The study of the correlation between Supply Chain Integration and Supply Chain Management of Coffee.

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Abstract: *To determine the relation between Supply Chain Integration with Coffee. It is very important to understand what are the current situation and barriers the industry would have to be faced from the existing environment. Through successfully deploying supply chain strategies the coffee industry can realize the integration among the members of the supply chain. Supply Chain Integration which requires great deal of correlation among the members of supply chain of coffee is one of the most important management tool which helps to recognize the priorities and determine the main actions necessary to realize how to be succeed in such business. This paper entails the concepts of Supply Chain, Supply Chain of Coffee, and Integration among the members of Supply Chain.*

Keywords: *Coffee, Supply Chain Management, Supply Chain Integration*

Introduction:

The New management practices and business models are frequently changeable and constantly fade as managers dedicate to make the companies succeed in this less predictable business world. One such area that has majorly benefited from new technologies is Supply Chain Management (SCM). Supply Chain Management (SCM), in general, is a synthesis of what was previously considered to be the management of a number of separable business functions on the one side, and several relatively independent theoretic domains on the other (Caper *et al.,* 2004). Today, SCM could be an integrated single function that is highly responsible for all aspects of management functions, as well as financial and other information interchange between business partners among the chain.

Coffee is the world's most widely traded tropical agricultural commodity (ICO, 2011). In the world economy, revenue from the coffee trading was worth approximately US$ 18.5 billion by 2015 (ITC, 2014). It is a major source of revenue for the livelihood of many in more than 40 countries, and it generates employment of more than 120 million jobs (CIRAD, 2012).

Porter stated that the linkage between suppliers' value chains and a firm's value chain provide opportunities in favor of the organization to improve its competitive advantage (Porter, 1998). Supply chain management seeks to

improve competitive performance by closely integrating the internal functions within a company and linking them effectively with the external operations of suppliers, customers, and other channel members (Kim, 2006a). One of the most well-known strategies for improving competitiveness is supply chain management (Gunasekaran *et al.,* 2008).

Literature Review:

According to Chain Awareness School Supply Chain Management covers the flow of goods from supplier through manufacturing and distribution chain through the end users (Houlihan, 1985). According to Integration School An integrative philosophy to manage the total flow of a distribution channel from the supplier to the ultimate user (Cooper and Ellram, 1990).

The four management stages in Supply Chain Management

Period	Stage 1 Until 1960s	Stage 2 1970s-1980s	Stage 3 1980s-1990s	Stage 4 1990s-2000s
Management stage	Warehousing and transportation	Total cost management	Integrated logistics management	Supply chain management
Management focus	Operations performance	Optimizing operations, cost and customer service	Tactics/strategies, logistics planning	Supply chain visions, objectives and goals
Organization design	Decentralized functions	Centralized functions	Integration of logistics functions	Partnering, virtual organization, market co-evolution

Source: Ross, 1997.

The Integrated Supply Chain
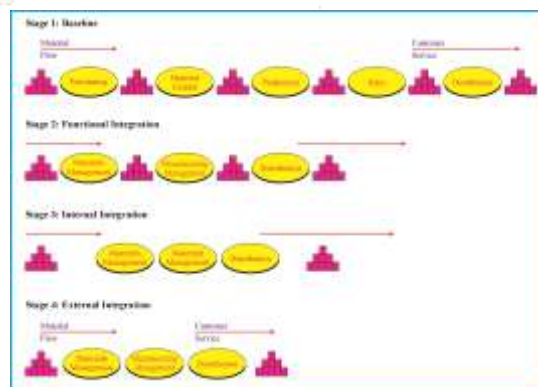
Source: Adopted from Stevens, 1989.

Stevens (1989) presents a framework for accomplishing an integrated supply chain, At Ist stage, the largest part of most supply chains is fragmented and can be distinguished by staged inventories, sovereign and often incompatible control systems, and primarily heavy organizational boundaries.

