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The Impact of Bakery Industry Supply Chain on the Pricing of Bread in Zimbabwe

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ABSTRACT

The paper sets out to carry an exploratory study for improving supply chain activities in an effort to reduce the bread retail price. The price of bread in Zimbabwe is more than that of most African countries such as Zambia, Namibia and Malawi whose prices range from US\$0.50 to US\$0.75 per loaf of bread. The major problem with the bread industry today is that there seems to be a hiking of raw materials prices, labour and production costs. The major question then is why bread costs 30 cents more in Zimbabwe than in other African countries. Data was collected using 100 consumer questionnaires, 100 bakery/retailer and 5 in-depth interviews. Convenience, judgemental, quota and stratified random sampling methods were used to select the respondents. Purchasing side findings were that 59% to 65% of the bakeries stated the shortage of flour in the country as the major cause behind the high price of bread. Most of the flour being used by bakeries is import flour. The second purchasing side problem is that of expensive suppliers of flour. Electricity shortages and untimely stoppages of power were cited by 76% of the production side players as the major impediment to the efficient production of bread. Their assertion was that the power cuts led to low production which in turn led to high inefficiencies in the production line. Forty-two percent (42%) of customers said that bread needed improvement in quality issues such as packaging and ingredients used. They agreed that if the quality improved they would pay more for it. The paper therefore concluded that the high price of bread in Zimbabwe as compared to other countries is a result of the use of expensive suppliers along the line coupled with low capacity machinery that has led to lowered output. In the long run the lowered output has resulted in sub-optimal operations in bread factories. The researchers recommended a Government intervention through policy change in terms of reduction in duty and tariffs levels on imported raw materials. Government could also intervene through capital injection into the supply chain. Other recommendations include business to business (B2B) collaboration and partnerships between wheat suppliers, marketing boards, millers, bakeries and retailers. Backward integration and rationalisation of the supplier base by bakeries is likely to lower the price of producing bread and hence its retail price.

Keywords: Efficiency, pricing, supply chain.

1.0 INTRODUCTION

Lambert and Cooper (2004) stated that the only way to successful supply chain is through cross functional integration. Any supply chain requires not only managing but also precise engineering and configuration to enable its responsiveness and flexibility which will lead to an elimination of costs and inefficiencies. This paper sought to find ways to engineering the Zimbabwean baking industry supply chain to reduce any inefficiency and reduce the retail price of bread. The dynamic functioning of the wheat to bread supply chain requires the unpacking of the supply chain into five main levels through which value addition takes place. These five main levels are the farmers, millers, the bakers, the retailers and the consumers. As a point of departure, the paper shall start by giving a background of the Zimbabwean bakery industry.

2.0 BACKGROUND

The baking industry in Zimbabwe is composed of players such as Proton, Super bake, and Bakers Inn. The industry also has very small players who are found in small towns and residential areas. Some supermarkets also own their in-house bakeries.

The industry depends on wheat imports from Brazil, India and Mozambique. By March (2011), Newsday reported a 50% decline in bread production, owing to the wheat shortage whose price ranges between US\$500 to US\$580 per tonne excluding transport costs. During a normal season bakers require 22 000 tonnes of flour per week but the country normally manages to stock less than 10000 tonnes per week (Richardson, 2007). The

national annual wheat requirements stands at 450 000 tonnes which is strenuous to most bakeries who are living from hand to mouth. This scarcity of key inputs is impacting on the price of flour and the flour shortages have also been worsened by the failure by local farmers to produce enough wheat as a result of the illegal western sanctions and the climate change (Jenrich, 2008). Two hundred and eighty- one (281) out of 300 millers closed shop in March 2011, leaving the country to rely on 19 millers. A number of bakeries are said to be facing imminent closure due to a plethora of challenges such as staggering debts owed to various financial institutions. The industry is generally crumbling like a deck of cards serve for – Bakers Inn, which has recently acquired new machinery. The rest of the bakeries are faced with an even bigger challenge of obsolete and low quality infrastructure and machinery.

Operational and capital funding have caused the biggest challenge for most bakeries in Zimbabwe, taking into consideration the prices of raw materials of which most of them are imports. Duty and tariffs on imports has left this industry whose capacity is dwindling between 50% and 40% to continuously decrease. Labour costs and general operating costs have also resulted in a lot of lay-offs and closure for most of the small players.

