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Reverse Logistics and Performance of Bottled and Sachet Water Manufacturing Firms in Ghana: The Intervening Role of Competitive Advantage

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Abstract:*This study principally aimedat examininghow reverse logistics influences firm performance, with competitive advantage playing an intervening (mediating) role. The study carefully selected 187 logistics, procurement and production managers via stratified sampling from Ghanaian bottled and sachet manufacturing firms. Questionnaire was the main data collection instrument for the study. The study tested all hypotheses using PLS-SEM via SMART PLS 3 software. The findings of the study showed that reverse logistics positively and significantlyinfluences competitive advantage and firm performance. The findings further disclosed that competitive advantage positively and significantlyinfluencesfirm performance. Moreover, the findings showed that competitive advantage plays a significant intervening (mediating) role between reverse logistics and firm performance. The study findings serve as an insight for managers to holistically consider and integrate reverse logistics into their supply chain so as to enjoy competitive advantage and improve their performance.*

Keywords: *Reverse Logistics, Competitive Advantage, Firm Performance*

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I. Introduction

In today's dynamic business environment characterized by fierce competition, stringent legal regulations coupled with the rising consensus for a clean and safe environment, organizations have become progressively concerned over supply chain sustainability issues. Reverse logistics is an essential component of green supply chain management (GSCM) perceived by organizations across geographical areas as the panacea to the ever-present environmental concerns (Ndung'u&Moronge, 2017). Owing to this claim, organizations are now investing their time and other relevant resources to appreciate the concept of reverse logistics so as to integrate its related practices into their operations, goals and objectives. Hitherto, most organizations were only practicing forward logistics. However, due to environmental, economic and legal reasons, these organizations are steadily integrating reverse logistics practices into their supply chain (Ongombe, 2012;Guta, 2016; Yu, Tianshan, Din, 2018).

Reverse logistics can be described as a practice whereby organizations take back products from end consumers so as to reduce adverse ecological effect and obtain potential benefits from the re-use and recycling of an entire product or its parts. Thus, it is concerned with the reclaiming of products from final consumers with the aim of proper disposal and capturing of value (Ho, Shalishali, Tseng &Ang, 2009). Impliedly, reverse logistics primarily helps to increase supply chain efficiency via cost reduction strategies while simultaneouslyreduce substances that threatens environmental sustainability.

There are diverse reverse logistics practices adopted by manufacturing companies. Some researchers (Eshikhati, 2014; Ndung'u&Moronge, 2017)have identified remanufacturing, reuse, repackaging, recycling and disposal as the commonly adopted reverse logistics practices. Undoubtedly, these practices have some perceived benefits to organizations. Laosirihongthong, Adebanjo and Tan (2013) articulate that practicing reverse logistics helps organizations to follow stringent legal regulations which prevent them from incurring penalties related to non-compliance. Salim (2016)further indicates that organizations that adopt reverse logistics are considered socially responsible due to their consistent use of environmental friendly activities. Thus, the integration and subsequent application of key reverse logistics activities makes an organization ecologically friendly. This enhances the reputation and goodwill of organizations which according to Dowling (2004) is a significant determinant that gives firms the competitive edge over their rivals. A properly managed reverse logistics process also minimizes logistics cost and improves the profitability of organizations (Bernon, Rossi & Cullen, 2011).

Akin to other African countries, Ghana's environmental issues continue to worsen despite the relentless call (pressure) from several stakeholders for a pollution-free, clean and safe environment. Statistics from Accra Metropolitan Assembly (2015) shows that, averagely, 40, 000 empty sachet water bags (wastes) are generated daily in Accra. Additionally, more than 300tons of plastic wastes arecreated in Accra (Ghana's capital city)daily. On a national level, statistics indicates that the plastic waste generated figures stand at 1.7 million tons (UNDP, 2017). Abalo, Peprah, Nyonyo, Ampomah-Sarpong and Agyemang-Duah (2018) claim that a large proportion of these plastic wastes are usually dumped indiscriminately or carelessly in the open space and gutters, bunt or buried by households, and/ or disposed-off via other inappropriate means. This incessant plastic and sachet waste generation threatens environmental sustainability because of its non-biodegradable nature. Regardless of this problem, there exist an untapped potential in this generated plastic waste that Ghanaian manufacturing firms can exploit in order to capture value via reverse logistics. Paradoxically, Ghana's manufacturing companies, including those who produce bottled and sachet water have not holistically embraced reverse logistics and its related practices into their operations.

