Achieving Competitive Advantage through Supply Chain Integration in the Cocoa Industry: A Case Study of Olam Ghana Limited and Produce Buying Company Limited

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ABSTRACT

The problem of partial supply chain integration has been going on with some organizations in Ghana especially in the cocoa industry. The study sort to empirically, examine supply chain integration practices that could lead to improved performance and competitive advantage; as well as major constrains to competitive advantage within the cocoa industry in Ghana. The study envisaged that, the causes of the industry's inability to integrate supply chain variables and appropriate solutions found; to curtail the problems of poor performance and effectively integrate supply chain functions for the industry to make informed decisions to improve their businesses and gain competitive advantage. The study revealed the relative importance index run on the mean factors that, some of the case companies stood strong in terms of internal integration using the general relative importance index as benchmark. All the factors of customer integration and supplier integration proved to be very important but not much statistically significant difference between the ratings of the case companies. Even though, some were slightly ahead of others. The study further revealed that there was a positive correlation between all the variables of supply chain integration. The ANOVA analysis confirms existing theory that the three aspects of supply chain integration together lead to improved performance and competitive advantage. Finally, the Cocoa industry, particularly PBC and Olam should adopt pragmatic approach to implement all the three aspects of supply chain integration to improve their performance to achieve sustainable competitive advantage in the cocoa industry.

Key words: Supply chain integration, Competitive Advantage, cocoa industry, Ghana, relative importance index, improved performance.

1. Introduction

One of the most significant changes in the paradigm of modern business management is that, individual businesses no longer compete as solely autonomous entities, but rather as supply chains (Lambert, 2008; Fantazy, Kumar and Kumar, 2010; Baharanchi, 2009; Narasimhan, 1997). Strictly speaking however, SCM is not just a chain of business on one-to-one, business-to-business relationship but a network of multiple business relationships in order to gain synergy of intra-company and inter-company integration and management. Consequently, SCI aimed at coordinating processes along the supply chain is considered an important determinant to maintain a competitive advantage over competitors (Pamela and Pietro, 2011; Christopher, Peck and Towill, 2006; Lambert, 2008). Most experts in mainstream logistics and SCM consider that the more integrated a supply chain, the higher the performance will be (Fabbe-Costes and Jahre, 2008; van der Vaart and van Donk, 2008; Singh and Power, 2009; Ou, Liu, Hung and Yen, 2010; Wiengarten, Humphreys, Guangming, Fynes and McKittrick, 2010).

One of the major producers of cocoa in the world is Ghana. Cocoa has been Ghana's primary cash crop and backbone of its economy for more than six decades. Cocoa provides about one-third of all export revenues; accounting for between 25-30 percent of total export earnings and contributes about 10% to GDP (Tutu, 2009**;** Ghana Cocoa Board, 2010). Despite the contribution of cocoa to Ghana's economy, it seems the pivotal role of supply chain integration in the industry, is underestimated. This has resulted in decline and fluctuations in production cocoa beans. It is in the light of these problems and its concomitant effects that informed the researchers to embark on this study to look into how supply chain integration could be adapted to improve cocoa production in Ghana. The study employed the following objectives: one, to examine the scope of supply chain integration within the Ghana cocoa value chain (GCVC); two, to examine the factors of supply chain integration within Olam and PBCs supply chain; and three, to evaluate ways in which supply chain integration lead to improved performance and competitive advantage. The study was also guided by the following research questions: What is the scope of supply chain integration within Ghana cocoa value chain (GCVC)? What are the factors of supply chain integration within Olam and PBCs' supply chain? And how does supply chain integration leads to improved performance and competitive advantage? It is hoped that this would help the cocoa industry in Ghana and beyond to make informed decisions to improve the competitiveness of the industry and help in the growth of Ghana's economy. Finally, the study will contribute to existing knowledge on SCI and serve as a springboard for further studies.

2. Related Studies

2.1 Supply Chain Management (SCM)

Market place is presently characterised by heightened global competition often against a backdrop of an excess of supply over demand (Christopher et al. 2006). Supply chain management (SCM) seeks to enhance competitive performance by closely integrating the internal cross-functions within a company and effectively linking them with the external operations of suppliers, customers, and other channel members to be successful (Monzcka and Morgan, 1997; Ellram and Cooper, 1993; Lambert, James and Elram, 1998; Kim, 2006; Tan, Kannan, and Hadfield, 1998). A supply chain consists of all stages involved, either directly or indirectly, in fulfilling a customer request. The objective of supply chain management is to maximize the overall value generated rather than profit generation. Although the importance of supply chain relations is widely acknowledged, seamless coordination is rarely achieved in practice (Hussain and Nassar, 2010).