The major problem with the bread industry today is that there seems to be a hiking of raw materials prices, labour and production costs. Production costs per loaf range between US\$0.80C and US\$0.90c. The price of bread in Zimbabwe is more than that of most African countries to mention but a few in South Africa bread costs between R8 to R10 which is equivalent to US\$0.80 and in Lesotho it costs an equivalent of US\$0.55, Zambia US\$0.50, Namibia US\$0.73 and Malawi an equivalent of US\$0.75 and in Zimbabwe it costs US\$1.00. The major question then is why bread cost 30cents more in some instances doubles the price of other African states. Could the supply chain of the bakery industries have some peculiarities that make it different from that of other African states?

2.1 Purpose of the study

To establish ways of improving the bread industry's supply chain in order to decrease the price of bread.

3.0 LITERATURE REVIEW

According to Rafael de la Vega and Eliza Knox (2006), great opportunities and challenges lie ahead in managing financial flows in supply chains. They suggest that the last three decades have seen tremendous strides being made regarding supply chain efficiencies. Pfeiffer and Salami (1978) define efficiency as an internal standard of performance and an approximate construct for doing things right, define supply chain management as the integration of key business processes from end user through original suppliers that provides products, services and information that add value for customers and other stakeholders. Rafael de la Vega and Aliza Knox (2006), further assert that the major areas of concern to managing a successful supply chain are issues such as reduced lead times, lower inventories, more responsiveness, and more planning and forecasting.

3.1 Lead Time

Lead time can be defined as the time from the moment the customer places an order to the moment it is received by the customer. The best way any business can reduce warehousing costs is by reducing lead time to zero. The shorter the lead times, the less complex the inventory management process and the likely reduction of the price of the final product. Martin (2012) in his two part series on "10 ways to reduce inventory and improve service", states that retail supply chains have long lead times and short season cycles. He further asserts that this results from a purchase he says is generated in the "dark". He says it's in the "dark" because no customers would have bought the products during that time. This is no different from most retail outlets in Zimbabwe. Bread has long lead-times from the bakeries to the retail outlets. The raw material shortages and the high price with which bread producers acquire them results in the long periods of shopping around for the best price alternative. This issue calls for all the players in the supply chain to venture into aggressive planning.

3.2 Lower Inventories

According to Aarti and Rupa (2006) in their article "challenges for supply chain management in today's global competitive environment, the trends in supplying inventory have evolved from the supplier (supply already made inventory). They state that nowadays inventories are tailor-made by customers to suit their production times. Their assertion is that the whole idea behind SCM is to remove inefficiencies, excess costs and most importantly excess inventories from the supply pipeline which extends from the customer back through his suppliers and so on. Excess inventories are a very common feature of the Zimbabwean bread supply chain; most retail outlets are common for stale and outdated bread. This is a sign that bread is not arriving Just In Time for purchasing by the

ultimate consumer. To counter this retailers need careful demand forecasting in order to evade the cost of stale bread. Lower inventory costs will enable bakeries to charge a lower bread retail price.

3.3 Responsiveness of a supply chain

Trent and Monczka (2003) discuss the value and need for integration between faculties in the supply chain. An integrated, well co-ordinated supply chain is difficult to duplicate and plays an important role in competitive strategy. The bread market is generally one of perfect competition, the supply chain is not accurate in as far as meeting customer demand is concerned. Dag Naslund and Steven Williamson (2000) quote Frank and Dennis that basic products such as bread and milk have a relatively stable demand and limited shelf life. This makes their demand predictable. However the Zimbabwean supply chain does not allow for a steady inflow of inventory because of the imported raw materials and the sprouted and unstable suppliers.

3.4 Supply chain forecasting

Demand forecasting and supply chain enable manufacturers to understand their customer's buying patterns and match with supply. In order to maximise their return on assets, most manufacturers resort to demand, forecasting and supply chain planning. Forecasting and supply chain planning helps the manufacturers to ensure that they get a complete picture of anticipated customer demand on a finished product level as well as supply. Most of the respondents especially those with in-house bakeries said it is difficult to plan and have steady forecasts. In-house bakeries were adopted by most Zimbabwean retailers in order to counter the delays and costs associated with outsourcing bread. Backward integration enables the retailers to forecast.

