Effects of supply chain integration on lead time in the retail industry in Ghana

Supply chain integration is concerned with the close alignment and coordination among parties within a supply chain as a means of improving performance. Inventory management of global supply chains presents challenges to retail businesses in developing economies where several uncertainties relating to order cycle, lead times and inventory decisions exist. This paper examines supply chain integration and its effects on lead times for the retail industry in Ghana. In the retail industry where products have varying shelf lives, the importance of supply chain integration is critical for performance and survival in a competitive business environment. A case study approach was used where purposive sampling was employed to select two retail giants operating in Ghana. It was found that an integrated supply chain results in significant reductions in lead times. Depending on the product category and the degree of supply chain integration, lead time reductions can be as high as 40%. A partnership relationship between the buyer and the supplier results in higher percentage reduction in lead times compared with the adversarial relationships. The benefits of reduced lead times include improved product availability, customer satisfaction, supply chain performance and efficiency. A partnership relationship is recommended to derive maximum benefits of supply chain integration. However, in a new, risky or hostile environment, an adversarial buyer-supplier relationship is recommended.

Introduction

A supply chain is an integrated process wherein raw materials are transformed into final products, then delivered to customers. Lambert, Cooper and Pagh (1998) defined supply chain management (SCM) as ‘the integration of key business processes from end user through original suppliers, and information that adds value for customers and other stakeholders’. The Council of Supply Chain Management Professionals (CSCMP) noted that SCM encompasses the planning and management of all activities involved in sourcing and procurement, conversion and all logistics management activities. More importantly, SCM also includes coordination and collaboration with channel partners, which can be suppliers, intermediaries, third party service providers and customers. Monczka and Morgan (1997) among others noted that SCM seeks to enhance competitive performance by integrating the internal cross-functions within a company and effectively linking them with external operators of suppliers, operators to be successful. Lambert and Cooper (2000) argued that the extent of joint planning is expected to bear heavily on the success of the supply chain and that though different components may be emphasised at different times during the life of the supply chain, planning transcends the phases. Zigiaris (2000) noted that successful SCM coordinates and integrates all of these activities into a seamless process. This includes integration of supply chain partners such as vendors, carriers, third party companies and even information systems providers.

Supply chain integration is a performance-improving approach that develops seamless linkages between the various actors, levels and functions within a supply chain to optimise customer service. The objectives of supply chain integration are to improve efficiency and reduce redundancy while also enhancing product availability. Supply chain integration strives to better connect demand with supply, which can both improve customer service and lower costs. However, it is not always possible to simultaneously achieve all these objectives. Demographic data indicates that Africa’s middle class population has tripled over the last 30 years, and the current trajectory suggests that this segment of the population will grow to over 1.1 billion by 2060 (cited in Africa Media Agency [AMA] 2014). The combined effects of population growth and increased urban migration include increased demand for goods and services and hence potential for significant retail growth. Also, Ghana has been identified as a country with a positive business environment in which foreign retailers can invest given its reputation for political stability and cultural tolerance (McTernan 2014). The objective of this paper is to examine the supply chain integration and the impacts of lead time in the retail industry with cases from Ghana. The premise
is that lead time can be used as proxy to assess the efficiency and performance of the supply chain in competitive business environment.

**Literature review**

Integrated SCM is about going from the external customer and then managing all the processes that are needed to provide the customer with value in a horizontal way (Monczka & Morgan 1997). Generally, SCM comprises integrated functions from raw materials to final products. SCM also covers integrated management of every organisation throughout the whole chain. Supply chain integration can be defined as the extent to which all activities within an organisation and the activities of its suppliers, customers and other supply chain members are integrated together (Tutuncu and Kucukusta 2008). Supply chain integration is usually classified into two categories: internal and external. Internal integration is concerned with inter-functional interaction, collaboration, coordination, communication and cooperation within an organisation. In contrast, external integration involves interactions and collaborations with suppliers and customers and other partners in the supply chain that are external to the central company. Customer integration, also termed ‘forward integration’, is intended to ensure effective flow of products and services to customers. Supplier integration (backward integration) is concerned with collaboration and interaction of suppliers to ensure effective flow of supplies (Otchere, Annan & Anin 2013). Treville, Shapiro and Hameri (2004) noted that supply chain integration includes just-in-time delivery, reduction in supplier base, supplier evaluation based on quality and delivery performance, establishment of long-term contracts with suppliers and elimination of paperwork. According to Kauremaa (2013), it is possible to distinguish three main approaches to integrating supply chains that differ from one another in terms of the objectives they have and the results they produce. This is presented schematically in Figure 1.