2.2 Supply Chain Integration (SCI)

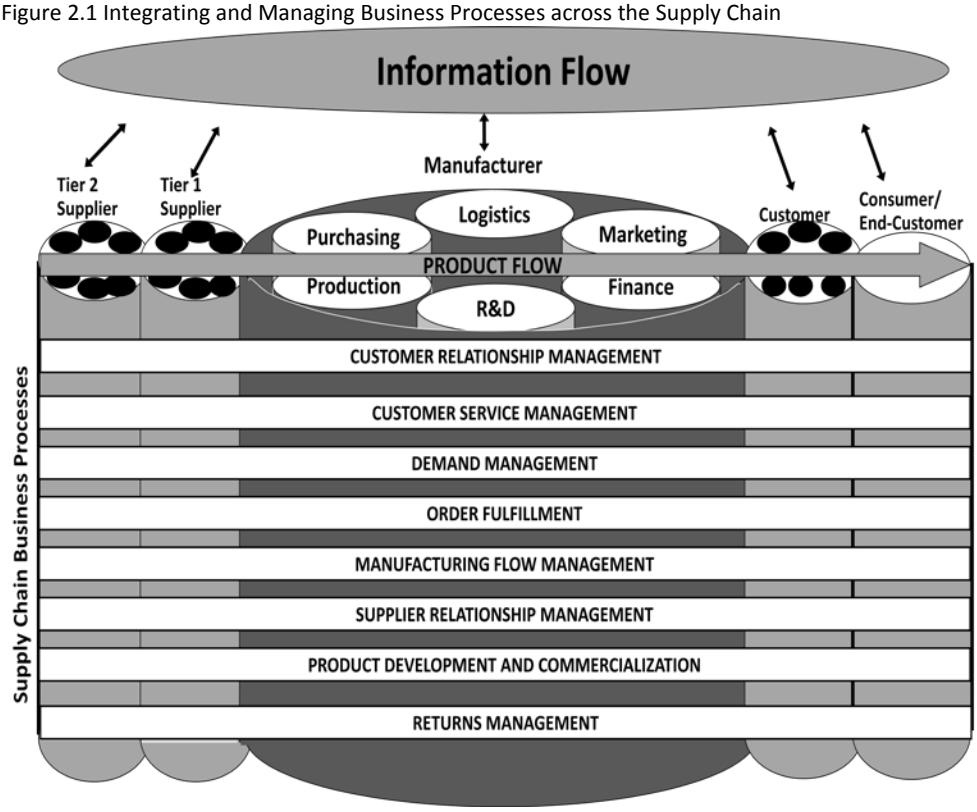
The intensification of global competition and the demand for better customer service have considerably increased the need for integration between companies. Several authors within the field of supply chain management have proposed definitions for integration but the one used in this paper is defined as "the extent to which all activities within an organization, and the activities of its suppliers, customers, and other supply chain members, are integrated together (Narasimhan & Jayaram, 1998)". Some experts have indicated that, Supply chain integration has three independent variables in its original scale they are: the organization's internal integration, supplier integration and customer integration (Tutuncu and Kucukusta, 2008). Some also consider integration in two levels: internal integration and external integration (Pagell, 2004). Finally, others classify SCI into three levels, from functional integration to internal integration and to external integration (Stevens, 1989). However, this study focuses only on internal and external integration, because functional integration is a pre-requisite for all firms to implement and achieve Internal Integration. Some authors argue that performance improvements are not assured with just one aspect of SC integration, they have proposed that implementing integration both upstream, operations, and downstream is better than concentrating the firm's efforts on integrating customers or suppliers (Frohlich and Westbrook, 2001). Furthermore, the best integration strategy must involve "complete integration". This means completely extending and connecting to upstream suppliers and downstream customers, forming a closed integration structure (Frohlich and Westbrook, 2001; Kim, 2006; Kannan & Tan, 2010). The basis of integration can therefore be characterised by cooperation, collaboration, information sharing, trust, partnerships, shared technology, and a fundamental shift away from managing individual functional processes, to managing integrated chains of processes (Vickery, Jayaram, Droge and Calantome, 2003; Kahn 1998; Pagell, 2004).

2.3 Internal Integration

Internal integration is a process of inter-functional interaction, collaboration, coordination, communication and cooperation that bring functional areas together into a cohesive organization (Kahn, 1998; Flynn, Huo, and Zhao, 2010; Zhao, Baofeng, Willem and Jeff Hoi, 2011; Stock, Greis & Kasarda, 1998). Again internal integration

necessarily involves cross functional teams that may bring together a carefully selected array of specialists who share information and make product, process, and manufacturing decisions, jointly and simultaneously (Koufteros Vonderembse, and Jayaram, 2005). Furthermore, with better internal integration, companies can identify, combine, and coordinate appropriate internal resources to improve capabilities across several domains such as quality, performance, cost, and delivery (Verona, 1999). Several authors have suggested implementing business processes in the context of supply chain management, but there is not yet an "industry standard" on what these processes should be (Lambert, Cooper & Pagh, 1998). They extensively describe the key business processes that are linked across the firm and the supply chain. There are eight (8) supply chain management (business) processes: as shown in figure 2.1. Each supply chain management process has both strategic and operational sub-processes. The strategic sub-processes provide the structure for how the process will be implemented and the operational sub-processes provide the detailed steps for implementation. The strategic process is a necessary step in integrating the firm with other members of the supply chain, and it is at the operational level that the day-to-day activities take place. Each process is led by a management team that is comprised of managers from each business function, including marketing, sales, finance, production, purchasing, logistics and, research and development. These teams are responsible for developing the procedures at the strategic level and for implementing them at the operational level (Lambert, 2008).

Figure 2.1 Integrating and Managing Business Processes across the Supply Chain



Source: (Adopted from Lambert, Cooper and Pagh, 1998). Supply Chain Management: Implementation Issues and Research Opportunities. *The International Journal of Logistics Management*, 9(2): 2

One best way of implementing internal integration is by using the supply chain operations reference (SCOR) model to ensure effective communication among the supply chain partners and to measure performance of the chain.