3.5 Purchasing and Supply chain efficiency

The purchasing function is responsible for acquiring the raw materials at the production stage. This is the function that should reduce the most costs as possible by choosing the most feasible suppliers. Wheelen and Hunger (2000) suggests three main purchasing strategies: Multiple sourcing, sole sourcing and parallel sourcing. In multiple sourcing the purchasing company uses many suppliers for a raw material and many suppliers compete. In sole sourcing the buying company uses one supplier and parallel sourcing uses two complimentary suppliers at a time. The ZNCC (Zimbabwe National Chamber of Commerce) respondent suggested that multiple sourcing was the bakery industry's best bet considering the inflation rate which is at 8% at the moment and the general economy performance.

3.6 Production and supply chain efficiency

According to Norman (1995), the core of a production system is its conversion subsystem, wherein workers, materials and machines are used to convert inputs into products and services. The method used to produce bread is mass production which produces long run of standardised goods for a mass market. The usual trend is that the price of the product will be very low. However, Zimbabwean bread producers sited issues such as electricity, and other utilities to be very high such that they had to pass on the cost to the final consumer.

3.7 Consumers and supply chain efficiency

Consumer tastes and interests emanate from the idea that classes of consumers prefer different quality of products. A study conducted by Nike in the late 1990s revealed that consumer sentiment ranged from 55-69%, stating that it is more important to know the origin of a products component than where it is manufactured and assembled. Retailers and ultimate consumers in the bakery industry are interested in the quality of bread and the nature of raw materials used to make the bread. Consumers also consider price when purchasing grocery products including bread. Consumers do have preferred brands and this impact on the retail shelving and storage costs. Retailers prefer to order high turnover bread to ordering low turnover bread in order to reduce their storage costs.

4.0 METHODOLOGY OF THE RESEARCH

4.1 Sampling Procedure

Convenience sampling was used to select the geographical location of the bakeries and the retailers to be used. The most convenient location for the study is Harare. After which the researchers used judgemental sampling to select five in-depth interview respondents from the following organisations: NBAZ (National Bakeries Association of Zimbabwe), GMAZ (Grain Millers Association of Zimbabwe), Z NCC (Zimbabwe National Chamber of

Commerce) and CZI (Confederation of Zimbabwe Industries). 200 other respondents were used of which 100 consumer respondents and 100 bakeries/retailer respondents were also used in the study. Quota sampling method was used to establish consumer samples across all residential areas in Harare comprising the low density and high density suburbs. For the bakeries and retailers, stratified-random sampling was used to select a 50 -50 sample.

4.2 Research Instruments

Data was collected using bakery/retailers survey questionnaires, consumer questionnaires and an in-depth interview schedule for experts in the bread supply chain. Key questions in the research instruments covered the purchasing, production and consumer related factors.

4.3 Data Presentation Methods

Data was presented in table's graphs and text. Graphs enabled some visual appeal on the significance of each bread operations factor behind high prices. Tables enable storage and containing of large quantities of data.

4.4 Limitations of the Study

There is a neutralising effect of treating bakeries and retailers as one side of supply chain. Though this was done since supermarkets also bake their own bread, there seems to be some variations in perceptions and strategic thinking. A sample size of 100 consumers might not be highly representative of all metropolitan residents. The study was carried in winter where there could be some high demand for bread and tea. The views of consumers might need to be captured for the whole year. Some data cells in Chi-Square analysis were below 5 hence compromising on the validity of p-values derived from the SPSS entries. The concrete achievement was however the systematic responses derived from all key respondents in the more homogeneous bread market and value delivery system.

5.0 DISCUSSION OF FINDINGS

Analysis of data was conducted using SPSS version 17.0. Demographic data of bakeries/retailers contained 62 men and 38 women in the age range of below 31 years to just above 61 years. Majority were in the \$501 to \$1100 income range. The dependents range from 3 to above 9 people. Qualifications of bakeries/retailers sample ranged from O-Level to Degree and above, with the majority in the diploma levels. Years of experience in the value chain system of respondents ranged from 2 to around 9 years. The respondents in the bakeries/retailers categories were mainly selected from the purchasing, production, delivery, marketing and engineering.

