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LOGISTICS INFORMATION SYSTEM (LIS) AT PHARMA FIRM – AN EVALUATION

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ABSTRACT

Logistics information systems *are a subset of the firm's total information system, and it is directed to the particular problems of logistics decision making. The popularity of logistics information systems has grown in recent years in order to meet the requirements of today's logistics managers. Analyzing and setting up the available systems can sometimes prove to be a difficult task. The main objective of the study is to evaluate Logistics Information System at a pharmaceutical firm. This study will help to reduce operational costs, improve efficiency, improve the timeliness of data, provide administrative/decision -making data, maintain transaction details, improve tracking and maintain complete paperless/electronic flow of information.*

For this study primary data were collected by the use of a questionnaire from 300 respondents from the employees and suppliers of the firm collected randomly especially from Logistics and Warehouse departments. Initially, the questionnaire validated using Cronbach Alpha test where the researcher's measurement scales of the constructs were stable and consistent in measuring the constructs. The collected data were analyzed using SPSS 20.0. Since pharmaceutical firms are moving towards next generation technology solutions by continuously improving their existing supply chain this study paving way for the firm in making use of real-time applications in near future.

KEYWORDS: *Visibility, Information Flow, Tracking, User Responsiveness, Competitive Advantage*

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INTRODUCTION

The logistic Information System will enable to coordinate all efforts of the firm to maintain a cost -effective flow of goods. The basis of successful sales work is the coordination of orders, stock status, and shipments as well as up-to-date information about the flow of goods. Logistics information system holds the whole system and coordinates all the components of logistics operations: planning and coordination and operation. Planning and coordination define nature and location of customers that supply chain operations seek top match to planned product and services and promotions (Shivani Dubey and Dr. Sunayana Jain, 2014)

The logistics function incorporates the smooth flow of materials, products and information throughout the organization's supply chain that must be supported by Information Systems especially "intelligent agent-based knowledge management system" (Gunasekaran et al. 2007).

A fully constructed Logistics information system contributes essentially to an organization's competitive advantage. These advantages are reflected in creating new, competitive positions, in cost reduction, and achieving a certain dependency differentiation in operations, as well as in better results of all the logistics functions within the organization.

In today's economy, many fundamental changes happened by altering the relationship with the firms customers, suppliers, business partners and colleagues. Especially, IT developments presented companies with unprecedented opportunities to gain competitive advantage. With IT boom, recently all firms make use of the existing data effectively from warehouse to end customers according to their requirement patterns. Effective logistics information systems paving ways for firms to have complete visibility on their products which helps them to focus more on global inventory which leads firms to reduce costs and also improve customer services through decreasing shipping and receiving cycle times (Moberg, 2002; Somuniywa 2010).

Recently,the pharmaceutical industry has grown over the years, and this has made the case for the ever -growing expediting shipping and logistics challenges. Pharma is a global industry, and the importance of having a coordinated and flexible supply chain cannot be overemphasized. Even though there are many technologies out now that are being implemented by logistics companies, the pharmaceutical industry does not even rely on logistics companies to handle this aspect.

Pharma companies are still quite optimistic with regard to the current business climate, there seems to be a rising awareness of the important role logistics might play in current and future challenges such as price pressure. And new service offerings "beyond the pill" also could affect logistics substantially: The majority of industry players are currently executing focus initiatives in various fields of logistics, including organization, process, and network setup. At the same time, however, there is still some room for optimization with regard to various strategic changes in logistics to further increase competitiveness.

Over the years many firms especially manufacturing and service sectors did not have a logistics function. Generally, customer service was handled by the sales department of the firms. Inventory was managed by manufacturing or sales according to location. Suppliers arranged inbound transport and outbound transport was booked by someone in the sales department. In the intervening period, many companies have created a logistics function to look after an increasing proportion of movement and storage functions. Typically, logistics manages or is strongly involved in purchases, inbound transport, inventory management, distribution and delivery transport, warehouse management etc.

Need for the Study

The purpose of this study is to formulate an integrated framework for pharma firms to establish and to improve their existing logistics distribution systems. This study also has a purpose to emphasize this dimension, highlighting how business models have succeeded in complementing each other and in originating a value creation network. Since information technology is an important prerequisite to good logistics management through integration of information technology with the logistics management. Many newer challenges arising where firms turning to be third-party logistics (3PLs) firms which understand international shipping and operate divisions devoted to the pharmaceutical supply chain. This opportunity makes the firms to evaluate the performance of logistics information systems to attain competitive advantage within the sector.

Objectives of the Study

- To determine the effectiveness of Logistics information system in terms of minimum variance (unexpected events that disrupt system performance), Movement Consolidation (Transportation cost) and Lifecycle support (ability to support a return of goods by customer)
- To evaluate operational efficiency, identify problems faced by firms using LIS
- To analyze the speediness of information flow through LIS that cannot be obtained manually (Responsiveness).
- To evaluate inventory movement process (flow of material and supplies) within a firm.