1. **Buyer-centric integration**: A buyer-centric model is concerned about the efficiency gains for the buyer. The buyer seeks to streamline its operations and pays for this through accepting greater dependence on the supplier. For its part, the supplier looks for a return on its investment through greater customer loyalty to the supplier and satisfaction.

2. **Collaboration-centric integration**: In collaboration-centric integration, a channel is created through which the parties can discuss a wide range of issues at various levels between their respective organisations. This sort of approach can not only produce much sought after operational improvements but also a range of unexpected benefits that arise from the better understanding of supplier and buyer of each other’s businesses.

3. **Synchronisation**: The synchronisation model is about the supplier making use of the increased transparency to improve its own operations. In this case, the buyer might, for example, look to outsource responsibility for replenishment to its supplier in the hope of receiving better service. The supplier, in turn, can cover the cost of the extra work by reducing its inventory levels as a result of the improved visibility and thus reduced uncertainty.

**Lead time**: Lead time is defined as the latency between the initiation and the execution of a process. Lead time is the key issue for enhancing performance of organisations across various industries (Treville et al. 2004). Lead time is a major consideration for retailers and customers in the supply chain. Higher levels of integration results in reduced lead times. Chopra, Reinhardt and Dadahardt (2004) showed that by decreasing the lead time uncertainty, the required safety stock increases. Singh, Sohani and Marmat (2013) noted that in an information-enriched supply chain, firms are closely connected with suppliers and customers both internally and externally because of information sharing resulting in reduced lead time and increased performance. Lead time can be measured in a number of ways, including manufacturing lead time (Jayaram, Vickery & Droge 1999) and customer lead time (Duenyas & Hopp 1995). Customer lead time is the time elapsed from receipt of an order until the finished product is either shipped or delivered to the customer. This paper focuses on customer lead time. Various variables can help reduce the lead times of products or delivery in the retail sector. Because the retailer does not normally add any value to the product yet to be distributed the final consumer, integrating supply chain in relation to lead time reduction is essential in satisfying customer’s demand. The retail industry is much concerned about delivering goods and services to the final consumer. This means delivery is of essence; therefore, ways to reduce lead time must be considered to get the product as close to the consumer as possible and on time.

**Retail industry landscape in Ghana**: According to Deloitte (cited in AMA 2014), ‘Africa’s middle class has tripled over
the last 30 years, and the current trajectory suggests that the African middle class will grow to 1.1 billion in 2060, making it the world’s fastest growing continent. This growth, coupled with the forecasted GDP growth of over 6%, drives the potential for retail growth on the continent significantly through increased purchasing power and consumer demand’. According to the African Retail Development Index (AMA 2014), African retailers such as South Africa’s Company A, which operates in more than 16 African countries, and Nakumatt, which is based in Kenya which operates in 4 East African countries, have done most of the expansion, but global retailers are moving in. For example, in 2011, Wal-Mart acquired South Africa’s Massmart, and it plans to open 90 supermarkets across Africa over the next 3 years. It is noteworthy that the characteristics of supply chains in Africa are more challenging than many other markets in the world. Therefore, it is important to acknowledge and understand these challenges to develop strategies to mitigate the risks versus the opportunities which the continent offers.