The consumer respondents were composed of 48 men and 52 women taken from both eastern and western residential areas of Harare. The main age range is 31 to 60 years. The major income range is less than \$501 to \$1400. Number of dependents of the consumer respondents ranged from below 3 to around 9 people. The consumer respondents had a uniform distribution of academic levels from O-Level to degree and above.

5.1 Purchasing Value Chain Findings

5.1.1 Purchasing Factors behind High Prices of Bread in Zimbabwe.

The various purchasing factors behind supply chain of bread production and price levels were ranked as below.

Table 1.1: **Purchasing Related Factors**

Purchasing Factor	Responses	Ranking
Shortage of flour	(68% Agree to Strongly Agree)	1
Use of expensive suppliers	(59% Agree to Strongly Agree)	2
High transport charges faced by suppliers	(56% Agree to Strongly Agree)	3
Longer distance of hauling inputs	(37% Agree to Strongly Agree)	4
Use of many levels and types of intermediaries	(27% Agree to Strongly Agree)	5

Source: Bubo and Vutete - Bread Price and Supply Chain Research (2012)

Flour is a key input and ingredient in bread making process. The shortage of flour in the local market was described as a critical cause of high prices of bread. This could be caused by poor timing of winter wheat planting and harvesting schedules. Limited local suppliers could be behind the high bread price in Zimbabwe. Some suppliers of wheat and flour were said to be charging higher prices to Zimbabwean importers since they purchase using the US Dollar (2000 – 2012). The sanctions were speculated to be causing the supply alternatives to be limited. The suppliers of wheat incur the insurances, freight and storage costs that are fed into the final price. Respondents agreed to this with a 56% rating.

Longer distances might cause uncertainty in the eyes of bakeries and millers. The 37% of industrial respondents believed that the longer distance of input were behind high prices, since supply shocks of flour are felt when there is delay in consignments. Use of many exchanges causes rent seeking behaviour to be cultured in the bread industry. Wheat is supplied by many players, who also sell to the millers. Large bakeries have also capacity to import wheat and flour. The existence of such influences to costs and efficiency levels in the supply chain had led to higher price of bread according to the findings at hand.

Fig 1.x Important Bread Supply Chain Factors

Source: Bobo and Vutete Bread Price and Supply Chain Research (2012)

Key

- a - Shortage of flour
- b - Use of expensive suppliers
- c - High transport charges faced by suppliers
- d - Longer distance of hauling inputs
- e - Use of many levels and types of intermediaries

5.1.2 Purchasing Strategies in the Supply Chain

Purchasing strategy in the supply chain	Responses	Ranking
Negotiating with existing suppliers	(Agree to Strongly Agree 59%)	1
Use of new suppliers	(Agree to Strongly Agree 67%)	2
Contract farming of wheat	(Agree to Strongly Agree 61%)	3
Lobbying for subsidies	(Agree to Strongly Agree 60%)	4

Source: Bobo and Vutete Bread Price and Supply Chain Research (2012)

The strategies are discussed starting with those preferred by respondents. Bakeries and millers need to ask their respective suppliers to cut the prices of inputs. Local firms might be overcharging bakeries on various inputs. Any marginal decrease in costs will improve the bread supply chain. New suppliers from Canada, USA and also in Europe and Asia could be approached for lower priced bread inputs. Agricultural technology is advanced in these

countries. This might cause a decrease in bread price by 10 cents per unit. Contract farming involves supply inputs to farmers and making them produce wheat at lower costs. There will be guaranteed supply of the key inputs. If done by the majority of bakeries and millers, supply shocks will be eliminated and causing a possible price reduction. Wheat farmers, millers and even bakeries might lobby government to get assistance in farming wheat and production of bread. Some 40% of respondents felt uncertain and disagreeable to this route due to financial problems the Zimbabwean government was facing at that time of research.

5.1.3 P-Value Analysis for Purchasing Function.

- Years of experience X Contract farming strategy.**

$X^2 = 1.937$, $p\text{-value} = 0.747 > 0.50$

The analysis gave a p-value of 0.747, which is greater than 0.50 and also far away from 0.05. Years of experience in the bread value chain system of the respondent has no association with naming the contract farming strategy. This reflects a strategy can be chosen by any person in the industry. New people to the bread supply chain commended in a similar way to those with more years in the system.

