A Study on Supply Chain Management through Information Communication Technology and Apparel Industry Performance: A case of Hawassa Industry Park

Gobena Beri Deressa*

Parul University, Waghodia, Vadodara Gujarat, India, CEO Gobena Beri IMPORT Hawassa, Sidama,Ethiopia., *gobenaberi@gmail.com*

Prof.(Dr.) Ajay Trivedi[2]

Dean at Faculty of Commerce, Parul University, Waghodia, Vadodara Gujarat, India

Dr. Anant Deogaonkar[3]

Shri Ramdeobaba College of Engineering and Management,Nagpur
deogaonkara1@rknec.edu

Abstract

The study aims to examine the effect of information technology use at supply chain management on the apparel industry's performance in Hawassa Industrial Park, Ethiopia. For the accomplishment of this study, the researcher employed an explanatory research design with a quantitative approach. The respondents' selections were carried out using a stratified random sampling technique. The data were analyzed using a multiple linear regression model with the help of SPSS software. The major findings indicate that The apparel industry at Hawassa Industry Park uses information technology to plan their activities in accessing raw materials for the production of apparel products, warehousing, and distribution. However, they did not use information technology on the return system. The industry's product will be sold at the domestic market when the buyers do not agree with the product's quality.

Keywords: Apparel industry, Information technology, Performance, Supply chain management

1. Introduction

Supply Chain Management (SCM) characterizes a significant change in how most organizations see themselves. Customarily, firms see themselves as having customers and suppliers. Historically, an organization did not consider the potential for either its supplier or its customer to become a companion. In many industries, each firm was very competitive with its suppliers and customers, fearing that they would be taken advantage of by them (Fredendall & Hill, 2016).

There are different manufacturing industries engaged in producing garment products in Ethiopia. Accompanying their products, the notion of supply chain management as a strategy could be seen as fragmented and not integrated with their activities to supply chain members horizontally. Because of the fragmented supply chain structure in Ethiopian firms, they merely do not have a competitive advantage (local or global); thus, their performance is weak.

Ethiopia is a member of COMESSA (Common Market for Eastern and Southern

Africa) & NEPAD (New Partnership for African Development), similar to NAFTA and EU markets. This politically motivated regional integration presupposes local firms' internal preparation to fully cooperate and compete with similar firms in the same region. Before integrating into regional and global markets, firms locally need to integrate within the organization's functions using information technology fully.

Information technology provides an opportunity for a virtual shortening of the supply chain as it extends around all over the world. Utilizing the Internet has no question facilitating data movement cheaper and faster than before. Consequently, the commercial sector and the apparel industry specifically use the ICT concept to optimize production. Despite the importance of this phenomenon, academic literature does not give us a clear picture of it. Therefore, this study aims to examine the effect of information technology use at supply chain management on apparel industries performance: A case of Hawassa Industrial park, Ethiopia.

2. Review of Related Literature
2.1. Supply Chain Management

A supply chain is a network of various organizations involved in upstream and downstream linkages in different activities and processes. It is the task of integrating organizational units along a supply chain and coordinating materials, information, and financial flows to fulfill customer demands to improve the supply chain's competitiveness (Christopher, 2003). The key elements of the supply chain and its management from these definitions are the upstream parties, the downstream parties, the integration of all the organizations involved, and the internal function. The upstream parties consist of an organization's functions, processes, and network of suppliers, while the downstream function, on the other hand, concerns the distribution channels, processes, and functions where the product passes through to the end customer (Handfield, 2002).

Supply chain management includes a set of approaches and practices that

effectively integrate suppliers, manufacturers, distributors, and customers to improve their long-term performance and supply chains (Chopra & Meindl, 2001). Supply Chain Management has been used to describe the planning and control of materials and information flows and logistics activities internally and externally between companies. Due to the increasing number of players and forces, a supply Chain may develop into a supply network, which will require a more complex and complicated management system (Cooper, Lambert, & Janus, 2007).