In Ghana, the landscape of retail is changing rather rapidly where consumers are gradually shifting from the traditional open market shops to supermarkets. McTernan (2014) noted a recent study that most Ghanaians still do their weekly shop at street markets (69%) or from street vendors (26%), while 17% now shop in supermarkets. In other words, even though retail business is huge, the formal retail sector in Ghana is very limited and the biggest component of the retail industry is informal trade. Regardless, the formal retail market in Ghana is visibly and rapidly expanding. According to McTernan (2014), ‘new shopping centres are sweeping the continent, and they are bigger, shinier and busier. In West Africa, Ghana is taking the lead with the largest in the region’. The Accra Mall, which was built in 2007, has a capacity of 20,000 square metres of retail space. The $100 m West Hills Mall was completed in 2014 and covers 27,700 square metres. According to McTernan (2014), Ghana is considered an ideal location in West Africa because of ‘political stability, lower costs and the ease of doing business have meant that retail investors can plan for the long term and use the country as a growth hub, attracting customers from across the region’. South African companies are leading the way in retail development in Ghana. In another study (Euromonitor News 2015), Ghana is seen to be on track to becoming Africa’s next hotspot for retailers. Ghana has been identified as a country with a positive business environment in which foreign retailers can invest. The country is developing a reputation for political stability and cultural tolerance and has made huge strides in diminishing its poverty problems. According to the study, Ghana is also seen as the doorway for foreign investors to tap the 250 million consumers in the region, and an exit point for landlocked nations such as Niger. Moreover, as an English-speaking nation, Ghana has close ties with American and British businesses. This reflects the strength of fast moving consumer goods (FMCG) companies in the country (Euromonitors News 2015).

Methodology
Given the diversity of the retail industry in terms of type and size, a case study approach was adopted for this study. Yin (2003) noted a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context especially when the boundaries are not clear between the phenomenon and the context. Yin (2003) further argued that the unique strength of case studies is its ability to deal with a full variety of evidence-documents, interviews and observations. According to Baxter and Jack (2008), qualitative case study is an approach that facilitates exploration of a phenomenon within its context using a variety of data sources. The case study approach is considered appropriate for this research. The study involved data collection through interviews of key players and analysis of historical data.

Case selection and data collection: Purposeful sampling was employed to select two retail giants operating in Ghana that are of foreign origin. To conceal the identities of these companies, there are referred to as Company A and Company B. These two companies being of foreign origin, obviously obtain their goods from both local (Ghanaian) and foreign suppliers. Even though the sample size may not be statistically representative, they invariably reflect the general characteristics of retail companies that have integrated their operations with partners in their supply chains. However, the selected companies can be considered to be representative of the experiences and practices of the foreign retail companies operating in Ghana, which is becoming a fairly competitive market place. The sample does not include indigenous Ghanaian retail companies. Therefore, no comparative analysis between foreign-based and local retail companies could be conducted. The focus of the study is to examine the impacts of supply chain integration on lead time, which is critical for the foreign-based retail companies. Data was collected through interviews and analysis of historical data.

Interviews: For the interviews, a semi-structured guide was used. The questionnaire was structured to capture information on the categories of products, the sources of merchandise (foreign and local), average lead times and levels of integration, as indicated by supplier relationship and experiences with suppliers and suppliers’ supplier, as well as information sharing among retails and suppliers. The respondents were selected based on their knowledge of inventory and procurement policies and practices and the operations of the company.

Historical data: In an attempt to measure the impacts of supply chain integration on lead time, a few categories of products that are common to the two companies were selected and the lead times before and after integration were analysed. It should be noted that the boundaries between none and full supply chain integration are not clearly defined for both companies. Furthermore, there are differences among the lead times for the individual products in each category. Consequently, for the purposes of this analysis, the lead times before and after integration are average values for the categories of products.
Findings and discussions

In general, the two companies sampled sell identical products with a few exceptions. Company A indicated that 60% of their products are sourced locally and 40% from foreign sources. The corresponding figures from Company B are 55% local and 45% foreign. The average lead times of locally sourced items are 7 and 5 days for Company A and Company B, respectively. The lead times for foreign items are about 10 times longer than the locally sourced items. These lead times present the average of all products (local of foreign). Depending on the origin of the item, the actual lead time could be shorter. The reasons for long lead times for foreign-sourced items (especially those arriving by sea) cannot be explained herein partly because the actual origins were not disclosed. However, the long lead times could be attributed, in part, to the long processing times at the sea ports of entry. Information gathered clearly indicated that the partners in the various supply chains have established collaborative relationships where they share information relating to sales figures, customer complaints, and stock inflow and outflow. The two companies also confirmed that the multi-tier relationship with the suppliers and suppliers’ supplier has helped to receive goods and services earlier than the anticipated lead time.

The ordering systems or replenishment practices are however different. Company A uses an Automatic Ordering System that is configured to monitor inventory levels and generate orders for replenishment. Obviously this company uses the continuous inventory monitoring system. In contrast, Company B has two systems of ordering: (1) corporate order which is sourced from South Africa and (2) local orders which are raised through a local third party agent.