- Qualification X Lobbying for government subsidies.**

$X^2 = 2.001$, $P\text{-value} = 0.368 < 0.50$

The analysis gave a p-value of 0.368 which is less than 0.50 but above 0.05. Respondents' qualification and 'Lobbying for government subsidies' are generally associated. Since it is less than 0.50 the relationship is not a matter of chance only. A p-value of 0.37 is not enough, however, to give a conclusive statement on the association between the variables. For it to be conclusive, it needs to be less than 0.05.

5.2 Production Value Chain Findings

5.2.1 Production Factors behind High Prices of Bread

Table 1.2:4 Production Factors behind High Prices of Bread in Zimbabwe

Production Factors Behind High Prices	Responses	Ranking
Shortage of electricity and other power supplies	(Agree to Strongly Agree 76%)	1
Failure by machinery	(Agree to Strongly Agree 74%)	2
Material wastage and defects in production	(Agree to Strongly Agree 63%)	3
Use of low capacity machinery	(Agree to Strongly Agree 59%)	4
Low skills and motivation	(Agree to Strongly Agree 51%)	5
High labour costs	(Agree to Strongly Agree 44%)	6
Problems in production scheduling and management	(Agree to Strongly Agree 40%)	7

Source: Bobo and Vutete Bread Price and Supply Chain Research (2012)

Production factors are discussed in order of importance as rated by respondents. Respondents said that electricity shortage had affected the bakeries and the millers of wheat through unnecessary stoppages. Shortage of power led to low production output of bread and failure to achieve production of economies of scale. Lower output in the market also bred high consumer prices of bread. Machine break down was mentioned by 74% of respondents as a serious factor behind high prices of bread. Machine electricity switches are generally affected by load shedding "on-offs". Some machine is generally old to operate for a longer period. Inefficiencies could also be caused by such machine failures. Material wastage could be traced in wheat transportation, flour milling and in mixing dough and additives. This adds to overall costs of the bread hence resulting in high prices of bread in the market. Sixty three (63%) percentage of the bakeries/retailers respondents agreed that material wastage and production defects as key influence to price levels. Current baking plants are said to be using small scale

machinery that produce output fewer to absorb the major overheads. Larger output machinery is needed for such a fast moving consumer good (FMCG). So each cost per unit could be high in the bread production in Zimbabwe. The bakeries/retailers respondents gave a 59% agree rating. Most bakeries and even retailers have a tendency of using semi-skilled employees in their operations. Their mistake adds up to costs and hence final bread prices. Bakery employees are generally demotivated by various conditions including low remuneration and work overload. This view was believed by about 51% of the industrial respondents in the study. Labour costs usually contribute about 70% of total costs. This might have caused bakeries to feel that any price reduction from US\$1 per loaf could not be accommodated without reducing the number of employees. Some respondents (56%) openly said that labour costs were not critical, citing the lower wages offered to employees as evidence. Idle time, time lags, uncoordinated work and production scheduling problems were cited as pushing up costs and bread prices. Some 60% of respondents were however viewing bread production as well coordinated.

Source: Bobo and Vutete Bread Price and Supply Chain Research (2012)

5.2.2 Production Strategies to Reduce Bread Prices

Production Strategy to Reduce Price of Bread	Responses	Ranking
Use of cheaper energy sources	(Agree to Strongly Agree 60%)	1
Use of large capacity machinery	(Agree to Strongly Agree 58%)	2
Use of long production runs process	(Agree to Strongly Agree 58%)	3
Implementing quality assurance approaches	(Agree to Strongly Agree 57%)	4
Use of high skilled labour	(Agree to Strongly Agree 47%)	5

Source: Bobo and Vutete Bread Price and Supply Chain Research (2012)

Use of own localised electricity generators is generally expensive compared to ZESA electricity. Sixty (60%) percent of respondents said that designing cheaper sources of energy will lead to cutting of costs. Coal and charcoal need to be used if supplied at lower costs. Achieving production and technical economies require large and new machinery and plants. As population of customers might be increasing, high volume production will enable lower costs per unit. A longer production run means output will continuously be received from the factory. This might avoid cooling and reheating inefficiencies. The ISO 9000 series, British Standards (BS) and other localised procedures were recommended by respondents on the bakeries and retailers to achieve lower costs

and more affordable bread price. This strategy was recommended by 47% of bakeries/retailers respondents. Proper production management and implementation of procedures require well trained personnel in the bakery industry. Some 53% felt the skills factor not agreeable since manual work is said to be dominating most bakery operations.