2.2. Apparel Industry

The apparel industry is one of the pioneer industries in the global economy. This industry has a recognized presence across the developing and developed nations compared to other industries (Ethiopian International Textile & Apparel Expo Directory, 2012). Since the industry operates using low-skill labor-intensive processes, textile and garment firms migrate from developed countries to developing countries to cope with the increasing competition in the globalized market (Daniel & Amare, 2012).

Textile industry history in Ethiopia began long before all manufacturing industries. The modern textile sector started in 1939, established by foreign capital under Dire Dawa Textile Mills' name. It is anticipated that there are approximately 2.6 million hectares of appropriate cotton production area, which is similar to Pakistan, the world's fourth largest cotton producer. The major export destinations are Asian countries, African countries, European countries, 67%, 23%, and 10% (Rundassa, 2019).

2.3. Information Technology

Information technology is a concept that includes all types of technology used in its different forms to produce, collect, manipulate, interact, exchange, present, and use information (business data, voice conversations, still images, motion pictures, including those not yet conceived). In terms of supply chain management, information technology plays a key role in the following

aspects. First, IT helps businesses to maximize the scope and sophistication of information that needs to be shared by their negotiating partners. Second, IT permits firms to provide real-time supply chain information, including inventory level, delivery status, production planning, and scheduling, enabling firms to manage and control their supply chain activities. Third, IT facilitates the alignment of forecasting and scheduling operations between firms and suppliers, allowing better inter-firm coordination. The problems in coordinating supply chain activities often hindered by time and spatial distance can be reduced (Paulraj & Chen, 2007).

Basic Enterprise Resource Planning (ERP) is one of the various software systems used to integrate the three processes (stages). ERP is a framework that efficiently incorporates all the data needed by the operational process operations, including finance, accounting, human resources, procurement, materials processing, quality management, allocation and delivery, and organizational or process reengineering and IT sales. Internal integration and external integration play different roles in the context of SCI. While internal integration recognizes the relevance of departments and functions working together as part of an integrated process, external integration emphasizes the importance of developing close, interactive relationships with consumers and suppliers (Flynn et al., 2010).

2.4. Performance of the Apparel Industry

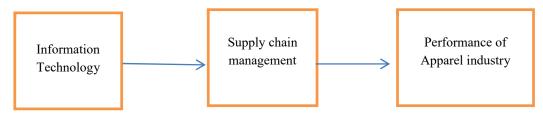Organizational performance refers to how effectively a business accomplishes its

market-oriented objectives and financial results (Yamin, 2009). Financial metrics have acted as an instrument for comparing entities and measuring an entity's actions over time (Holmberg, 2000). Any organizational initiative, including supply chain management, should ultimately enhance organizational performance. Several prior studies have measured organizational performance using financial and market criteria (Li et al., 2006). An organization's performance can be measured using marketing, financial, and customer satisfaction. Marketing performance includes sales growth, market share, product development, and market development. Financial performance includes profitability, return on investment, and cash flow from operations (Tseng, 2011).

2.5. Conceptual Framework

The conceptual framework is a network or plane of interconnected ideas that provide a detailed explanation of a theory or phenomenon. The concepts that constitute the conceptual framework support articulating their respective phenomena and establishing a framework-specific philosophy (Jabareen, 2009). This study's variables comprised one dependent variable (Supply Chain Performance) and five independent variables (SC flexibility, SC collaboration, Supply base rationalization, SC control, and SC avoidance).

Figure 1 Conceptual Framework of the Study
Source*:* Own construction from the literature review (2021)

Research Hypothesis

- **Ho$_1$**: Information technology use at planning activities does not affect apparel industry performance.
- **Ho$_2$**: Information technology use at accessing raw material does not affect apparel industry performance.
- **Ho$_3$**: Information technology use at production does not affect apparel industry performance.
- **Ho$_4$:** Information technology use at warehousing does not affect apparel industry performance.
- **Ho$_5$**: Information technology use at distribution does not affect apparel industry performance.
- **Ho$_6$:** Information technology use at the return system does not affect apparel industry performance.

3. Research Methodology

The researcher used an explanatory research design and a quantitative approach to achieve the stated objectives. This is because explanatory research design is used to identify factors or examine the effect of independent variables on the dependent variable.