Globally, several studies have validatedthe link between reverse logistics and firm performance. For instance,Serut (2013) disclosedthat reverse logistics and firm performance are positively correlated. On the other hand, De Giovanni and Vinzi (2012) found that GSCM had no significant influence on organizational performance. Yet still, Azevedo, Carvalho and Cruz Machado (2011) found a combination of positive relationship and other relationships. Evidently, it can be presented that there are inconsistent research findings with respect to the link between reverse logistics and firm performance. In the Ghanaian context, very scanty studies have looked at the adoption of reverse logistics, especially how reverse logistics influences firm performance. For instance, Kwateng, Debrah, Parker, Owusu and Prempeh (2014) looked at some reverse logistics practices in the Ghanaian pharmaceutical manufacturing industry. The researchers therefore found no studies regarding how competitive advantage plays an intervening (mediating) role between reverse logistics and performance of bottled and sachet water manufacturing firms in Ghana. It is therefore evident that there exists paucity of knowledge gap worth delving into. Consequently, this study sought to look at the influence of reverse logistics on performance of Ghanaian manufacturing firms that produce bottled and sachet water, by considering the intervening (mediating) role of competitive advantage.

II. Literature Review

2.1 Theoretical Review

2.1.1 Resource Based View Theory

The Resource based view theory was popularized by Barney (1986) to examine the behaviour of firms and competitive advantage. The theory suggests that a firm's ability to have competitive edge over its rivals and perform well is contingent on its unique resources and capabilities (Lynch, Keller &Ozment, 2000;Vlachos, 2016). Thus, the theory holds that firms have unique resources and capabilities they can exploit to enhance their competiveness over rival firmsand improve their performance. Barney (1986) grouped a firm's unique resources into three: human capital resources, organizational capital resources and physical resources. Capabilities can be described as the set of skills that a firm needs in order to take absolute advantage of its assets. According to Tibben-Lembke (2002), there are three universal strategies that assist firms to compete in the market and they include: differentiation, low-cost leadership and focus.

Firms in the manufacturing of bottled and sachet water can decide to integrate reverse logistics practices into their operation so as to remain different from other rival firms who adopt negative environmental practices. When this happens, these firms potentially coin a market niche for its products and services. Eshikhati (2014) claim thatintegrating reverse logistics is best achieved via the creation of eco-friendly policies, investing in the right technology (equipment) and capability building of employees. The integration of key reverse logistics practices into a firm's operation serves as "bedrock"to achieve competitive advantage which will lead to growth in market share and subsequently higher profitability (Fortes, 2009). This theory was adopted for this study because it has been validated by other researchers (Guta 2016; Ndung'u, &Moronge, 2017) to analyze how the variables of interest for this study (reverse logistics, competitive advantage as well as firm performance) are related.

2.1.2 Concept of Reverse Logistics (RL)

Reverse logistics isan emerging conceptbut has become a fast-growing research area in the field of logistics and supply chain management. It has become popularand rated highly among several stakeholders. Despite its popularity among stakeholders like academicians, society, manufacturing firms and governments, reverse logistics lacks a unanimous definition. For instance, Mwaura, Letting, Ithinji and Orwa (2015)narrowly defines reverse logistics as involving the return of products by customers to the original organization that sold the products with the aim of recuperating as well as potentially capturing valuefrom any unused products or its related components. However, from a broader perspective, reverse logistics is considered as a management

process which deals with the cost effective and efficient flow of inputs, partly finished products, final products and its associated information from the final consumer to the firm that originally sold the product with the aim of capturing value and protecting the environment via proper disposal(Murphy, 2012). For the purpose of this study, reverse logistics is explained as the process whereby a firm puts in place mechanisms to retrieve products previously sold but already consumed by the customer for purposes of capturing value via recycling and reuse so as to enhance environmental sustainability.

Reverse logistics aims at minimizing activities that negatively affects the environment. Supporting this claim, Ashby et al. (2012) aver that the main rationalebehind reverse logistics is to curtail or eliminate environmental waste like chemical or dangerous waste, energy, emission and solid waste (used bottled and empty sachet water) that threatens safe and clean environment. An integration of concrete reverse logistics practices into a firm's supply chain provides multiple benefits to the firm and its environment. Reverselogistics reduces waste and increase an organization's profits (HungLau & Wang 2009), helps firms to respond to the changing needs of customers (Guta, 2016), enhance firm reputation and competitiveness (Huscroft, 2010), and minimize total logistics cost (Bernon, Rossi & Cullen, 2011). Typical reverse logistics practices include remanufacturing, reuse, recycling, repackaging and disposal. However, this study will focus on recycling and reuse since it is best applicable to Ghanaian bottled and sachet water manufacturing firms.