Literature Survey

Joseph Adeniyi Kolawole (2015) investigated logistics information systems in the distribution of flour in Nigeria. The findings of the study revealed that logistic information systems such as e-commerce, interactive telephone systems, and electronic data interchange positively correlated with the distribution of flour in Honeywell Flour Mill. The study recommended that computer-to-computer communication of business transactions and documents, as well adopt new technology such as, tracking-and-tracing systems (Barcode-scanning for packages and palettes), tracking vehicles with Global Positioning System (GPS), measuring vehicle performance with 'black boxes' (containing logistic data) and Automatic Equipment Identification (AEI) into their firms existing systems.

Ketikidis et al. (2008) adopting different LIS and technologies could provide an organization a competitive advantage to manage accurately their logistics operation in order to differentiate in the industry it competes. The author found out that lack of information sharing is noted to be the main bottleneck for maximizing the organization's profit. The author suggested that RFID's should be considered as thetransformational event rather than as innovative technologies

Shpend IMERI (2012) explore the current status and future patterns of Logistics Information Systems [LIS] of organizations in Macedonia. The author adopted a Grounded methodology to analyze the data collected as well as other sources of information. The author collected data from 65 companies and are analyzed by the employment of descriptive statistics by utilizing 'Statistical Package for Social Sciences' (SPSS) software in order to test the collected data. The findings from this study suggested that firms in Macedonia are not ready yet to play an important role in the South-East European supply chains or in global supply chains. The present obstacles identified by the author weak organizational strategic planning and low level of infrastructure as well as low level of Logistics and Supply Chains Management education are the main drawbacks for this country.

AHM Shamsuzzoha and Petri T Helo (2011) Global industries are facing problems, both from tracking and tracing in their logistics networks that creates huge coordination problems in the overall product development sites. Authors have hoped technologies would be able to offer solutions for tracking and tracing distribution chains through future information technologies such as available real- time tracking technologies.

RESEARCH METHODOLOGY

The descriptive research design was adopted in this study to conclude the inferences derived from the hypothesized testing. The data has been collected from both primary and secondary sources. Primary data have been collected from the respondents through a field survey. The secondary data for the study was collected from the published

journals, magazines and other periodicals, books published research works, etc. Internet services were also used to collect the latest information through various websites.

In this study, the target population covers all the existing employees of the pharma firm, especially from logistics and warehouse departments. 350 potential respondents were used as a sampling size and in order to choose the potential respondents in this survey ***convenience sampling technique*** has been adopted.

In this study, the drop-off survey techniques have been used. The copies of self-administered survey questionnaires have been given to the respondents in order to make sure the confidentiality and privacy aspects of participants in the survey. Before the actual survey being conducted, a pilot test with 20 potential respondents was carried out. The pilot test was carried out with the purpose to ensure the reliability of the scale measurement as well as the quality of the questionnaire.

Based on the feedback from the pilot test study, a final set of questionnaire was produced. Out of 350 questionnaires that have been distributed in the actual survey, 320 questionnaires were gathered. Apart of 30 questionnaires that were unfinished for the reason of either the respondents were not willing to cooperate or they did not take the survey seriously. However, the rest of the questionnaires (320) have been used (91.4 percent) for data analysis using SPSS software (Version 20.0).

RESEARCH RESULTS

Demographics Results Analysis

Respondents of this survey consist of 78.3% male and 21.1% female. The age trend of the participants is as follows. Between the age of 26-30 years old group has the highest respondents (44.6 percent) that are followed by the age group of 31-35 years old (16.3 percent), 36 – 40 years of age (9.9 percent) and had the lowest participant amongst all the age groups participated in this survey.

As for as respondents' designation participated in the survey were the majority of the respondents are executives (61.9 percent), followed by Junior Executive (19.8 percent), and followed by Officer (17.3 percent).

Reliability Test

The study also conducted a Cronbach's alpha reliability test as a measure that signals the consistency and stability of the instruments used in the survey when repeated measurements are made. The value of Cronbach alpha with the range of greater than 0.70 is considered acceptable and good (Cavana et al., 2001). Based on the finding, Cronbach alpha for the construct ranged from lowest to 0.786 (User responsive and performance) to 0.897 (Data availability). In conclusion, the outcome concluded that the measurement scales of the constructs were stable and consistent in measuring the constructs.

Reliability of Constructs

Table 1: Reliability of Constructs

Constructs	Composite Reliability
User Responsive & Performance	0.786
LIS Operational Efficiency	0.892
Data Availability	0.897
Implementation Hurdles	0.834

Validity Test

In order to measure validity, construct validity has to be utilized and the measurement of the validity undertaken through factor analysis. The value of Kaiser-Mayer-Olkin (KMO) was 0.850 (between 0.5 and 1.0) which means that the sample size is big enough to conduct factor analysis. With reference to the principal components analysis and VARIMAX process in the orthogonal rotation, the outcomes showed that the Eigenvalues for all the constructs were higher than 1.0, ranging from the lowest of 1.928 (User Responsive and Performance) to the highest of 6.831 (Data Availability). In the case of convergent validity, the factor loadings for all items within a construct showed in Table 2 were more than 0.50.