The sampling frame is an accurate and complete list of all elements in the target population (Hair et al., 2007). Thus, Hawassa Industrial Park consists of 22 apparel producing companies where all companies employed 2013 medium and senior-level staff. The researcher used Yamane (1967) formula to determine the sample size as follows:

$$n = \frac{N}{1 + N(e^2)} = \frac{2013}{1 + 2013(0.05^2)} = 334$$

Where: n = Sample size
N = Total Population
e = Sampling Error

After determining the sample size, a stratified random sampling technique was used. After stratifying the industries based on shades, the probability proportional to size method was used to get a representative number of respondents from each shed. Then systematic random sampling was used to get the final respondent.

A closed-ended questionnaire was used to obtain the data. The questionnaire was constructed using a five-point rating system ranging from 1 to 5, with 1 being strongly disagree and 5 being strongly agree. Using SPSS software, the obtained data was analyzed using multiple linear regression analysis.

4. Results and Interpretation

A multiple linear regression analysis was used to examine the effect of information technology use at supply chain management on apparel industries' performance. Before analysis, the basic assumptions of linear regression were checked, such as linearity, Multicollinearity, normality, and heteroscedasticity. The result did not show misspecification of the data, and the analysis was made as follows:

Table 1 Results of Regression Analysis Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.788	.621	.614	.16750

Source: Model output, 2021

According to the model summary of multiple linear regression analysis, the R-value of the model as per Table 4.13 was 0.788, which shows the highest degree of relationship between independent and dependent variables. The R^2 value of the regression model was 0.621, indicating that 62.1% of the effect of performance of the apparel industry has been explained by planning activities, accessing raw materials, production, control activities, and distribution. The remaining 37.9% of the variance in performance of the apparel industry was not accounted for by the independent variables considered in the model.

Table 2: Results of ANOVA Output

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	15.045	6	2.508	89.380	.000
	Residual	9.174	327	.028		
	Total	24.219	333			

Source: Model output, 2021

The ANOVA table (Table 4.14) indicated that the multiple regression model itself is statistically significant or not significant. Because R^2 is not a statistical significance test (it only measures explained variation in Y from the predictor Xs), the F-test is used to test whether or not R^2 could have occurred by chance alone. The results of the output found in the ANOVA table show that the model is statistically significant when planning activities, accessing raw materials, production, control activities, and distribution were included (F=89.380, p<0.001). Therefore, the overall equation was found to be statistically significant.

Table 4.1: *Results of Multiple Linear Regression Analysis*

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	**SE**	**Beta**		
1	Constant	1.564	.105		14.961	.000
	Planning	.076	.024	.143	3.217	.001
	Raw material	.130	.022	.225	5.890	.000
	Production	.156	.024	.258	6.644	.000
	Warehousing	.138	.016	.352	8.368	.000
	Distribution	.077	.020	.143	3.884	.000
	Return system	.026	.015	.059	1.737	.083

Note: B= Regression coefficient (Estimate), Std.Error = Standard Error, Dependent variable = performance of the apparel industry

Source: Model output, 2021

The regression analysis results indicated that among six variables included in the model, five had been found to affect the apparel industry's performance significantly. These are planning activities, accessing raw materials, production, control activities, and distribution. The interpretation is in the following paragraphs.

According to the results of Table 4.15, planning activities has a positive and statistically significant effect on the performance of the apparel industry (β = 0.076, p < 0.01). The result of the regression coefficient indicates that, on average, a one-unit increase of planning activities brings 0.076 units to increase in performance of the apparel industry.

Based on the results of Table 4.15, accessing raw materials has a positive and statistically significant effect on the performance of the apparel industry (β = 0.13, p < 0.001). The result of the regression coefficient indicates that, on average, a one-unit increase of accessing raw materials will increase the value of the performance of the apparel industry by 0.13 units.

As presented in Table 4.15, production has a positive and statistically significant

effect on the performance of the apparel industry ($\beta = 0.156$, $p < 0.001$). The result of the regression coefficient indicates that, on average, a one-unit increase in production brings 0.156 units to increase in performance of the apparel industry.

