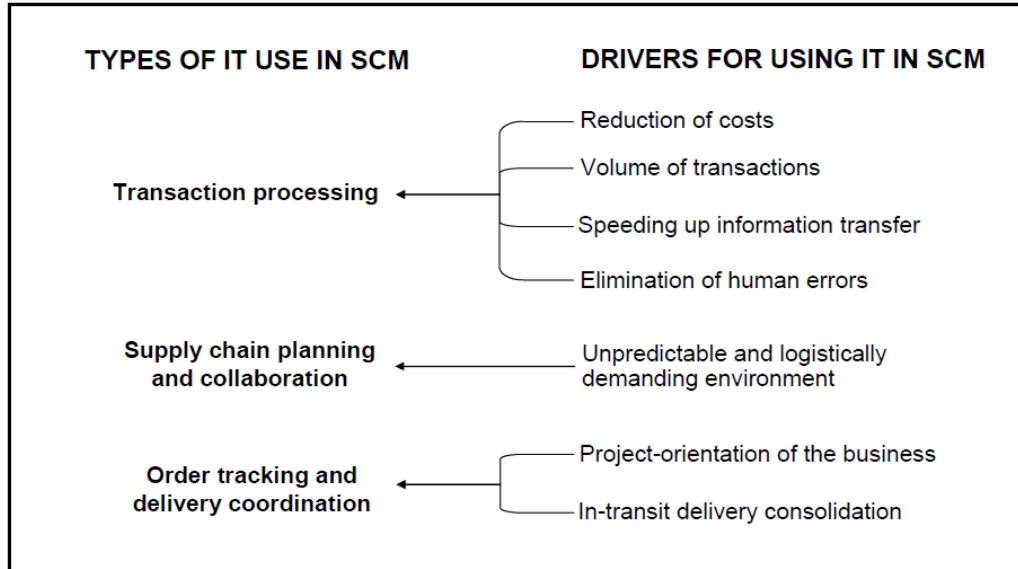


Fig 1: relationship between IT use and Drivers

Drivers for IT use in SCM

The second construct, drivers for using IT in SCM refers here to the reasons why IT is used in a certain manner in SCM. Based on our literature review, we expected that following drivers for the use IT in transaction processing can be found in the case companies: *reduction of the costs* of operational processes (manual work), improvement of information quality by *eliminating human errors*, and *speeding up the transfer of information* between organizations. We further hypothesized that the *volume of transactions* acts as a driver for using IT for transaction processing. It was also assumed that supply chain coordination information is shared especially in volatile, *unpredictable, and logistically demanding business environments*. Finally, we expected that tracking and coordination activities are performed in *project oriented businesses* and in cases with *in-transit delivery consolidation*. The presumed relationships between these drivers and the a priori constructs are presented in Figure 1.

RESULTS AND DISCUSSION

Frequency tables were drawn, then the bar charts and pie charts were chosen as distribution pattern graphs. The bar chart was chosen because it was the best form of diagram for discrete variables such as those that were obtained from the survey responses.

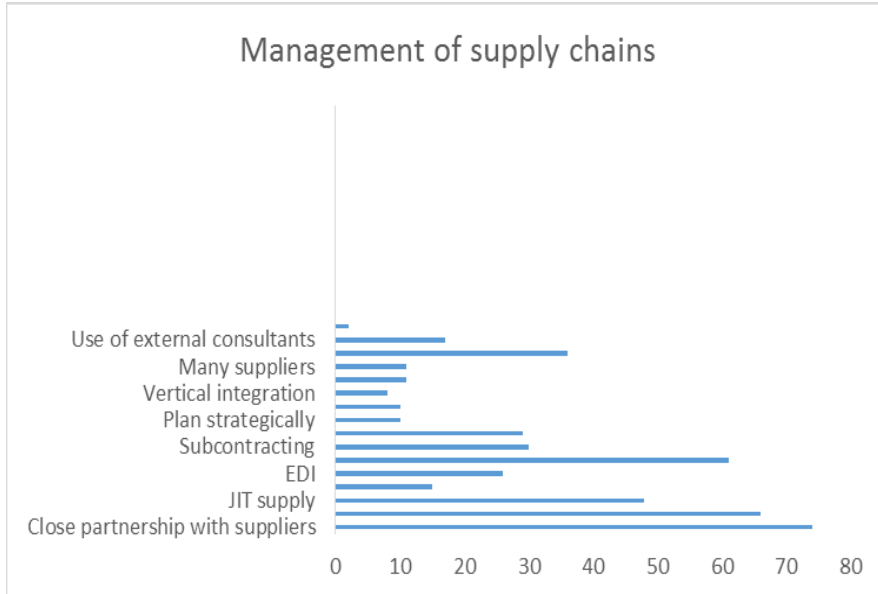


Figure 2. Management of supply Chains.