5.3 Customers and Demand Factors Discussion

5.3.1 Basic Results of Consumer Perceptions on Bread in Zimbabwe

Perceptions Items	Responses	Ranking
Customers can conveniently pay full dollar price	48% agree to strongly agree	1
Customers have no good substitute for bread	39% agree to strongly agree	2
There are too many customers in the bread market	37% agree to strongly agree	3
Customers want Brands and packaging that are attractive	43% disagree to strongly disagree	4
Bread is seen as a basic product	49% disagree to strongly disagree	5
Customers have an alternative source of bread	50% disagree to strongly disagree	6
Bread is seen as value for money	51% disagree to strongly disagree	7
Customers are not sensitive to price increases	52% disagree to strongly disagree	8
Customers' income is adequate	59% disagree to strongly disagree	9

Source: Bobo and Vutete Bread Price and Supply Chain Research (2012)

Customers said they could pay the dollar price tag mainly due to lack of change problems in each transactions. They indicated that inconvenience will come if price is changed to price tags like 85cents and 95 cents. Consumer respondents generally agreed that they have no good substitute products to use in place of bread. A lower value of agreeing of 37%, said that too many customers seems to be in the bread market. This is likely to be behind high prices in the market. Customers denied by 43% that they want brands and packaging that are attractive. The study also indicated that 49% disagreed that bread is seen as a basic product. The high bread price could be caused by lack of alternative source of bread except the sole Zimbabwean market. This is based on 50% of customers who disagreed on the statement that "customers have an alternative source of bread". Interestingly customers denied that bread is seen as value for money in Zimbabwe. The consumer respondents said that customers are sensitive to price increases. Consumers said their income is inadequate to purchase bread at higher prices. The findings indicated that 59% of consumer respondents disagreed that customer's income is adequate.

Perception Items	Responses	Ranking
Customers want improvement in ingredients and pay higher price	42% agree to strongly agree	1
Customers want reduction in price and purchase more bread	43% disagree to strongly disagree	2
Customers will allocate more money if bread price falls	44% disagree to Strongly disagree	3
Customers want bread brands that are constantly advertised and communicated	45% disagree to strongly disagree	4
Customers' taste on bread will remain the same	51% disagree to strongly disagree	5

Source: Bobo and Vutete Bread Price and Supply Chain Research (2012)

The expectations of customers are critical in a supply chain. The bread consumers said they want improvements and pay a higher price. The improvements could be some colouring, bran seeds and even milk flavours. Customers said that they will not change the level of bread purchase even its price is reduced. They said the reduction will be done to go to the real price levels. "Customers will allocate more money if bread price falls", was rejected by a 44% disagreement response. Unlike the view of producers and retailers, the consumer respondents had a 45% disagreement to the purchasing preference of brands that are constantly advertised and communicated. The study produced a 51% disagree- to - strongly disagree on the view that "customer's taste on bread will remain the same". Consumers might prefer other products that can be convenient to use as bread in future. The value chain needs to be upgraded to meet new trends in consumer's needs and expectations.

5.3.2 Correlation of Consumer Factors Behind High Prices

The analysis was done to establish the gaps between bakeries/retailers and consumers on the customer related supply chain factors. Direct analysis on the agreeableness to customers and bakeries was also done and is given below:

Correlation analysis using the Spearman's rank order method was carried out by the researchers. This assisted to indicate whether inconsistencies in supply chain expectations exist in the bread industry.