2.4 External Integration

Many firms are collaborating with their customers and suppliers to obtain information and complementary resources, which they can deploy to build competitive advantage. Gimenez and Ventura, (2005), Stevens, (1989) suggest that external integration is an extension of the internal integration achieved in a previous stage. External

supply chain integration reveals two major areas of emphasis. They are: Customer integration (CI) and Supply integration (SI). Supplier integration also called "backward" integration (Frohlich and Westbrook, 2001); it is the process of interaction and collaboration between an organization and its suppliers to ensure an effective flow of supplies (Zhao et al. 2011). Supplier integration leads to significant improvements in terms of cost (i.e. material cost, product cost, and manufacturing cost), delivery quality, and shorter cycle time (Ragatz et al. 2002). On the other hand, by managing suppliers strategically, a firm could improve its competitive capability, in terms of dependability, flexibility, cost, and quality (Narasimhan and Jayaram, 1998). Customer integration, also called "forward" integration (Frohlich and Westbrook, 2001), refers to the process of interaction and collaboration between an organization and its' customers to ensure an effective flow of products and/or services to customers (Zhao, Xie and Zhang. 2002). Customer integration involves sharing demand information, help the manufacturer to understand better the customer needs and to forecast better customer demand, as well as collaborative involvement of customers with respect to product design, provision of better quality products at lower cost and more flexibility in responding to customer demand (Fynn et al. 2010).

2.5 Performance

There have been calls for further empirical research that investigates the link between supply chain integration and performance (Stank, Keller and Daugherty, 2001; Rodrigues, Stank and Lynch, 2004). In response, Rosenzweig, Roth, and Dean, (2003) concluded that supply chain integration directly relates with business performance. Also internal collaboration directly affects firm performance (Stank et al. 2001). A number of researchers have also found that higher levels of integration generally lead to better performance (Gimenez and Ventura, 2005; Stock et al. 1998). Some researchers use all three integration variables in assessing the effect of supply chain integration on performance (Zhao et al. 2011). Flynn et al. (2010) assessed the impact of three dimensions of supply chain integration (supplier integration, customer integration, and internal integration) on operational and business performance. They found that internal integration directly relates to both business and operational performance and that customer integration directly relate to operational performance. Although supplier integration is not relate directly to either type of performance, the integration of supplier and customer were related to operational performance. Internal and external integration influence each other along with performance. Research indicates that internal integration's impact on performance depends on the functional areas that are being integrated and the level of external integration (Gimenez and Ventura, 2005). In line with other papers from 2000 onwards discussing SCI and performance Stock et al. (2000); Frohlich and Westbrook, (2001) found that the levels of integration correlate and influence each other positively.

Recent academic debate has arisen on the actual positive impact of integration on company performance. A couple of literature reviews on SCM survey-based research have argued that studies on the effect of SC integration on performance are not unanimous and that caution is advisable (Fabbe-Costes and Jahre, 2008; van der Vaart and van Donk, 2008). For instance, Stock et al. (2000) concluded that external integration does not necessarily provide performance benefits in all cases. Others have also suggested that integration might be more difficult in practice than in theory and should therefore be differentiated (Jahre and Fabbe-Costes, 2007; Power, 2005). Others intimate that, integration is more rhetoric than reality (Fawcett and Magnan, 2002). Furthermore, it is difficult to come to a conclusion that integration clearly affects performance, since most of the studies in this field are discernable enough that integration and performance have been defined and measured in a different and mostly limited way (Fabbe-Costes and Jahre, 2007).

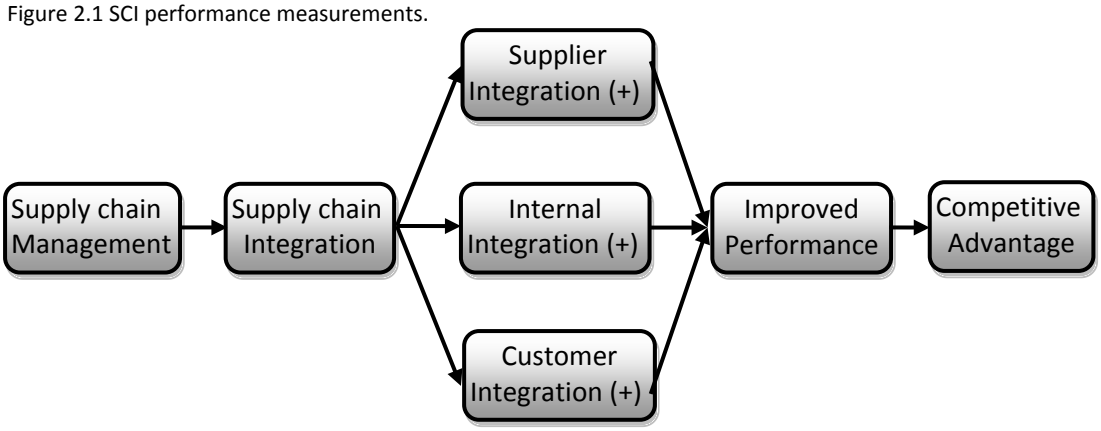
2.6 Competitive Advantage:

Firms have realised that enhanced competitiveness requires that companies ceaselessly integrate within a network of organizations. Firms ignoring this challenge are destined to fall behind their rivals, given the current trend of global supply chain competition, integration is regarded as a prerequisite for gaining improved performance (Kannan and Tan, 2010; Lee, 2000). It is the extent to which organisations integrate with their supply chain "partners" that determines their competitiveness (Christopher, 2011). Other theories that provide competitive advantages are: One, Competitive Forces Analysis (CFA): Performance of organisations largely depends on the competitiveness of the business environment. It is in the light of this and others that Professor Michael Porter of the Harvard business School in 1979 developed a five competitive force analysis framework for Industries as follows intense competitive rivalry within industry, threat of new entrants, threat of substitute products or services, bargaining power of customers (buyers) and bargaining power of suppliers. Two, the Resource-based view (RBV) another competitive tool that has become a dominant theory upon which arguments in academic journals and textbooks alike is grounded. The Resource-based view (RBV) asserts that firms gain and sustain competitive advantages by deploying valuable resources and capabilities that are inelastic in supply and

application of the bundle of valuable resources at the firm's disposal (Wernerfelt, 1984; Barney, 1986, 1991; Peteraf, 1993; Penrose, 1959). Firm resources that hold the potential for sustained competitive advantage must have four attributes which are valuable, rare, In-imitable, and non-substitutable (VRIN) (Barney, 1991). Three, "the value chain," also provide Competitive Advantage and complements the five competitive forces to provide competitive advantage. The value chain explains a firm's advantage and overall performance in terms of its pricing and its competitive advantage over rivals.

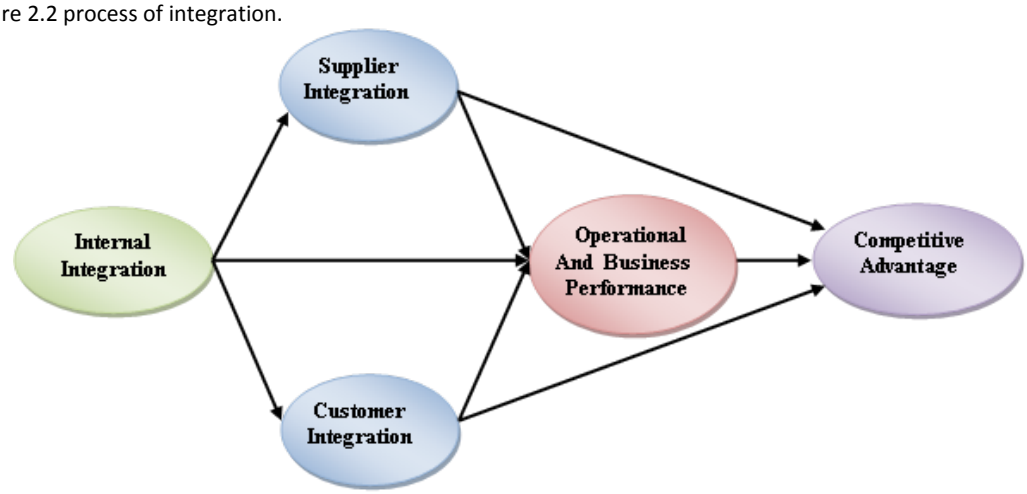
2.7 Conceptual framework:

Figure 2.1 SCI performance measurements.



Source: (adapted and modified from Lee, Kwon, and Severance, 2007)

Figure 2.2 process of integration.



Source: (Adapted with modification from Koufteros *et al*, 2005).

The above diagrams explain the conceptual framework and theory of the study: Figure 2.1 indicates that Supply chain management leads to supply chain integration and is moderated through supplier, internal and customer integration; which leads to performance and eventually provides competitive advantage. Figure 2.2 explains that internal integration leads to external integration and both lead to improved performance and finally lead to competitive advantage.

3. Methodology

For the purpose of this study, both approaches were adopted, The study adopted an adductive (inductive and deductive) approach, although the focus leaned more towards deductive; as the studies seek to establish causal

relationships between variables of SCI, performance and competitive advantage in Ghana's cocoa industry. The study also used a multiple cases with the aim to obtain information from more situations that were similar in the research problem area, in other to establish whether the findings of the first case occur in other cases for the purpose of generalization (Saunders, Lewis and Thornhill, 2009). The choice of a multiple methods was imperative as they provide better opportunities to answer research questions and to evaluate research findings to make inferences and for triangulation purposes (Tashakkori and Teddlie, 2003, as in Saunders et al. 2009). Interview administered questionnaire and self-administered questionnaire were used to collect quantitative data from management and staff of the case companies (Olam Ghana limited, PBC and COCOBOD). The questionnaire had a very simple structure to enable the researcher cover all research questions

The target population for this research consists of the case companies' staff and COCOBOD staff in Ashanti region. In order to increase precision and to minimize sampling bias, Kumasi and other five districts out of the twenty-seven districts in Ashanti Region were randomly selected, these were: Atwima Mponua, Atwima Nwabiagya (Nkawie), New Edubiase, Offinso and Ahafo Ano South districts. It was not possible to survey the entire population however; efforts were made to ensure that the sample size of each of the categories had equal representation among the groups by using computer to randomly select the sample size to address the research questions table 3.1. One hundred and Twenty (120) respondents from management and staff of COCOBOD, Olam and PBC in Ashanti Region of Ghana, were selected from five districts and Kumasi for the study.

