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Using supermarket Loyalty card data to explore exported yam marketing performance and prospects in the UK

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Stakeholders operating within the yam export market lack shopper insights to formulate effective marketing and supply chain management strategies. This paper aims to show how supermarket loyalty card data on yam shoppers in the UK can be analysed to objectively assess marketing performance and prospects through year-on-year comparison of key marketing measures and regression. The results demonstrate the huge marketing potential that actual supermarket yam shopper behaviour brings to inform current marketing performance of exported yam and future export marketing strategies. Evidence from the study suggest that sales value of supermarket yam over 104 weeks ending 16th December 2013, increased by 15.27%, but sales volume and number of customers buying yam declined by 5.54% and 8.97% respectively. Whilst the results of the regression suggest that the number of customers buying yam is the key factor contributing to the volume of sales of yam, average price per tuber and number of distribution outlets were not salient factors. However, the value of yam sales was positively influenced by average retail price of yam at 1% level. The results of this study are of interest to both global south yam export market academics, yam supply chain stakeholders and managers tasked with promoting exports of food products to international markets in Europe and Northern America.

Key words: Export marketing performance, supermarket loyalty card data, shopper behaviour, Ghana Yam.

INTRODUCTION

Yam is a multi-variety root and tuber crop that is important for food, income generation and socio-cultural practices (Aidoo et al., 2013). It is also the source of raw materials for starch for industries, particularly pharmaceutical companies (Amanze et al., 2011). Yam is also an emerging exportable food product for West African states such as Benin, Nigeria, Cameroon, Ivory Coast and Ghana (Ohene-Yankyera et al., 2011, Anaadumba, 2013). Indeed, close to 60 million people in West Africa are connected with the yam enterprise as producers, processors and consumers. A meal of yam is prepared in different forms as boiled, fried, and roasted yam or fufu across West Africa and the rest of the world (Aidoo et al., 2013). It is a major source of carbohydrate in West African diet and a provider of rural employment for many people in yam growing areas of the sub-region; accounting for 32% of all farm income (Chukwu and Ikwelle, 2000).

Ghana is the third largest producer of yam in the world, after Nigeria and Ivory Coast, with 6.3 percent of its arable land under yam cultivation (Anaadumba, 2013). However, it is the leading exporter of yam in the world, accounting for 94% of total yam exports in West Africa (FAOSTAT, 2012). Statistics of the Ministry of Food and Agriculture (MoFA) Ghana show that yam production accounted for about 24 percent of total roots and tubers production in the country (MoFA, 2010) and it contributes about 16 percent of Ghana's agricultural gross domestic product. Ghana has been a net exporter of yam for the

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past eight years (FAOSTAT, 2012; Ghana Export Promotion Council, 2011). It is worth noting that yam exports from Ghana represents less than 1 percent of the country's total value of exported food products, and also accounts for less than 0.01 percent of the total yam produced nationally (FAOSTAT, 2012).

FAOSTAT (2012) further shows that the United Kingdom accounts for 49% of Ghana's yam exports, followed by Netherlands (18%), United States of America (18%) and other countries including Germany, Canada, Italy accounts for the remaining 10%. Anaadumba (2013) suggests that yam exports to Western Europe and Northern America is driven by increasing demand by Ghanaians and other West Africans resident in Europe and America. Notwithstanding this reason for increasing demand for yam from these foreign destinations, first generation British of African descent and indigenous Europeans and Americans have been introduced to yam through foreign travels and/or interactions with African friends. It is also common knowledge that fried and boiled yam is a popular recipe on the menu of most African restaurants in Western Europe and America.

The economic benefits of yam cultivation coupled with high population growth rate in the West Africa and increasing demand abroad are compelling motivators for expanding production and supply of yam for both domestic and export markets (Asumugha et al., 2009). However, the yam enterprise is constrained by high labour demands for agronomic practices and logistics (Ezeh,1991) such as land preparation, planting, staking, weeding, harvesting, high cost of yam seed (NRCRI, 2004; Asumugha et al. 2009) and transport to market (Aidoo et al. 2013). Another challenge confronting the yam industry is the adverse effect that the less developed yam marketing system has on prices paid by buyers and income received by farmers (FAO, 2003). Recent studies and reports have recommended the need for a better understanding of the yam value chain from the level of the producer up to the main foreign markets in Europe and United State of America (Aidoo et al. 2012) to forestall losses along the chain. An analysis of incentives and disincentives for yam in Ghana recommended the need for research to bridge the existing marketing information gap on yam value chain (FAO, 2013).