Based on Table 4.15 result, warehousing has a positive and statistically significant effect on the performance of the apparel industry ($\beta = 0.138$, $p < 0.001$). The result of the regression coefficient indicates that, on average, a one-unit increase of accessing raw materials will increase the value of the performance of the apparel industry by 0.138 units.

As per the results of Table 4.15, distribution has a positive and statistically significant effect on the performance of the apparel industry ($\beta = 0.077$, $p < 0.001$). The result of the regression coefficient indicates that, on average, a one-unit increase of distribution brings 0.077 units to increase in performance of the apparel industry.

5. Conclusion And Recommendations

Information technology use at planning activities and access to raw materials have a positive and statistically significant effect on the performance of the apparel industry. Information technology implementation comprises various operations, including planning activities that can improve the performance of various functions. Therefore, it is recommended that apparel industries strive to ensure the sustainability of information technology usage by providing continuous training for their employees. Likewise, the apparel industries should increase their efficiency by utilizing information technology with raw material suppliers to increase the level of external integration. It helps increase information integration by sharing in accu warehousing rate and timely ways with all partners.

Information technology use at production and warehousing has a positive and statistically significant effect on the performance of the apparel industry. Therefore, the apparel industries are advised to strengthen the usage of information

technology for production. This is because information technology helps to reduce production cost by limiting theft, misplacement of rarely used goods, and keeping better records of work in progress. Similarly, the apparel industry should ensure warehouses are adequately automated by information systems that can improve how warehouses can be managed.

Information technology use at distribution has a positive and statistically significant effect on the performance of the apparel industry. Therefore, apparel industries should strengthen the use of information technology to distribute their products since Information Technology helps restructure the entire distribution set up to achieve higher service levels and lower inventory and supply chain costs.

References

[1] Chen IJ, Paulraj A. Towards a theory of supply chain management: the constructs and measurements. Journal of operations management. 2004; 22(2):119-50.

[2] Chopra, S., & Meindl, P. Supply Chain Management: Strategy, Planning, & Operation. NJ: Prentice-Hall. Inc; 2001.

[3] Christopher, M. Logistics and Supply Chain Management. London: Pitman Publishing;2003.

[4] Cohen, W .M., & Levinthal, D. A. Absorptive capacity: a new perspective on learning and innovation. Administrative Science Quarterly. 1990; 35:128-152.

[5] Cooper, M.C., Lambert, D.M. and Janus, P.D. Supply chain management: more than a new name for logistics. The International Journal of Logistics Management. 2007; 8(1): 1-13.

[6] Daft, R. L. Organization Theory and Design. West Publishing, St. Paul, MN;1992.

[7] Daniel, K.,& Amare, M. Competitiveness for Ethiopian Textile and Garment Industries: A Way Forward. Second National Workshop on Future Prospects and the Role of Textile

and Garment Sectors in Achieving the Millennium Development Goals of Ethiopia;2012.

[8] Flynn, B. B., Huo, B., Zhao, X. The impact of supply chain integration on performance: a contingency and configuration approach. Journal of Operations Management.2010; 28(1): 58-71.

[9] Handfield, R. Supply Chain Redesign: Converting Your Supply Chain into an Integrated Value Stream, New York: Financial Prentice Hall;2002.

[10] Holmberg, S. A systems perspective on supply chain measurements. International Journal of Physical Distribution and Logistics Management. 2000; 30 (10): 847-868.

[11] Rundassa MW, Azene DK, Berhan E. Comparative advantage of Ethiopian textile and apparel industry. Research Journal of Textile and Apparel; 2019.

[12] Jabareen, Y. (2009). Building a conceptual framework: philosophy, definitions, and procedure. International journal of qualitative methods, 8(4), 49-62.

[13] Tseng, M.-L., Wu, K.-J., & Nguyen, T. T. Information technology in supply chain management: a case study. Procedia - Social and Behavioral Sciences. 2011; 25: 257-272.