2.1.2.1 Reverse Logistics Practices

2.1.2.1.1 Recycling

Recycling involves the breakdown of an already used product or waste product into manageable components and reprocessed into its original or new form. Parallel to this description, recycling can be defined as the process whereby materials that are earmarked as waste are recovered from the environment, sorted out and reprocessed for the purpose of reusing the processed materials as inputs or finished product (Global Recycling Network, 2008). Recycling as akey reverse logisticcomponent is commonly known in Ghana but less practiced by manufacturing companies, with bottled and sachet water manufacturing firms not precluded. One practical waybottled and sachet water manufacturing firms can effectively practice recycling is to sensitize customers about the importance of recycling via advertisements. Another important practice is to integrate well-documented policies of recycling into their operations. Lastly, firms can create awareness by putting recycling signs on their packaging (Laosirihongthong et al., 2013) and giveappreciatedincentives to customers who return used products for recycling.

2.1.2.1.2 Reuse

In simple terms, reuse is considered as a keyreverse logistics practice where a product can be used again for the same purpose for which it was created or designed. Hazen et al. (2011) also described reuse as involving the recovering or recuperating of any component of a product that has been returnedto the firm but possess some form of value. In a situation where this happens, the product is introduced again into the supply chain. Reuse normally consists of the washing or recovery of used products, return of usable packaging materials, refurbishing and repairing (Guta, 2016).Among the reverse logistics practices, reuse is considered among the waste management practices that is most eco-friendly (Amemba, 2013).

2.1.3 Competitive Advantage (CA)

In today's globalized business environment, firms (including bottled and sachet water manufacturing companies in Ghana) are constantly in the limelight of fierce competition where they need to go beyond just the production of products. To exceed the expectation of customers, firms need an appreciable understanding of the term "competitive advantage". Competitive advantage is simply explained as a firm's capabilities and market position to perform in several ways that competitors find it difficult to emulate or copy either in the present or future (Kahreh, Ahmadi&Hashemi, 2011). It represents the various superior strategies and ways carved by a firm that distinguishes its operations and product offerings from that of competitors. Porter (as cited in Dash, 2013) indicates that a firm can only outperform its competitors if it creates a distinguished strategy which can besustained over a long period of time. Thus, for firms to remain competitive, it is overly necessarythat they embrace activities and tools that make them different from their competitors.

Competitive advantage can beperceived as a multidimensional and relative concept because firms attain superior advantage over other rival firms via different sources. Parallel to this assertion, there is a rich literature foundation by some scholars (Thatte, 2007; Ismail, Rose, Abdullah &Uli, 2010; Diab, 2014) that have consistently adopted multiple dimensions to measure competitive advantage. In reference to these scholars, cost, quality, time, flexibility, product innovation, and responsiveness have uniformly been identified as the measurements for firms' competitive advantage. This study therefore measured competitive advantage taking these dimensions into consideration.

2.1.4 Firm Performance (FP)

Firms often have goals and objectives, most of which are enshrined or incorporated in their strategic and long-term plans that they seek to achieve within a specified period. There is no harmony regarding the definition of firm performance and its measurements. Generally, firm performance is concerned with how well a firm is realizing its goals as well as objectives. According to Mungai (2012), firm performance compares a firm's actual output as against its goals and objectives. Thus, it provides a measure of a firm's actual achievement versus what it expected to achieve. Firm performance is an important construct and has been extensivelyadopted in several studies as a dependent variable. When measuring firm performance, it is very significant to identify accurate multiple measurements that will provide a better basis for comparing the firm's profile and progress over different time periods (Al-Matari et al 2014). Consequently, some researchers (Elvin & Hamid 2016;Selvam et al, 2016) advocate the use of both financial performance and market performance metrics as relevant indicatorsin measuring firm performance.

Financial performance is the means by which a firm (including bottled and sachet water manufacturing firms in Ghana) subjectively measure how well it can use available assets from its main mode of business to generate revenue. Thus, financial performance considers monetary indicators to measure orevaluatefirm performance (Kaguri, 2013).Some of the widely used financial performance indicators include: return on investment (ROI), return on assets (ROA), return on equity, profitability among others. Conversely, market performance shows how well a firm's product offering is performing in the market (Guta, 2016).Customer loyalty, customer satisfaction, increase in sales, market share among others are examples of market performance indicators.In consistent with the review of extant literature, this study measured firm performance from a multidimensional perspective taking into consideration both financial and market performance indicators.