Table 2: Factors Identified by Principal Components Factor Analysis

Factor Name	Variable Name	Factor Loading	Eigen Value	Percentage of Variance Explained	Cronbach's Reliability Coefficient
User Responsiveness and Performance	Relationship between supplier and firm gets strengthened	0.873	1.928	11.035	0.786
	People within the firm work some degree of satisfaction	0.852			
	Increase in Labor Utilization	0.871			
	Overhead administrative expenses decreases	0.874			
	Average delivery planning time decreases	0.775			
LIS Operational Efficiency	Reduction in in-bound and out-bound transportation cost	0.646	2.034	12.047	0.892
	Building long-term relationship with key suppliers	0.736			
	Make use of multi-functional teams	0.867			
	Ensure a reliable and predictable supply	0.892			
Data Availability	Across all the channel members	0.872	6.831	13.74	0.897
	Real-time capabilities (24 x 7 support)	0.851			
	Increases product visibility and control	0.872			
	Increased Customer Service	0.770			
	Improvement in system productivity	0.851			
Implementation Hurdles	Design Hurdles	0.732	1.965	12.022	0.834
	Operational Hurdles	0.621			
	User Problem Hurdles	0.834			
	Integration Hurdles	0.874			

Note: KMO Measure of Sampling Adequacy = 0.850 p = 0.0001 ($p<0.05$); df = 297

Cumulative Percentage Rotation Sums of Squared Loadings = 63.914

Linear Regression

	Mean	Std. Deviation
User Responsiveness and Performance	3.16	1.219
Data Availability	3.19	1.205
LIS Operational Efficiency	2.62	1.286

Correlations				
		User Responsiveness and Performance	Data Availability	LIS Operational Efficiency
Pearson Correlation	User Responsiveness and Performance	1.000	0.92	0.78
	Data Availability	0.92	1.000	.057
	LIS Operational Efficiency	0.78	.057	1.000
Sig. (1-tailed)	User Responsiveness and Performance	.	.134	.081
	Data Availability	.134	.	.162
	LIS Operational Efficiency	.081	.162	.

In the correlation matrix above, User responsiveness and performance and data availability an (r = .092) and LIS operational efficiency and User responsiveness and performance an (r=0.78) exists a positive correlation

Variable	Unstandardized Coefficients		Standardized Coefficients	T	Sig	95% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
Constant	3.545	.240		14.800	.000	3.074	4.016
Data Availability	.060	.058	.060	1.031	.304	.175	.055
LIS Operational Efficiency	.073	.055	.077	1.340	.181	.181	.034

Dependent Variable: User Responsiveness and Performance

Model Summary						
Model	Change Statistics					Durbin-Watson
	R Square Change	F Change	df1	df2	Sig. F Change	
1	.010[a]	1.513	2	297	.222	2.084
a. Predictors: (Constant), LIS Operational Efficiency, Data Availability						
b. Dependent Variable: User Responsiveness and Performance						

Durbin-Watson statistic informs the data value is 2.084 which is so close to 2 that the assumption between predictors and dependent variable been met.

Table 3: Showing Inventory Movement Process after Implementing LIS

Inventory Movement Process	Weighting Score
Physical Inventory	38.84
Goods Movement	49.15
Goods Tracking	42.24
Inventory Valuation	37.61
Cost Adjustments Review	31.32

From the above analysis, the table 3 shows that goods movement between suppliers, manufacturers, and consumers improved with a weighting score of 49.15 followed by goods tracking (42.24) and physical inventory (38.84) after implementing LIS within the firm.

CONCLUSIONS AND FUTURE DIRECTIONS

For pharmaceutical companies, this study extends visibility in virtually every area of the business – from development to manufacturing, transport, distribution, dispensing and consumption. Real-time information, when coupled with advanced analytics engines, can become the basis for making faster, more accurate decisions; heightening efficiencies, verifying product quality, and assuring regulatory compliance. It is part of enterprises must constantly innovate and utilize emerging technologies to remain relevant, competitive, and profitable.

This research allowed, either by the review of the literature on the subject, or by the case study, the examination of how LIS are applied in the pharma units studied, particularly giving its advantages and, at the same time, its limitations, helping to demystify that "complete and definitive" system is being dealt with.

By adhering to best practices and learning from others that have successfully implemented technology platforms and solutions, pharmaceutical companies can be better prepared to face the growing demands of today's hyper-competitive, hyper-connected global economy. It is obvious, that the trend is becoming new among pharmaceutical companies all over the world. For using logistics Information System, personnel needs to be trained and devices need to be maintained.

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