Stage 2 involves functional integration, which focuses principally on the internal flow of goods in the company. This means that companies have acknowledged the need for at least a limited degree of integration between contiguous functions; e.g., distribution and inventory management.

At stage 3, engages the integration of those features of supply chain management directly under the control of the individual company.

In stage 4, where the linkage and coordination of activities now proceed upstream to suppliers and downstream to customers.

Objectives of the Study:

- To identify the web-based technologies for exchanging information among the members of the Supply Chain.

- To examine the level of strategic partnership in Supply Chain members.

- To Assess the stable procurement through different network applications

Hypothesis:

H: There is a positive relationship between supply chain integration and supply chain management.

Data Analysis:

Supply Chain Management of Coffee is a series of phases implicated to produce a product and deliver it to consumers. It starts with cultivation, harvest, pre-processing, post-processing, roasting and ends with distribution and consumption.

The Coffee Supply Chain is very much required to manage better inventory in storehouses. Since Coffee is considered as one of the high-value commodity throughout the world. There by designing a proper supply chain, the interrelationship between the players involved could be enhanced (2016-future Supply Chain, Global Commerce Initiative).

Measurement and scaling of constructs

Construct/ Variable	Type of scale and its construction	Items used	Adopted from
Supply Chain Integration	**Six** items 5-point semantic differential scale anchored by: **5-**Very high **1-**Very low	SCI1	Frohlich and Westbrook, 2001; Kim, 2006b.
		SCI2	
		SCI3	
		SCI4	
		SCI5	
		SCI6	

(**SCI1-**Information exchange through Internet or Web-based technologies, **SCI2-**Level of strategic partnership, **SCI3-**Participation level in the design phase, **SCI4-**Participation level in the process of procurement and other processes, **SCI5-**Establishment of quick ordering system, **SCI6-**Stable procurement through network(e.g. EDI)).

Descriptive Statistics

ITEMS	Distribution of Responses (%)					Scale Properties				
	5	4	3	2	1	MEAN	MED	SD	SKEW	KURT
SCI1- Information exchange through internet or web-based technologies	09.8	04.9	12.3	72.1	00.8	2.50	2	0.99	1.71	-0.22
SCI2- Level of strategic partnership	09.8	45.9	32.8	11.5	00.0	3.54	4	0.82	-0.22	-0.46
SCI3- Participation level in the design phase	07.4	01.6	35.2	54.9	00.8	2.60	2	0.86	1.58	2.07
SCI4- Participation level in the process of procurement & other processes	00.0	79.5	07.4	12.3	00.8	3.65	4	0.72	-1.88	2.13
SCI5- Establishment of quick ordering system	00.0	18.0	68.9	12.3	00.8	3.04	3	0.58	-0.26	1.08
SCI6- Stable procurement through network (e.g.EDI)	09.0	45.9	00.8	43.4	00.8	3.19	4	1.12	-0.02	-1.60

Firstly the descriptive statistics are developed for the data collected as per the research methodology. The descriptive statistics are tabulated and tested for the results obtained. The second part of data analysis is to validate the measures applicable for the testing of hypothesis developed.

Structural equation modeling (SEM) was used to answer a set of interrelated questions in this study which have both managerial and theoretical importance. SEM can scrutinize a series of dependent relationships simultaneously. It is mainly useful in testing theories that contain multiple equations involving dependence relationships (Hair *et al.,* 2006).

The correlation analysis is significant at p≤0.01. The Measure of Sampling Adequacy (MSA) or Kaiser-Meyer-Olkin (KMO) is larger than 0.70 and the observed MSA or KMO is 0.73. Bartlett's test of sphericity was significant, chi-square value is 2844.52 at p=0.00. The values of Item to-Total-Correlations (ITC) and Communalities are very positive and are more than the threshold values. The percentage of variance explained is 89.21% (the recommended level is 60%) and the eigen values are more than 1.