2.2 Empirical Review

2.2.1 Reverse Logistics and Firm Performance

Several studies have attempted to link reverse logistics to firm performance. For instance, Eltayeb et al. (2011) conducted a study on GSCM and environmental sustainability among certified Malaysian companies. Their study tested the hypotheses that reverse logistics practices have positive influence on firm performance (both financial performance and market performance). HungLau and Wang (2009) also contend that firms that are located in developing countries that integrate reverse logistics into their operations help in reducing waste and increase their profitability via the adoption of recycling activities. Additionally, other studies (De Brito et al., 2005; Bernon, Rossi & Cullen, 2011) highlight that reverse logistics practices improve a firm's profits, enhance its reputation and increase the firm's market share. Moreover, Genchev, Landry, Daugherty and Roath (2010)disclosed thatreverse logistics serves asan important precursor for firm profitability.

Elsewhere in Kenya, the study findings of Guta (2016) showed that both reuse and recycling as practices of reverse logistics have a strong positive correlation with financial performance as well as marketing performance. In tandem to this finding, Siew (2015) found that repair, remanufacturing and recycling as reverse logistics practices contributed to firm performance via boosting sales growth and profitability. It can therefore be deduced that, manufacturing firms (including the producers of bottled and sachet water in Ghana) that adopt reverse logistics practices into their supply chain can decrease new raw materials usage, produce value-added products, and reduce the entire cost incurred in producing the product which will eventuallyhave a significant influence on the firm's performance (both financial and market performance). In light of the above review, this study proposed the first hypothesis.

H_1: Reverse Logistics has a positive and significant influence on firm performance

2.2.2 Reverse Logistics and Competitive Advantage

In order for firms to stay competitive, it is very necessary to scan their environment and adopt tools that differentiate their operations and product offerings from their proximate and distant rivals. Empirical findings from several studies and literature indicate that reverse logistics is a strategy or tool that firms can embrace to enhance their competitive advantage. Ongombe (2012)undertook a study among water bottling firms in Nairobi and found a significant and strong relationship between reverse logistics practices and firm competitive advantage. Again, Huscroft (2010) highlights that, the integration and implementation of concrete reverse logistics practices gives a firm the leverage over its competitors which eventually lead to growth in market share. Likewise, firms that practice reverse logistics enhance their product image which ultimately becomes a key cornerstone for competitive advantage (Rao& Holt, 2005).

In the opinion ofJanse et al. (2010), reverse logistics is perceived as akey component of GSCM that firms adopt to enhance their competitiveness over rivals. Impliedly, it can be stated that reverse logistics serves as astrategic and defensive tool that firms integrate into their operations as well as goals to enhance their superiority over competitors. Thus, reverse logistics can be used as an important tool that firms can integrate into their supply chain to outsmart their competitors. This claim is vehemently supported by Andrade et al

(2013) who highlighted that firms that adopt well-structured reverse logistics practices enjoy competitive advantage via corporate image because consumers' expert firms to be ecologically responsible. It can therefore be adduced that when consumers perceive firms to be environmentally-friendly through reverse logistics practices, such firms gain superior advantage over their rivals. Again, the integration of reverse logistics into firms' supply chain can help them reduce their cost of production which may be later translated into the provision of competitive prices, quality and innovative products and become responsive to their customers. This review formed the basis of developing the second hypothesis of this study.

H_2: Reverse Logistics has a positive and significant influence on competitive advantage

2.2.3 Competitive Advantage and Firm Performance

Firms in this modern era of business environment consider competitive advantage as well as firm performance as two important ingredients for their survival, hence strive to be better than their rivals and perform well at the same time. Consequently, there is a plethora of studies which considers attaining competitive advantage as a significant precursor of firm performance, thus, indicating that competitive advantage and firm performance are related. Sinaga and Gallena (2018) conducted a study among SMEs in Indonesia and found that competitive advantage significantlyinfluences firm performance. Thus, it can be indicated that improved firm performance is tied or linked to competitive advantage as supported by (Powell, 2001). In a related study conducted in Bangaldish,Monsur and Yoshi (2012) found that competitive advantage positively and significantly influences firm performance. The study empirically disclosed that firms in Bangladesh that engage in industrial upgrading stand the chance to have competitive edge over their rivals which eventually leads to better performance.