Undoubtedly, the lack of marketing insight is a major limiting factor that requires urgent research attention to address. Thus, the purpose of this novel study was to explore exported yam marketing performance and prospects in the UK using the analysis of supermarket loyalty card data on yam shoppers. The study objectives were:
1) To assess the marketing performance of exported yam on the UK market in terms of marketing performance measures such as sales value, sales volume, number of customers, product distribution and repeat purchase rate, and 2) To explore the relative contributions of marketing factors such as price, number of customers and

distribution on retail sales volume of yam over most recent 2 years.

FACTORS INFLUENCING MARKETING PERFORMANCE

A lot of factors influence marketing performance but the role of the customer is vital to market growth and business success (Lee and Ritzman, 2005), as they drive sales and profits. Due to the important role of customers a lot of attention has been given to customer satisfaction research (Wilson et al., 2008, Wicks and Roethlein, 2009). There is also acceptance among marketing academics that price, product, promotion, and distribution (marketing mix elements) are fundamental factors that can deliver marketing knowledge when investigated (Kotler, 1997, p. 92; Vignali, 2011; Yamoah et al., 2013).

Pricing strategy adopted by a business has a direct influence on customer response and retail sales performance (Yamoah, 2013). Also, Yoo et al. (2000) indicates that customers use price as an essential external construct for product quality. Whereas low priced products are viewed to be of low quality or offer inferior benefit, premium prices are associated with high quality brands (Blattberg and Winniewski 1989, Kamakura and Russell, 1993). The price tag however operates in tandem with the other marketing mix elements (Zikmund and D'Amico, 1993). As per the principles behind the rational consumer purchasing decision making model known as the theory of planned behaviour (Ajzen and Fishbein, 1980 and Ajzen, 1991) price increases will normally lead to a decline in retail sales value and volume. Conversely, a situation where price increases does not bring about reduction in retail sales value could connote loyalty on the part of customers.

Literature suggests that product type is a key determinant of distribution strategy selection, but to provide the best chance for success, including receiving retailer support; companies tend to distribute products in selected stores and not intensively (Yoo et al., 2000). Intensive distribution however grants consumers time and place utility that intend enhances the perceived value offered by the products (Smith, 1992). Thus, choosing a distribution strategy is an important decision that requires very careful considerations.

METHODOLOGY

The study followed a three-stage analysis to assess marketing performance and the key factors driving retail sales of yam. Phase one involved year-on-year comparison of three key marketing performance indicators (headline figures) namely, sales value, sales volume and number of customers buying Ghanaian Yam at Tesco-a leading food supermarket in the UK. The second

phase covered further year-on-year analysis of measures beneath the headline figures, comprising spend per customer, unit per customer, average price per unit, number of stores selling, sales per store (value and volume), and repeat purchasing rate. As a follow up to the results of phase 1 and 2 multiple regressions to estimate the impact of average price, distribution and the number of customers on supermarket yam retail sales volume was undertaken. Multiple regression analysis is deemed suitable because it examines the single as well as joint effects of marketing factors on yam retail sales volume. Regression analysis technique is popular within business research in general and consumer behaviour studies in particular (Hair, 2010).

Loyalty card data was used for the year-on-year comparisons and the multiple regression analysis. This data set held by dunnhumby UK has the added benefit of generating aggregated and disaggregated level data. Unlike reported or claimed behaviour data, loyalty card data is based on actual shopper purchasing behaviour that could provide objective understanding into the influence of price, distribution and number of customers on yam retail sales volume. The loyalty card data for this research covered data on yam shoppers in Tesco for 104 weeks (19th December 2011 – 17th December 2013). Tesco's loyalty data was selected for this study because of its market leadership position in the UK food retail industry, as it has 30.7 percent market share of the total grocery retailing market in the UK, which is representative of the UK shopper (Kantar World panel, 2010).