Table 3.1 Location and category of Respondents

DISTRICTS	**PBC**	**OLAM**	**COCOBOD**	**TOTAL**
Atwima Mponua	6	6	5	17
Offinso	6	6	5	17
New Edubiase	6	6	5	17
Atwima Nwabiagya (Nkawie)	6	6	5	17
Ahafo Ano South	6	6	5	17
Kumasi	10	10	15	35
Total	40	40	40	120

Source (Author's construct, 2012)

The secondary data used for the study were sourced from the case company's web sites and organizational diary. The questionnaire was prepared to elicit information on the integration variables within the case companies and their supply chain. The questions were prepared after intensive review of literature from journal articles, books, official publications, thesis reports, interviews, observations, and internet resources. It was developed based on the research questions and objectives, and was designed to include both open ended and closed ended questions. The questionnaire was composed for COCOBOD officials, staff, and management of Olam Ghana and PBC respectively. The questionnaire was consisted of both categorical and scale type question items. All data were coded and analysis were carried out using the Statistical Package for Social Sciences (SPSS) version 16.0 and Microsoft Excel 2007 Software to measure the means of all the factors of SCI, find the relative importance index (RII) of all the means, frequencies, and percentages. The software was also used to run correlation and regression analysis to measure the relationship between the variables and to determine the strengths and weaknesses as well as the type of the relationship that exist between the variables. Furthermore, ANOVA was used to find any statistically significant differences between the variables used to assess the performance of the case companies as well as the impact and effects of the relationships (such as: t-Stats, P-value and Co*efficients*). All the variables were tested at the p-value of 0.05 or 0.01 levels of probability. Out of the one hundred and twenty (120) questionnaires administered, 81 were returned representing 67.5% response rate. Notwithstanding, the challenges faced during the research, it did not in any way affected the reliability, validity, credibility, and accuracy of the result.

4. Result and Analysis

Respondents were asked to rate the factors of supply chain integration within their industry that leads to improved performance and competitive advantage. The rating was a five point likert scale, ranging from 1 = 'Not Important at all' to 5 = 'Very Important' and 1 = 'Strongly Disagree' to 5 = 'Strongly Agree'.

Table 4.1 Supply Chain Integration Variables

Factors / Variables	COCOBOD		PBC		Olam		RPI	R
	No	Mean	No	Mean	No	Mean		
Internal Integration (II)								
Different departments in your company collaborate with the company's' development programme(s).	29	3.90	24	4.12	28	3.93	**0.795**	**1st**
Different departments in your company share technical information with each other quickly if required.	29	3.83	24	4.08	28	3.68	**0.770**	**2nd**
Delivery flexibility	28	3.96	24	3.92	28	3.96	**0.738**	**3rd**
Periodic interdepartmental meetings among internal function	28	3.50	24	3.54	28	3.89	**0.730**	**4th**
Easy information flow among various departments	29	3.79	24	3.71	28	3.86	**0.698**	**5th**
Different departments in your company provide each other with their plan(s).	29	3.21	24	3.58	28	2.9	**0.677**	**6th**
Integrative inventory management across internal functions	29	2.69	24	3.29	28	2.57	**0.565**	**7th**
Computer-based planning system across all functional units	29	2.31	24	2.54	28	2.25	**0.472**	**8th**
Data integration in operation process among all employees	29	2.34	24	2.42	28	2.04	**0.452**	**9th**
Integrated database among internal functions through network.	28	2.14	24	2.04	28	1.89	**0.405**	**10th**
Customer Integration (CI)								
You have the capability to frequently, satisfy your customers.	29	4.24	24	4.33	28	4.07	**0.802**	**1st**
You have frequently periodical contact with your customers.	29	3.86	24	4.08	28	3.93	**0.790**	**2nd**
You work in partnership with your customers.	29	4.17	24	4.29	28	4.00	**0.787**	**3rd**
You have long-term relationships with your customers.	29	3.86	24	3.88	28	1.89	**0.770**	**4th**
You have the capability to deliver products quickly (responsiveness).	29	3.86	24	3.92	28	3.64	**0.760**	**5th**
Your customers give feedback on quality.	29	3.69	24	3.96	28	3.64	**0.719**	**6th**
You and your customers share technical information with each other if required.	29	3.52	24	3.46	28	3.32	**0.686**	**7th**
Your customers have the capability to forecast market growth and demand.	29	3.21	24	3.75	28	3.18	**0.672**	**8th**
You collaborate with your customers development programme(s).	28	3.11	24	3.46	28	3.18	**0.648**	**9th**
You and your customers have transparent information about each other's inventory status.	29	2.90	24	3.54	28	3.00	**0.625**	**10th**
Supplier Integration (SI)								
You and your suppliers share technical information with each other if required.	28	3.82	24	3.54	28	3.86	**0.793**	**1st**
You and your suppliers work in partnership with each other.	28	4.04	24	4.33	27	3.96	**0.792**	**2nd**
Your suppliers collaborate with you with their development programme(s).	28	3.71	24	3.46	28	3.86	**0.788**	**3rd**
Your suppliers have the capability to deliver products quickly (responsiveness).	27	3.67	24	3.92	27	3.89	**0.769**	**4th**
You actively engage suppliers in your quality improvement efforts.	28	3.79	24	3.96	28	4.00	**0.763**	**5th**
You and your suppliers have long-term relationships with each other.	28	3.86	24	3.87	27	3.96	**0.753**	**6th**
You and your suppliers have transparent information about each other's inventory status.	28	3.50	24	3.75	28	3.57	**0.748**	**7th**
You give feedback on quality to your suppliers.	28	3.89	24	3.46	28	3.71	**0.697**	**8th**
You and your suppliers have frequent periodic contact with each other.	28	3.86	24	4.08	27	3.67	**0.690**	**9th**
Your suppliers have the capability to frequently, satisfy you.	28	4.00	24	4.29	27	4.04	**0.592**	**10th**

Source: Factors adapted with modification from Sha & Chen (2008) Gimenez & Ventura, (2005), Koufteros *et al*, (2005), Zhao et al. (2011) and Flynn *et al* (2010) with Author's own field survey (2012).