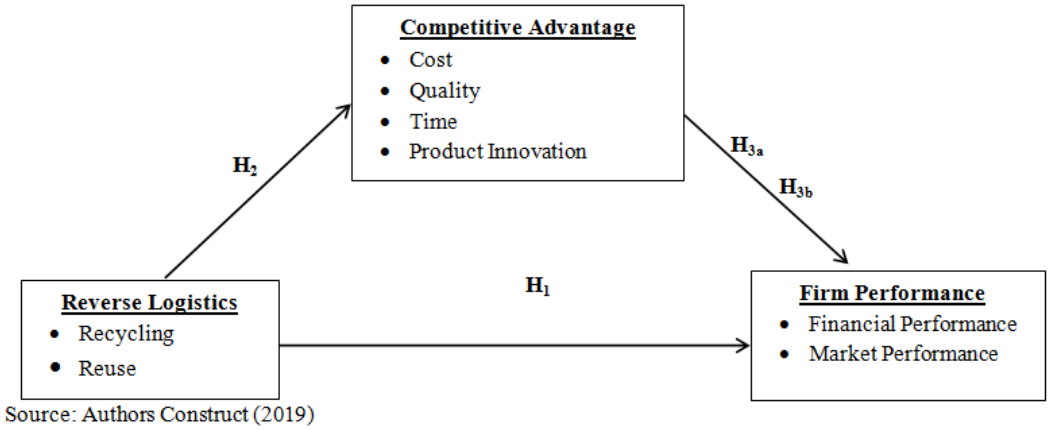
According to Porter (1985), quality as a dimension of competitive advantage has the tendency to increase a firm's market share and improve other financial indicators of the firm. Swink and Song (2007) further showed in their empirical findings that product innovation as a component of competitive advantage is significantly related to a project's return on investment. Fundamentally, it can be deduced that manufacturing firms that employ reverse logistics stand the chance to gain competitive advantage which will eventually lead to improve performance. This review therefore served as the basis for advancing the third hypotheses.

H_{3a}: Competitive advantage has a positive and significant influence on firm performance

H_{3b}: Competitive advantage plays an intervening (mediating) role between reverse logistics and firm performance

2.3 Conceptual Model

From the empirical review above, a conceptual model based on the variables of interest was developed (See Figure 1).



Source: Authors Construct (2019)

Figure 1: Conceptual Model

III. Research Methodology

The causal research design with a quantitative research approach was employed for this study. The rationale for employing the causal research design was primarily due to the fact that it helped to identify the causal links between variables of interest under study. The quantitative research approachalso helpedthe researchers to validate, predict, establish, confirm and develop generalization that contribute to theory via quantitative data (Leedy&Ormrod 2010). The study selected 187 respondents (logistics, production and procurement managers) via stratified sampling from Ghanaian manufacturing firms that deal in the production

of bottled and sachet water. The choice of the sample was influenced by Krejcie and Morgan (1970) population-sample size matrix.

Questionnaire was the primary data collection instrument used for the study. The questionnaires were self-administered to the respondents. The questionnaire contained three latent variables (Reverse logistics= 6, Competitive advantage= 5, Firm Performance= 6) comprising of seventeen (17) indicators which were captured in the literature. However, in order to increase composite reliability, average variance extracted (AVE) as well as content validity, five (5) indicators with outer loadings between 0.40 and 0.70 were carefully removed from the scale (Hair, Hult, Ringle&Sarstedt, 2014). Consequently, each construct was measured by four (4) indicators respectively. The scale measurements for reverse logistics were adapted from Hazen et al. (2011) and Eshikhati (2014) while that of competitive advantage was adapted from Thatte (2007). Firm performance measurements scale was adapted from Quynh and Huy (2018).

Partial least square structural equation modeling (PLS-SEM) via software package SMART PLS 3 was adopted as the statistical modeling technique to test the hypotheses of the study. PLS-SEM was employed for the study because it is an analytical tool that works efficiently with relatively small sample sizes, very appropriate in analyzing predictive relations, handles complex as well as multi-layered models with several structural and measurement model relations, and very robust in dealing with reasonable missing data (Hair, Hult, Ringle, &Sarstedt, 2016). Moreover, PLS-SEM unlike other analytical tools can deal with both reflective models (as used in this study) and formative models (Henseler et al. 2009). In evaluating the performance of reflective models used in the study, the composite reliability was determine to assess internal consistency, convergent validity was determined by considering the average variance extracted (AVE). Additionally, the discriminant validity was measured by considering the factor loadings, Fornell-Larcker criterion and HTMT ratio. Table 1 indicates the various construct reliability and validity measurement criteria and respective thresholds.