DATA ANALYSIS

Phase one of the analysis compared year-on-year headline yam marketing performance figures (sales value, sales volume and number of customers) to revealed the percentage change between most recent two years (*Year I: 52 weeks from 19 Dec 2011 to 16 Dec 2012 compared to Year II: 52 weeks from 17 Dec 2012 to 15 Dec 2013*). Similarly, the second phase of the analysis involved year-on-year comparison of key measures behind the headline figures: spend per customer, unit per customer, average price per unit, number of stores selling, sales per store (value and volume), and repeat purchasing rate to show the respective percentage differences between the two set of periods – Year 1 & 2. For the multiple regression phase of the analysis supermarket yam retail sales volume and value were conceptualised as the dependant variable for the regression model (YRSv). Average price per tuber of yam (Xap), Number of stores selling (Xnss) and Number of customers (Xnc) were conceptualised as independent variables for the model. Two separate models were estimated with volume of sales and value of sales as dependent variables. The double logarithmic functional form of the regression model was estimated since it is

known to reduce the presence of autocorrelation in time series data. The equation below represents the model used for the regression analysis:

$$Ln\text{YRSv} = ß_0 + ß_1 Ln\text{Xap} + ß_2 Ln\text{Xnss} + ß_3 Ln\text{XnC} + (e) .... (1)$$

In the model, YRSv represents the dependant variable (total sales volume or sales value for yam for 104 weeks ending 15th December 2013. Natural logarithm is denoted in the equation as *Ln*; and ß0 represents the regression constant which is a fixed unknown parameter. The parameters Xap, Xnss, Xnc and (e) represents the average price per unit of tuber, number of Tesco stores selling yam, and number of customers purchasing yam per week respectively, and (e) the error term of the model which encompass all immeasurable factors which may also be influencing yam retail sales volume apart from the selected independent variables. The standardized beta coefficients in the regression output were reported with the corresponding t-values. Beta coefficients results showed how a change in the independent variables influenced the magnitude by which retail sales volume and value changed over the effective period (see Hair, 2011).

RESULTS AND DISCUSSION

Table 1 indicates that supermarket sales value has grown by 15.2% year-on-year (2013 over 2012 figures). On the contrary, the comparison further revealed that sales volume and the number of customers buying yam declined by 5.54% and 8.97% respectively. These results raise an interesting question as to how sales values has grown simultaneously as the units of yam sold and the number of customers buying at Tesco supermarket have both declined? The most likely reason that could be speculated for such retail sales growth trends was increased retail price over the period, and this called for further analysis on other marketing measures behind the headline indicators covered in phase 1.

Results of the year-on-year comparison of the seven additional marketing measures presented in table 2 confirm that price increases indeed contributed to the growth in retail sales value of yam. For example, table 2 shows a reduction (-12.46%) in the number of Tesco stores selling yam from 313 in 2012 to 309 in 2013.

Table 2 further shows that repeat rate of purchase by yam shoppers, amount of money spend per customer, number of tubers of yam purchased per customer, retail sales (value and volume), all posted increases year-on-year. The net inference is that yam purchases are customer demand driven and this suggests a high level of customer loyalty on the part of yam shopper in the UK. In fact, the results reveal a classic case of shoppers paying more for a product they need and can afford.

The results of the regression models capturing price, number of distribution points/outlets and number of customers buying yam as factors driving supermarket yam

Table 1. Year-on-year marketing performance headline indicators for yam – sales value, sales volume and number of customers (*Year I: 52 weeks from 19 Dec 2011 to 16 Dec 2012 compared to Year II: 52 weeks from 17 Dec 2012 to 15 Dec 2013*).

Marketing performance Indicator	Year-on-year percentage change	Figure for the latest 52 weeks
Sales Value	15.2%	£134,977
Sales Volume	-5.54%	28,840
Number of Customers	-8.97%	16, 840

Source: Results based on dunnhumby data analysis (2013).

Table 2. Year-on-year marketing performance indicators behind the headline figures for yam (Year I: 52 weeks from 19 Dec 2011 to 16 Dec 2012 compared to Year II: 52 weeks from 17 Dec 2012 to 15 Dec 2013).

Marketing performance Indicator	Year-on-year percentage change	Figure for the latest 52 weeks
Average price per tuber	22.02%	£4.68
Tesco stores selling	-12.46%	309
Repeat purchase rate	5.81%	23.30%
Spend per customer	26.63%	£8.02
Unit per customer	3.78%	1.71
Sales per store (Value)	31.68%	£437.00
Sales per store (Unit)	9.92%	93

Source: Results based on dunnhumby data analysis (2013).

retail sales volume (model I) and sales value (model II) are presented in Table 3.