Principle Component Analysis

ITEMS	Factor Loadings ING	COM	ITC
SCI2- Level of strategic partnership	0.90	0.92	0.90
SCI 6- Stable procurement through network (e.g. EDI)	0.87	0.80	0.80
SCI 4- Participation level in the process of procurement & other processes.	0.74	0.55	0.58
SCI 5- Establishment of quick ordering system	0.59	0.85	0.90

SCI- Supply Chain Integration; COM-Communality; ITC- Item to Total Correlations;

KMO- Kaiser-Meyer-Olkin; DF-Degrees of Freedom; P- Probability; Bartlett's Test;

χ^2- Chi-Square.KMO= 0.73; DF= 75; P= 0.00; $\chi2$= 2844.52

.Loadings less than 0.30 are suppressed.

The Confirmatory Factor Analysis is successfully performed and the proceedings are explained below and tabulated in the table. The goodness of fit indices has successfully passed the threshold values for the Supply Chain Integration construct. The ratio between the chi-square statistic and the degrees of freedom is 1.91, which indicates a good fit. The incremental fit indices Normed Fit Index (NFI) is 0.97, Non Normed Fit Index (NNFI) is 0.98 and Comparative Fit Index (CFI) is 0.92, are above the recommended minimum values. The other absolute fit index Root Mean Square Error of Approximation (RMSEA) is 0.05 and Standardized Root Mean Residual (SRMR) is 0.05, are below the upper limits. The overall results of the fit indices are satisfied.

Confirmatory Factor Analysis

First Order Factors	Standardized loadings	t-value
ING1- Information exchange through internet or web-based technologies	0.48	
ING2- Level of strategic partnership	0.76	10.55
ING4- Participation level in the process of procurement and other processes	0.79	09.23

Fit Indices: Chi-Square= 101.25; DF=53; CMIN/DF=1.91; p=0.05; NFI= 0.97; NNFI= 0.98;

CFI= 0.92; RMSEA= 0.05; SRMR= 0.05.All the t-values are statistically significant at

p≤0.05.a-Fixed parameter.NFI- Normed Fit Index; NNFI -Non-Normed Fit Index; CFI -Comparative Fit Index;
RMSEA- Root Mean Square   Error of Approximation; SRMR -Standardized Root Mean Residual.

Hypothesis Testing:

There is positive relationship between supply chain integration and Supply Chain Management of Coffee which were accepted due to strong path coefficient (0.76) and t-value of 6.53 at p≤0.05. The Beta coefficient confirms that the effect of the variables between each other is good.

Results and Discussion:

When an integrated Supply Chain is running in a business, the functions or the processes are considered in a group rather as a single, so that it creates a sort of value among the members of the supply chain. In the integrated supply chain the created value is reaching the limits above the expectation of the firm. The study has shown how the supply chain integration leads to the better firm performance and increasing the quality in Supply Chain of Coffee.

The overall level of Supply Chain Integration of the company is seems to be very strong. The major suppliers connected to the company are Growers, Intermediaries, Cooperatives, Processors and Roasters as explained in the early stages of the research. The company has carefully selected the growers, as they should know the every concepts of supply chain management.

The Hypothesis was tried to investigate the relationship between the supply chain integration and Supply Chain Management of Coffee. This hypothesis was based on the increased integration of supply chain leads to an increase in the Supply Chain Management of CoffeeThe constructs of Supply Chain Management of Coffee is very much reliable and valid. The other studies in this area are showing very significant results. The supply chain integration allows the company to take advantage of internal competencies (Carter and Narasimhan, 1996; Narasimhan, 1997; Kim, 2006a; Kim, 2006b).

Conclusion:

Over a century of development in the field of marketing logistics and management, researchers can now focus on how important supply chain management has become to the competitive nature of business today. We have experienced the evolution of individual business competition to the collaboration of business in supply chain network to form a business entity that competes with other supply chain networks.

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