Table 1: Construct reliability and validity measurement criteria

Measurement criteria	**Recommended threshold**
Factor loading (Hair et al., 1998)	≥ 0.70
Composite reliability (Bagozzi and Yi, 1988)	≥ 0.60
Average Variance Extracted (Rodgers and Pavlou, 2003)	>0.50
Cronbach's Alpha (Henseler et al., 2009)	≥ 0.70
HTMT Ratio (Hair et al., 1998)	<0.85

Source: Adapted from Hair et al., (1998) and Henseler et al., (2009)

IV. Results

The study applied PLS-SEM technique in assessing or estimating the structural model. In the opinion of Hair et al (2014), model estimation provides an empirical measures of the causality between the indicators (measurement models), and the constructs (structural model). This helped to check for construct validity and reliability. The model was therefore assessed in multiple ways. First, to assess the internal consistent, the Cronbach'salpha as well as composite reliability was evaluated. The Cronbach's alpha was between the range of 0.758 to 0.874 while Composite reliability was between the range of 0.847 to 0.914 (See Table 2). This implies that the model is reliable since both Cronbach's alpha as well as composite reliability exceeds the thresholds for measurements criteria highlighted by Henseler et al. (2009) and Bagozzi and Yi (1988) respectively. Again, to assess the convergent validity, the AVE was evaluated. The AVE was between the range of 0.581 to 0.727, signifying that the constructs have convergent validity (See Table 2). The AVE of the constructs as estimated is above the suggested threshold of 0.5 as postulated by Rodgers and Pavlou (2003).

Table 2: Cronbach's Alpha, Composite Reliability, Average Variance Extracted (AVE)

Constructs	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Competitive Advantage	0.874	0.914	0.727
Firm Performance	0.864	0.909	0.716
Reverse Logistics	0.758	0.847	0.581

Source: Field Data

Discriminant Validity

To test for whether the construct was unique and fully captures the phenomenon not denoted by other constructs in the model, the discriminant validity was inspected. Fornell-Larcker criterion, factor loadings and HTMT Ratio were used to evaluate the model's discriminant validity. The findings are presented in Table 3, 4 and 5. The Fornell-Larcker criterion as proposed by Fornell and Larcker's (1981) states that the square root of each construct related to the AVE values ought to exceed the latent variable correlations. A critical look at Table

3 shows that the square roots of all the AVE values exceed the correlations of the various latent variables in the model.

Table 3: Fornell-Larcker Criterion

Constructs	Competitive Advantage	Firm Performance	Reverse Logistics
Competitive Advantage	0.853		
Firm Performance	0.623	0.846	
Reverse Logistics	0.464	0.595	0.762

Source: Field data

Table 4 presents the factor loading of the constructs used in this study. All factor loadings excluding RL4 indicator measuring reverse logistics construct were well above the suggested value of 0.70 (Hair et al., 1998). The indicator (RL4) was maintained because it improved the AVE, composite reliability and contend validity (Hairet. al, 2016).

Table 4: Factor Loadings

Factors	Competitive Advantage	Firm Performance	Reverse Logistics
CA1	0.886		
CA2	0.902		
CA3	0.814		
CA4	0.803		
FP1		0.817	
FP2		0.918	
FP3		0.920	
FP4		0.713	
RL1			0.787
RL2			0.795
RL3			0.765
RL4			0.697

Source: Field data

Table 5 shows the HTMT ratios of the constructs used in the reflective model. A critical look at Table 5 indicates that every construct in the reflective model was well below the value of 0.85 as proposed by Henseler et al., (2015) since the greatest value is 0.703 of competitive advantage.