Supply chains were mostly managed and sustained through close partnerships with suppliers. EDI, Subcontracting and the use of external suppliers were also quite popular. Very few organisations used the Vertical integration method of supply chain management.

The success of organisation in managing their supply chain was also captured. Most organisations indicated that they were often successful, 56% made this indication. This also tends to point out that in some cases, but fewer, their supply chain was not successful in providing the much needed aid to beneficiaries in good time.



Figure 3. Managing supply chain success.

Most organisations were satisfied with their methods of supply chain management but in planning for the future, most organisations intend to start implementing third party logistics and vertical integration, this was the case for mostly for those that were not satisfied. The main advantage of the vertical integration is the increased control, to increase or reduce production, at will, so there is more supply chain coordination.

From the 105 responses recorded, more than 75 had a logistics department present and around 15 did not. Logistics is that part of the supply chain process that plans, implements, and controls the efficient, effective forward and reverse flow and storage of goods, services, and related information between the point of origin and the point of consumption in order to meet customers' requirements. It is pivotal for Humanitarian organizations to have such a department which ensure goods reach their intended destination in good time. Most organizations also had a clear logistics plan. It also has advantage of quick analysis, & can incorporate the complex tradeoffs.

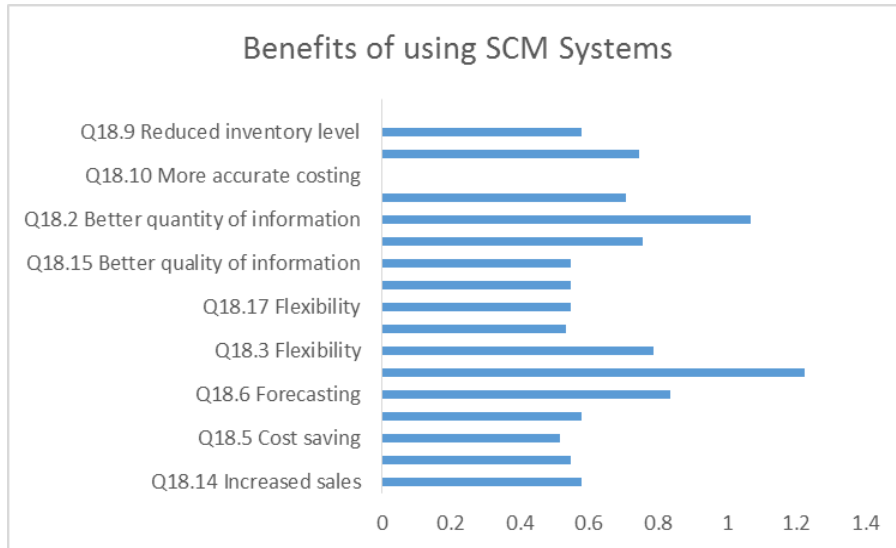


Figure 4. Benefits of using SCM systems.

The major benefit that was recorded was that of flexibility and being able to predict future requirements. This helps ensure sustainability of the supply chain. Other notable benefits included better quality information and more accurate costing.

Most participants indicated that they faced a serious problem when it comes to skills shortage, vendor support and integration with customers system, but these were rather rare when compared to responses of those facing a little problem mostly in Hidden cost.

Most organisations plan to introduce the standard package of e-business as everyone is equal on this platform, when you are interacting with your clients or vendors using e-business, it is difficult for them to tell how big your business is. With a professionally developed and maintained website, any small organization can look as impressive on the Internet as the large corporations do. It is a level playing field that helps create opportunity for small organizations.

Important measures that must be promoted and implemented include closer cooperation between companies, improved information provision, better infrastructure and more funding and support amongst others.