The adjusted R-squared values were above 0.95 indicating that over 95 percent of the variances in yam retail sales volume and value are accounted for jointly by the number of customers buying yam at Tesco supermarket, number of distribution outlets and the price of yam. The signs of the standardized beta coefficients and the corresponding significance levels indicate that number of customers buying yam is positively related to retail sales volume and value at the 1% level. Whereas the effect of price on retail volume was not statistically significant at the 10% level, average retail price of yam influenced the value of yam sales significantly at the 1% level. Results of the regression analysis suggest that changes in the number of customers buying Ghanaian yams and the average retail price of yam are the most critical variables that explain the magnitude by which supermarket yam sales volume and value are changing in the UK.

CONCLUSIONS

This paper explores exported yam marketing performance and prospects in the UK using supermarket loyalty card data analysis. Exported yam is performing quite well in the UK as evidenced by the growth in supermarket retail sales value between 2012 and 2013. However, sales volume, number of customers buying yam and the number of Tesco stores selling Ghanaian yam declined over the same period. Increased yam price is a prevalent feature of the supermarket yam market in the UK but this has not deterred yam customers from buying more. The number of customers buying exported Ghanaian yam in Tesco supermarket is a key factor driving the amount of tubers of yam purchased by shoppers despite the fact that increased price contributed to increased sales value over the past two years. Increasing sales value and high customer loyalty inference that can be drawn from the results are positive indicators of good marketing performance and prospects

Table 3. Regression results.

Marketing Factor	Model I: Volume of sale model*	Model II: Value of sale model
Ln_Price	-0.005 (-0.527)	0.420 (71.380)***
Ln_Distribution points	0.001(0.022)	0.001 (-0.014)
Ln_Number of customers	1.002 (16.277)***	0.616 (16.367)***
Constant	-0.024 (-0.181)	-0.027 (-0.205)
Model diagnostics:	*Adjusted R^2=0.978;* *F=13820 (df=101;sig @0.000)*	*Adjusted R^2=0.988; F=37040* *(df=101;sig @0.000*

*T-values in parenthesis; *** denotes significance at 1% level.
Source: SPSS Regression output from dunnhumby data (2011-2013).

for exported Ghanaian yam on UK supermarket. It is worth noting that retail sales value driven by price increases is not sustainable unless it occurs with improved product quality. The obvious focus of the industry will be to attract more customers to the market.

Marketing strategies and export policy implications

In terms of marketing implications the findings of the study could inform what marketing strategies will be effective for future success. Managers of exported yam portfolio have the option of concentrating efforts on existing customers and/or exploring market expansion. Shopper loyalty indicators such as repeat rate of purchasing yam, amount of money spent per customer and number of tubers purchased per customer collectively support the option of focusing on improving existing customer satisfaction towards maintaining and enhancing customer loyalty. There is however the alternative to aggressively pursue strategies to attract new customers through in-store as well as external marketing communication methods, such as sales promotion, in-store tasters, provision of more nutritional information and introduction of a specialised isle for exotic roots and tuber products.

The findings of this study also have implications for yam export supply chain management. Specifically, the yam supply chain ought to be developed efficiently by taken into account exported yam shopper insight from the export market instead of operating the existing one which is based on assumptions about who buys Ghanaian yam in the UK. Stakeholders tasked with managing and promoting yam exports ought to explore existing avenues to access export market shopper insights based on actual purchasing behaviour such as dunnhumby loyalty card data used for the analysis in this paper. There is also a latent potential for growth as supermarkets in foreign export destinations such as UK continue to incorporate more ethnic foods in their product portfolio. However, such enabling market environment would require further quality improvements in production, packaging and delivery standards because of the ever rising levels of competition and requirements from buyers in Europe and Northern America.

Limitations and areas for future research

The findings of the current study are based on a year-on-year comparison and regression analysis of two years of dunnhumby loyalty card data from Tesco, which is representative of the UK grocery food shopper. The data is however limited in the sense that the greater amount of Ghanaian yam exported are retailed by relatively smaller Afro-Caribbean and Asian shops across the UK. Thus, a study capturing yam customers from smaller ethnic shops would provide important insight that will complement the findings of this study. Secondly, the model for the regression analysis concentrated on number of customers, price and distribution; other marketing factors which are not accounted for in this study could contribute to supermarket retail sales growth of yam in the UK. Therefore, assessing the roles of additional factors such as promotion and provenance (country of produce of yam) could provide useful insights that will inform adopting appropriate marketing strategies to sustain the yam export market.

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