4.1 Internal integration

It is discernable from table 4.1 that most of the mean ratings fell between 'Neutral' and 'Important' threshold indicating that most of the factors were important as far as internal integration was concerned. It is obvious that delivery flexibility = 3.96 (n=28) was the highest factor for both Cocobod and Olam, collaboration with different departments with the company's' development programme(s) = 4.12 (n=24) was the highest for PBC. Interestingly, Integrated database among internal functions through network = 2.14 (n=28), 2.04 (n=24), 1.89 (n=28) were the least of all the factors for Cocobod, PBC and Olam respectively. With the relative importance index for the factors, collaboration with different departments with the company's' development programme(s) = 0.795 was highly ranked. Different departments in your company share technical information with each other quickly if required= 0.770 ranked second, followed by delivery flexibility= 0.738 and the least ranked was integrated database among internal functions through network= 0.405. The individual case companies present a slightly different picture: Delivery flexibility was ranked highest for both PBC = 0.729 and Olam = 0.741 followed by collaboration with different departments with the company's' development programme(s) = 0.708 and 0.732 respectively, making this factor very important the result also confirms that the least ranked factor was integrated database.

4.2 Customer Integration

It is clear from table 4.1 that almost all the mean ratings fell between 'Neutral' and 'Strongly Agree' threshold indicating that almost all the factors were important to them as far as customer integration is concern. Capability to frequently satisfy your customers = 4.33 (n=29), 4.24 (n=24), 4.07 (n=28) was without doubt the highest factor for PBC, Cocobod and Olam respectively; followed by, working in partnership with customers = 4.29 (n=24), 4.17 (n=29), 4.0 (n=28) in the same order. Surprisingly, the least rated factor was the long-term relationships with customers =1.89 (n=28) for Olam. The relative importance index shows a similar trend, Capability to frequently satisfy your customers = 0.802 was highly ranked for all respondents, it was also ranked the highest for PBC = 0.833 and second for Olam =0.768. However, the least mean factor for all respondents, long-term relationships with customers = 0.770 was ranked forth. A sharp contrast is seen between the two case companies concerning share technical information with each other if required. While Olam ranked it first = 0.821, PBC ranked it tenth = 0.458

4.3 Supplier Integration

Once again, it is discerning enough from table 4.1 that all the mean ratings for the case companies fell between 'Agree' and 'Strongly Agree' threshold indicating that all the factors were important to them as far as customer integration was concern. It is clear that work in partnership with each other = 4.33 (24), 4.04 (28) and suppliers have the capability to frequently satisfy you =4.04 (28) was rated highest for PBC, Cocobod and Olam respectively. While having transparent information about each other's inventory status =3.50 (28) and 3.57 (28) was the least ranked factor for Cocobod and Olam respectively. The relative importance index (RII) however showed that sharing technical information with each other = 0.793 was ranked highest for all respondents and confirmed by both case companies, PBC = 0.831 and Olam = 0.771. The least factor for all respondents was 'suppliers have the capability to frequently satisfy you' =0.592. The next highly ranked factor was 'collaborate with you with their development programme(s)' PBC = 0.764, Olam ranked it first as well = 0.771.

4.4 Improved Performance

Table 4.2 Correlation Analysis Improved Performance (IP) case companies

CORRELATION ANALYSIS					
	II	CI	SI	IP	CA
Internal Integration(II)	1				
Customer Integration (CI)	0.20494784	1			
Suppliers Integration (SI)	0.27416012	0.629341707	1		
Improved Performance(IP)	-0.09053322	0.315296366	0.103694878	1	
Competitive Advantage	**-0.09542719**	**0.184857926**	**0.139308877**	**0.457867041**	**1**

REGRESSION STATISTICS	
Multiple R	0.365042991
R Square	0.133256386
Adjusted R Square	0.099487154
Standard Error	0.452503861
Observations	81

ANOVA				
Regression	3	2.424000373	0.808000124	3.946088753
Residual	77	15.76650031	0.204759744	
Total	80	18.19050069		

Variables	***Coefficients***	***Standard Error***	***t Stat***	***P-value***
Intercept	3.053933533	0.380507794	8.025942115	9.0661E-12
Internal Integration (II)	-0.120338521	0.092663307	-1.298664214	0.197935015
Customer Integration (CI)	0.320670722	0.103910319	3.086033454	0.002818235
Suppliers Integration (SI)	-0.074589393	0.084761351	-0.879992964	0.381601369

IMPROVED PERFORMANCE =3.054-0.12 II+0.320 CI-0.074 SI

Summary Output

Regression Statistics	
Multiple R	0.457867041
R Square	0.209642227
Adjusted R Square	0.199637699
Standard Error	0.401947787
Observations	81

ANOVA

	df	*SS*	*MS*	*F*	*Significance F*
Regression	1	3.385489038	3.385489038	20.95473284	1.72479E-05
Residual	79	12.76339985	0.161562023		
Total	80	16.14888889			

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	2.024628842	0.339009092	5.972196292	6.34741E-08
Improved Performance	0.431408184	0.094242612	4.577633978	1.72479E-05

COMPETITIVE ADVANTAGE =2.0246+0.4314 IP Source: (Author's own field survey, 2012).