Forecasting and quantification

Generally forecasting and quantification for national HIV/AIDS commodities is mostly done by the AIDS and TB Unit with assistance from Natpharm. It is normally driven by funds available for procurement and final quantities to order. This is mostly not accurate as there is no systematic process for forecasting national commodity requirements.

Government is encouraged to establish a well-defined and sustainable systematic process for forecasting and quantifying national commodity requirements. better and more accurate forecasts will only happen when important logistics data on supplies distributed to victims is collected and reported on a routine bases.

Procurement

According to the survey, the facilities resupply quantities are determined digitally through computer. Currently, most donors are using their own procurement mechanisms to bring HIV & AIDS commodities into the country. These are not well coordinated thus they impose the risks of duplication and gaps in commodities availability. It is of great importance that procurement is coordinated centrally through information sharing among different NGOs, government and donor agencies. This can be done through encouraging information sharing via the already existing Procurement and Logistics Subcommittee or via the National ARVs programme. Procurement of commodities should also be coupled with other functional members of the logistics system, including forecasting and quantification, inventory management and calculating stock status, within the pipeline at all times. Procurement was mostly driven by the availability of funds hence more funds should be made available to organisations such that risks and possibilities of stock outs and defaulting are reduced. (Takang et al, 2006)

Transaction processing

Most of the organisations, used IT to process transactions with their suppliers. They also used IT to transaction processing with their customers. These were mostly used for the processing of orders and invoices in the companies. In some cases, IT was also used to process delivery verifications and dispatch advices. As expected, reduction of manual work and costs, improvement of information quality, speeding up of information transfer, and volume of transactions were found to drive the use of IT for transaction processing. Furthermore, the reasons for using IT for transaction processing were mostly similar between the organisations. The companies aimed to reduce manual work associated with sales transactions to reduce the related costs, and to increase the reliability and speed of information transfer between companies.

Supply chain planning and collaboration

The use of IT for supply chain planning and collaboration was more limited in the study than the use of IT for transaction processing. This also consistent with earlier findings on the sharing of planning information (Kemppainen and Vepsäläinen, 2003; Kauremaa et al., 2004). Less than half of the organisations used IT for supply chain planning and collaboration. Furthermore, unlike assumed, unpredictable and logistically demanding environment did not stand out as a driver for this type of IT use among the case companies. Instead, an important commonality among most of the companies using IT for supply chain planning and collaboration was that they used the information shared through the IT system for running a specific cross-organisational process.

Order tracking and delivery coordination

Most organisations in the study also used IT systems in order tracking and coordinating the progress of orders or deliveries or in providing this information. Of these, order-specific status reports were updated manually into an extranet page if interested stakeholders specifically requested it.

Conclusions and Recommendations.

In this study the use of IT for SCM purposes was studied by dividing the use of IT into three categories, 1) transaction processing, 2) supply chain planning and collaboration, and 3) order tracking and delivery coordination. Further, the drivers behind these different IT use types were examined. Based on the empirical data collected for this study, the three IT use categories proposed represent well the roles that IT plays in SCM. In addition to clarifying this widely discussed topic, the categorization provides a basis for further research on the use of IT in SCM. As expected, reduction of manual work and costs, improvement of information quality, speeding up of information transfer, and volume of transactions were found to be the drivers for the transaction processing role of IT in SCM. In addition, the continuity of the business relationship was found to drive this use of IT. The use of IT in supply chain planning and coordination, in turn, was found to be driven by the implementation of cross-organizational processes, most often the VMI system. Unpredictable and logistically demanding environment also came out as a driver for this use of IT. Finally, project orientation of business and in-transit consolidation were found to drive the use of IT for order tracking and delivery coordination. Moreover, this use of IT was mostly driven by the need to coordinate other activities or deliveries based on the progress of specific tracked deliveries.

In order to better understand the complex phenomenon of supply chain management, the research on the use of IT in SCM should be complemented by research on the other means of supply chain coordination. The success of humanitarian operations is hard to measure. Economic success is the standard performance measure in the pro-profit world. For non-profit organizations this evaluation is more complex, considering difficult-to-formulate elements such as unmet need fulfilled and more tractable ones like cash flow. Keeping complete track, control and accountability of the humanitarian programs and their outcomes is challenged by the high urgency and pace of this type of operations, and time for analyzing and recording is usually tight.

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BIOGRAPHY

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