Table 5: Heterotrait-Monotrait Ratio (HTMT)

Constructs	Competitive Advantage	Firm Performance	Reverse Logistics
Competitive Advantage			
Firm Performance	0.703		
Reverse Logistics	0.572	0.730	

Source: Field Data

Structural Model

Table 6 summarizes the findings of R2, Adjusted R2, F-Square and path coefficients in the structural model. R2 explains the percentage of variance of the endogenous variable explained by the exogenous variable. In assessing the effect size of the constructs, the F2 was computed. Cohen (1988) states that, F2 values should be 0.2 (small effect size), 0.15 (medium effect size) and 0.35 (large effect size). A critical look at Table 6 confirms that competitive advantage as well as firm performance have R2 values of 0.215 and 0.507 respectively. Again, the Adjusted R square values for competitive advantage as well as firm performance are 0.211 and 0.505 respectively. The result therefore indicates that reverse logistics as well as competitive advantage combine to explain 0.507 of the variance in firm performance. Reverse logistics also predicted 0.215 of variance in competitive advantage. The result of the F square depicts moderate effects of competitive advantage and reverse logistics 0.311 and 0.242 respectively on firm performance.

Table 6: Structural Model

	R Square	Adjusted R Square	F square
Competitive Advantage	0.215	0.211	0.311
Firm Performance	0.507	0.502	--
Reverse Logistics	--	--	0.242

Path	Beta Coefficient	Standard Deviation	T Statistics	P Values	Hypothesis Testing
Reverse Logistics -> Firm Performance	0.390	0.072	5.423	0.000	H1: Supported
Reverse Logistics -> Competitive Advantage	0.464	0.069	6.761	0.000	H2: Supported
Competitive Advantage -> Firm Performance	0.442	0.066	6.660	0.000	H3a: Supported

Source: Field Data

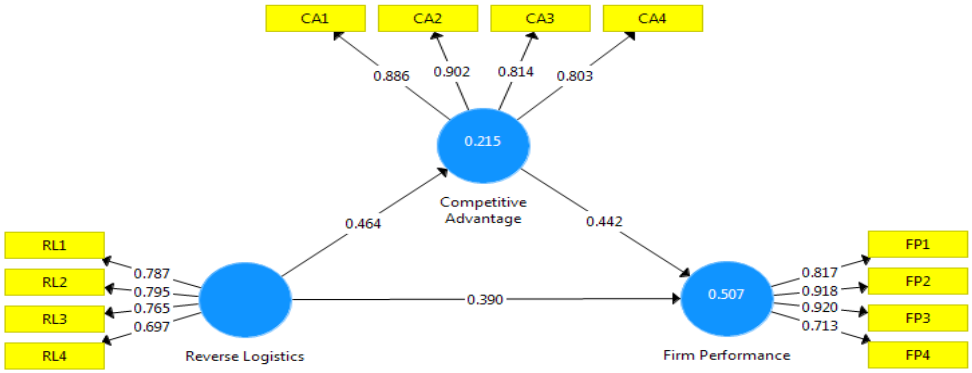


Figure 2: Structural Model

The findings from Table 6 and Figure 2 depicts that all the hypotheses proposed by the study were supported. This means that hypotheses 1which proposed that: Reverse Logistics (RL) has a positive and significant influence on firm performance (FP) was supported (β = 0.390, t-value= 5.423, p=0.000). Again, hypothesis 2 which proposed that: Reverse Logistics (RL) has a positive and significant influence on competitive advantage (CA) was also supported (β = 0.464, t-value= 6.761, p=0.000). Moreover, hypothesis 3a which proposed that: Competitive advantage (CA) has a positive and significant influence on firm performance (FP) was further supported by the findings of the study (β = 0.442, t-value= 6.660, p=0.000). Finally, the result of the mediating analysis calculated in the study is presented in Table 7. The mediating analysis looked at the magnitude to which the indirect effect via a mediator (intervening variable) modified the hypothesized direct path. In this study, competitive advantage was considered as the mediating variable. Analysis of the data therefore suggests that hypothesis 3b: Competitive advantage plays an intervening (mediating) role between reverse logistics and firm performance, proposed by the study was supported (β = 0.251, t-value= 4.686, p=0.000). Thus, it can be said that competitive advantage significantly mediates the predictive relationship between reverse logistics and firm performance.

Table 7: Mediation (Indirect Effect)

Path	Beta Coefficient	Standard Deviation	T Statistics	P Values	Hypothesis Testing
Reverse Logistics -> Competitive Advantage -> Firm Performance	0.251	0.044	4.686	0.000	H3b: Supported

Source: Field Data

V. Discussion

It can therefore be inferred from the findings that the performance of bottled and sachet water manufacturing firms will improve when they integrate reverse logistics practices into their operations. This is consistent with the findings of Eltayeb et al. (2011) and Guta (2016) who disclosed that reverse logistics practices positively influences firm performance. Other researchers (De Brito et al., 2005; Bernon, Rossi & Cullen, 2011) further agree with this finding by highlighting that reverse logistics practices improve a firm's profits, enhance its reputation and lead to growth in market share of firms.