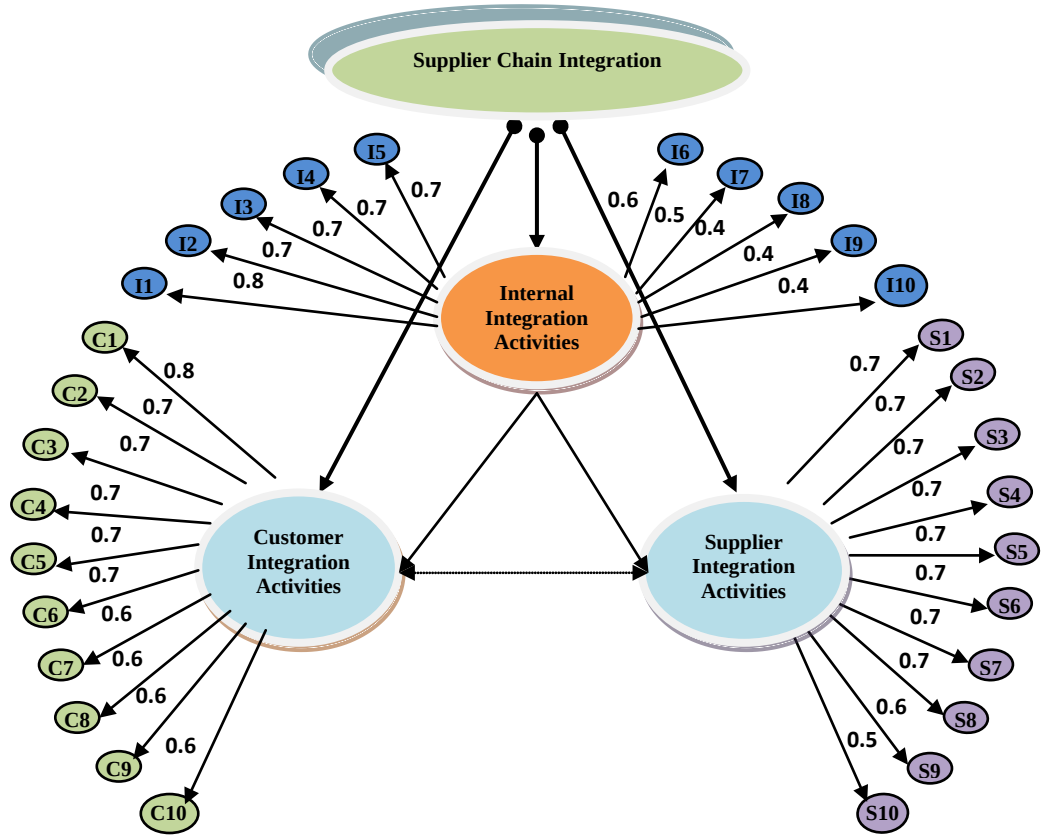
It is discernable from table 4.2 that the correlation analysis portrays a generally positive relationship among the variables. However, comparing the individual variables, it was clear that not all of them have positive relationships. There is a strong positive relationship between supplier integration (SI) and customer integration (CI) value = 0.629, the next highest positive value occurs between competitive advantage (CA) and improved performance (IP) about = 0.458. This is followed by a positive but not strong relationship between improved performance (IP) and customer integration (CI) =0.315. It is worthy of note that, there was a negative relationship between improved performance (IP) and internal integration (II) about = -0.091as well as between competitive advantage (CA) and internal integration (II) = about -0.095. The regression statistics between II, CI, SI and CA indicates that, the multiple R = 0.365 is not strong enough, the R Square of 0.133 is rather weak, this is affected by the high standard error = 0.453. The analysis of variance (ANOVA) is discernable from table 4.2 that indeed the three aspects of supply chain integration (II, CI, SI) actually leads to improved performance with Coefficients of approximately (3.054). Notwithstanding, individual variables showed that both internal integration and supplier integration on their own do not lead to improve performance as their Coefficients and *t-Stat* give negative values. However, customer integration leads to improved performance with Coefficients of about (0.321), P-value (0.003) and *t-Stat* (3.086). Finding out whether improved performance leads to competitive advantage, the regression statistics between them indicates that, the multiple R = 0.458 is relatively strong, the R Square of approximately 0.210 is weak, and the standard error = 0.453 is high. The ANOVA indicates that, improved performance leads to competitive advantage with Coefficients of approximately (0.431), P-value (1.725) which is statistically not significant and *t-Stat* (4.578).

5. Discussion and Conclusions

5.1 The scope of SCI within the Ghana cocoa value chain

Figure 5.1 and table 4.1 shows the scope and relationship between various aspects of integration. Ghana cocoa value chain (GCVC) follows an integration process that goes through three different stages. In stage I, there is 'no' to 'very low 'integration; in stage II companies internally integrate all functional units in the industry, such as logistics, purchasing, marketing and other units; finally, in stage III, the internal integration achieved in stage II is extended to other supply chain members, such as customers and suppliers. This study confirms existing literature and aligned with organizational theory as proposed by Gimenez and Ventura (2005); Koufteros et al. (2005); Zhao et al. (2011) and Flynn et al. (2010), who suggests that, there are three levels of integration that leads to improved performance and competitive advantage. They are: low integration, medium (partial) integration, and full (complete) integration. Their conclusions were drawn from very strong empirical evidence after testing a set of hypotheses. Their result confirms positively as follows: There is a very low level of external integration in companies with a low level of internal integration, the positive correlations between internal and external integration imply that internal integration is conducive for external integration and they influence each other. If firms want to collaborate with external customers and suppliers, they need to enhance internal integration. The fact is that the higher level of internal integration is directly proportional to external integration, this suggest that, firms first integrate internally and then extend the collaboration to customers and suppliers.

Figure 5.1 the scope and relationship between various aspects of integration and values of Relative Importance Index.