In assessing the impacts of supply chain integration on lead times, three categories of products were selected: groceries (fruits and vegetables), household goods and appliances. The suppliers of these groups of products are different for the two retail companies. Table 1 compares the lead times before and after supply chain integration for the three product groups. It is noted, in general, supply chain integration results in significant reduction in lead times. It is also noted that even though the retail companies use different suppliers, the percentage reductions in lead times are identical for a given product group. Between the two companies, Company B appears to experience high reductions in lead times following supply chain integration compared with Company A. For example, for groceries, Company A experiences about 44% reduction in lead time while Company B enjoys roughly 55% reduction in lead time. The reasons for the marked differences in lead time reductions between the two companies are not clearly evident. However, the differences could be attributed to several factors including the type of buyer–supplier relationships, degree or level of supply chain integration, efficiency of the suppliers, among others.

Buyer–supplier relationships

The two companies each has a platform for sharing information concerning improvement of relationship, indicating that they use that for frequent meetings. However, they have different types of business relationships with their partners in the supply chains. Company A has adversarial relationship with its suppliers, whereas Company B maintains a partnership relationship. A partnership relationship is a tailored business relationship based on mutual trust, openness, shared risk and shared rewards that results in business performance greater than would be achieved by the two firms working together in the absence of partnership. Partnerships, however, are costly in terms of the time and effort required. In contrast, adversarial relationship is one wherein businesses treat each other and their clients as adversaries instead of as partners. There is little or no trust between them, and their means of communicating with each other is very formal. They do not have direct contact and no direct involvement in each other’s activities. In the right business environment, a partnership relationship is the appropriate approach, but in a risky and hostile environment, it is best to apply an adversarial approach (Differencebetween.net).

In terms of integration, the type of buyer–supplier relationship appears to suggest that Company A which maintains adversarial business relationship adopts the buyer-centric model which is concerned about the efficiency gains for the buyer. In this model, the buyer seeks to streamline its operations, for example by reducing the amount of manual work in order processing. The buyer pays for this through accepting greater dependence on the supplier. Company B which operates the partnership relationship appears to adopt the synchronised integration model. In this model, the buyer (i.e. the retail company) outsources responsibility for replenishment to its suppliers in the hope of receiving better service. The suppliers make use of the increased transparency to improve their own operations, for example, reducing its inventory levels as a result of the improved visibility and thus reduced uncertainty. Regardless of the type of business relationships, both companies have multi-

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<th>Variable</th>
<th>Company A</th>
<th>Company B</th>
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<tr>
<td></td>
<td>Groceries</td>
<td>Household and personal care</td>
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<td>Lead time before SCI (days)</td>
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tier relationships with their partners, that is, relationships with the suppliers and their supplier. The essence of this to ensure that the logistics requirements are met, quality is not compromised and cost is effectively managed. Information from the interviews indicates that multi-tier relationship has helped to receive goods and services earlier than the anticipated lead times.

Trkman and Groznik (2006) described different benefits of supply chain integration to include enhancement of the process of information sharing inside-out of the organisation resulting in cost reduction. It also enables retail organisations to do effective renovation and business process modelling which increase efficiency and profit margins. Li, Ragu-Nathan, Ragu-Nathan and Rao (2006) also added that supply chain integration enables the organisation to gain a sustainable competitive advantage and enables it to realise its goals and objectives. Singh et al. (2013) also concluded that investing in levels of connectivity and interdependency through supply chain integration results in reduction in lead time

Conclusion
There are different models or approaches to collaboration between buyers and suppliers. In the retail industry where products have varying shelf lives, the importance of supply chain integration is critical for performance and survival in a competitive business environment. An integrated supply chain results in significant reductions in lead times. Depending on the product category, and the degree and maturity of the supply chain integration, lead time reductions before and after integration can be as high as 40%. Furthermore, a partnership relationship between the buyer and the supplier is considered the preferred approach because it results in higher percentage reduction in lead time compared with the adversarial relationship. However, in a risky and hostile environment, it is best to apply an adversarial approach.

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Competing interests
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Authors’ contributions
E.D.F. (Ghana Institute of Management and Public Administration) and A-V.B. (Ghana Institute of Management and Public Administration) contributed equally to the writing of this article.

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