Furthermore, by deduction from the study findings, it can be averred that bottled and sachet water manufacturing firms that integrate reverse logistics practices (recycling and reuse) into their supply chain will have competitive edge over their rivals in the manufacturing industry who fail to adopt reverse logistics. Thus, once firms (including bottled and sachet water manufacturing firms) adopt and implement reverse logistics practices, they will stand out among their competitors. This finding is parallel to that of Ongombe (2012) who found a strong positive relationship between reverse logistics and competitive advantage. Additionally, Huscroft (2010) concurs with this finding by highlighting that the integration of effective reverse logistics practices gives a firm leverage over its rivals.

Moreover, from this finding, it can be adduced that firms that offer moderate prices, provide quality and innovative products on time to customers' create a competitive niche for themselves in the market relative to their competitors which will eventually improve their performance. Supporting this finding, Sinaga and Gallena (2018) found competitive advantage as significantly predicting firm performance. Likewise, Monsur and Yoshi (2012) found that competitive advantage positively and significantly influences firm performance.

VI. Conclusion and Practical Implications

The principal objective of this study was to examine how reverse logistics influences the performance of bottled and sachet water manufacturing firms in Ghana, considering the intervening (mediating) role played by competitive advantage. The findings of the study revealed that competitive advantageplays a significant intervening (mediating) role between reverse logistics and firm performance. From the findings, it can be concluded that bottled and sachet manufacturing firms that integrate reverse logistics practices (recycling and reuse) into their supply chain stand a greater opportunity of enjoying competitive advantage and an improved performance (both financial and market performance). Thus, as bottled and sachet manufacturing firms integrate reverse logistics practices into their supply chain, their cost of production incurred in producing will eventually reduce because the use of new raw materials purchased from suppliers is reduced. A reduction in cost of production means that these firms can offer competitive prices, offer quality and value added products, and be responsive to their customers. This will in effect give them superior advantage over their competitors and further improve their performance (both marketing and financial performance).

The findings of the study provide practical insights for key stakeholders like academicians, managers, and the government. For academicians, this study contributes to the pool of empirical studies on reverse logistics that can be relied upon for further studies. Managers of bottled and sachet water manufacturing firms in should consider reverse logistics as a tacticaland cardinal tool that must be employed to enhance their performance. Thus, despite the relative capital-intensive nature of integrating reverse logistics into their operations, these firms can design and implement long-term concrete policies geared towards retrieving a percentage of products (say 60% of consumed bottled and sachet water or establish collection points where consumers can drop consumed plastics and sachet water) previously sold to customers for recycling and reuse. This will ensure that these firms remain eco-friendly while concurrently enjoy the benefits inherent in reverse logistics. Moreover, managers of bottled and sachet manufacturing firms who perceive reverse logistics as capital intensive can outsource this function to third parties (other firms) that have the requisite technology and knowledge. Once these bottled and sachet water manufacturing firms outsource the reverse logistics function to third party providers, the cost associatedwith reverse logistics will be streamlined.

Furthermore, the contribution of the Ghanaian government can be very important in helping bottled and sachet water manufacturing firms integrate reverse logistics practices. The government as a key institution can offer incentives (subsidies, tax rebate, tax holidays etc.) for manufacturing firms that produce bottled and sachet water. This will help these firms offset part of the relatively huge cost of implementing reverse logistics. The manufacturing industry with the support and collaboration of the Ghanaian government can also come out with a national policy geared towardsmaking sure that manufacturing firms integrate reverse logistics into their operations. This will help improve firm performance alongside contribute to environmental sustainability.

VII. Limitations and Suggestions for Further Study

Akin to other studies, there are some few limitations of this study that could provide diverse opportunities for further research. First, the study was limited to the quantitative approach. The researcher therefore recommends that further studies consider a mixed approach (both quantitative and qualitative) to elicit more thought-provoking results. Second, the study considered bottled and sachet water manufacturing firms in the manufacturing industry. Further studies can be expanded to consider either beverage or fruit drink producing companies or automobile companies to help in the comparison of results and the provision of new insights regarding reverse logistics. Last but not least, the sample for the study was relatively small; hence, future studies can use a larger sample. Finally, further studies can introduce other mediating (like organizational support or firm reputation) or moderating variables (like firm size) or environmental performance measures as part of the firm performance variables.

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