Source: Designed based on Author's own field survey, 2012)

It is discernable from table 4.1 and figure 5.1 that, the relative importance index (RII) conducted on the factors shows almost all the them were important since majority are above (0.5) threshold. The factor 'You have the capability to frequently satisfy your customers' (RII = 0.802) was the most highly ranked factor. Followed by 'Different departments in your company collaborate with the company's' development programme(s)' (RII = 0.795), 'You and your suppliers share technical information with each other if required' (RII = 0.793) and 'You and your suppliers work in partnership with each other' as second, third and forth highly ranked respectively. This means that for organisations within the GCVC to gain total integration that will lead to improved performance and competitive advantage, the four factors above should be given the first priority. On the other hand, the least ranked factors was 'Integrated database among internal functions through network' (RII = 4.05), 'Data integration in operation process among all employees' (RII = 0.425), and 'Computer-based planning system across all functional units' (RII = 472) in that order. This means that integrated database was not a critical factor as far as supply chain integration in the Ghana cocoa value chain is concerned which is a worrying situation.

5.2 Examining the factors of SCI within Olam and PBCs supply chain

Analysing the mean ratings of all the three categories of SCI, both PBC and Olam follow a similar trend, indicating that almost all the factors were important (Table 4.1). This is because most of the mean ratings fell between 'Neutral' and 'very important' threshold. Also, using the general relative importance index as a benchmark, both Olam and PBC stood stronger in some of the factors of internal integration, but fell slightly in almost all the factors for both customer integration and supplier integration. The internal integration shows that, the mean ratings for PBC were higher than that of Olam. The relative importance index further confirms that all the factors for the internal integration were important. It is however, significant to note the contrast between the ratings that, while PBC was ahead of Olam in the mean ratings, Olam was ahead of PBC with the relative importance index. For customer integration, it is discernable that the mean ratings for PBC were higher than that of Olam.

The relative importance index indicates that all the factors of customer integration were very important but there is no statistically significant difference between the ratings of PBC and Olam. Finally, with supplier integration it was comprehensively clear that the mean ratings for PBC were higher than that of Olam for almost all the factors. The relative importance index emphatically portrayed that all the factors of supplier integration were very important, falling between the range of (0.531 and 0.813). It is also clear that there was no statistically significant difference between the ratings for PBC and Olam even though; PBC seems to be slightly ahead of Olam.

5.3 How SCI leads to improved performance and competitive advantage.

Statistical analysis shown in table 4.2 indicates that generally, there was a positive correlation between all the three aspects of supply chain integration variables (II, CI, and SI), improved performance and competitive advantage. However, comparing the individual variables shows that not all of them had positive relationships. Significant among them were between supplier integration (SI) and customer integration (CI) value = 0.629 indicating a strong positive relationship. The relationship between improved performance and internal integration and between competitive advantage (CA) and internal integration were both negative. The regression statistics and ANOVA also indicates that the three aspects of supply chain integration (II, CI, and SI) together, actually lead to improved performance. Nevertheless, the individual variables showed that not all of them on their own could lead to improve performance. In addition, the regression statistics and ANOVA indicated that, improved performance leads to competitive advantage. These results were consistent with existing published literature by many experts in the field of supply chain. Such as Frohlich and Westbrook, 2001; Kim, 2006; Kannan and Tan, 2010; Vickery et al. 2003; Kahn, 1998; and Pagell, 2004, who argue that performance improvements are not assured with just one aspect of SC integration, and have therefore proposed that implementing complete integration both upstream (SI), operations (II), and downstream (CI) is better than concentrating on only one aspect. Furthermore, there is a great deal of empirical evidence to show that successful supply chain integration can improve firms performance and competitive advantage (Fabbe-Costes and Jahre, 2008; Van der Vaart and Van Donk, 2008; Singh and Power, 2009; Ou et al., 2010; Wiengarten et al., 2010, Tutuncu and Kucukusta (2008). Furthermore, the result was consistent with the conceptual framework developed for this study based on the literature review.

5.4 Conclusions

The findings from the studies indicated that almost all the factors of SCI were important since about 90% were above (0.5) threshold. Furthermore, the RII for customer integration and supplier integration showed to be very important. It was however; clear that there was not much statistically significant difference between the ratings of PBC and that of Olam as far as the relative importance index was concerned. Even though PBC was slightly ahead of Olam. Comparing the general relative importance index with the case companies, both Olam and PBC performed better than the benchmark. Again, statistical analysis of SCI revealed that there was a positive correlation between all the three aspects of supply chain integration variables (II, CI, and SI), improved performance and competitive advantage. Nevertheless, the individual variables showed that not all of them had positive relationships. The regression statistics and ANOVA indicated that the three aspects of supply chain integration (II, CI, and SI) all together lead to improved performance, but the individual variables showed that not all of them on their own could lead to improve performance. Finally, the test showed that improved performance also leads to competitive advantage and the results were consistent with existing published literature and theory. Based on the findings of the study, it is recommended that: One, the Cocoa industry in Ghana, particularly PBC and Olam should adopt pragmatic measures to implement all the three aspects of supply chain integration. Two, the cocoa industry in Ghana should adopt innovative technology that could integrate their supply chain partners and computer-based systems for smooth and agile information flow especially, PBC and Olam. Three, COCOBOD should maintain the quality assurance process through the quality of the current three-tier system to maintain the industries global image. Finally, further study needs to be conducted on all the LBCs in Ghana as well as the upstream and downstream cocoa supply chain such as (farmers, processors, distributors, retail outlets of cocoa products and the consumers of the finished cocoa products).

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