	Rank _{BR}	Rank _{CO}	Rank _{BR} - Rank _{CO}	(Rank _{BR} - Rank _{CO}) ²
Customers are not sensitive to price increases	4	8	-4	16
There are too many customers in the bread market	9	3	6	36
Bread is seen as a basic product	7	5	2	4
Customers can conveniently pay full dollar price	1	1	0	0
Customers have an alternative source of bread	6	6	0	0
Customers have no good substitute for bread	2	2	0	0
Brands and packaging are attractive	5	4	1	1
Bread is seen as value for money	3	7	4	16
Customers' income is adequate	8	9	1	1
$\sum d^2 = \text{Total} = 74$				

Source: Bobo and Vutete Bread Price and Supply Chain Research (2012)

$$\sum d^2 = \text{Total } 74$$

$$\begin{aligned}
 \text{Formulae: } R_s &= 1 - 6 \sum d^2 / N(N^2 - 1) \\
 &= 1 - 6 * 74 / (9^2 - 1) * 9 \\
 &= 1 - 37/60 \\
 &= 23/60 \\
 &= +0.38
 \end{aligned}$$

There is a weak positive correlation since the R_s value is below 0.50. The ranks on the agreeableness show that bakeries/retailers and consumers agreed on some factors. These points caused the R_s to be positive.

- Customers can conveniently pay full dollar price
- Customers have no alternative source of bread
- Customers have no good substitute for bread

The point of departure in the correlation is caused by the following:

- 'There are too many customers in the bread market'. Consumers slightly agreed to this against bakeries/retailers.
- 'Customers are sensitive to price increases'. Customers agreed on this while retailers/bakeries opposed the view.
- 'Bread is seen as value for money in Zimbabwe'. Customers disagreed with this statement in contrary to the view of bakeries/retailers.

The analysis shows that areas of convergence in rating value chain factors are lower than areas of divergence. A coefficient of determination of $(0.38333)^2 = 0.1469444$, reflects that 14.7% of variation in the rating of factors can be explained by industry variables and 85.3% of differences in rating are explained by other factors of the value chain system.

The implications are that the managers of supply side organisations like wheat farmers, millers and retailers need to continuously monitor variations in customer perceptions and situations for them to remain relevant and attractive.

Table 1.3: Correlation of Consumer Expectations

	$Rank_{er}$	$Rank_s$	$Rank_{er} - Rank_s$	$(Rank_{er} - Rank_s)^2$
Customers want improvement in ingredients	5	1	4	16
Customers want reduction in price and purchase more bread	3	2	1	1
Customers will allocate more money if price falls	1	3	-2	4
Customers' taste on bread will remain the same	2	5	-3	9
Customers want bread brands that constantly advertise and communicate	4	4	0	0

Source: Bobo and Vutete Bread Price and Supply Chain Research (2012)

$$\sum d^2 = \text{Total } 30$$

$$\text{Formulae: } R_s = 1 - 6\sum d^2 / N(N^2 - 1)$$

Where R_s is Spearman's rank correlation coefficient

$\sum d^2$ sum of squared Rank differences between the two respondents groups

N the number of items responded to

$$\begin{aligned}
 R_s &= 1 - 6 \cdot 30 / (5^2 - 1) \cdot 5 \\
 &= 1 - 6 \cdot 30 / 24 \cdot 5 \\
 &= 1 - 3/2 \\
 &= -1/2 \\
 &= -0.50
 \end{aligned}$$

$$R_s = -0.50 \text{ (Strong Negative Correlation)}$$

A negative value shows that the bakeries and retailers' responses are different from those of consumers. Consumers were expressing a different view on chain direction. In the study more customers said that their taste on bread might change in the future. This means bread producers might need to be proactive on social, health and economic motives on bread consumption and produce different version and features of bread.

5.3.3 Discussion on p-values Analysis on Consumers and Demand

- a. Dependents X Bread is seen as a basic product

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.146 ^a	4	.709
Likelihood Ratio	2.072	4	.723
Linear-by-Linear Association	.245	1	.620
N of Valid Cases	100		

a. 3 cells (33.3%) have expected count less than 5. The minimum expected count is 3.08.

$X^2 = 2.146$, p-value = 0.709 df=4

No association at all. Any relationship could be a matter of chance. Dependents numbers and peceiving bread as basic are statistically not associated in this study.

- a. Income X Customers can conveniently pay a dollar

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	2.908 ^a	6	.820
Likelihood Ratio	2.846	6	.828
Linear-by-Linear Association	.148	1	.701
N of Valid Cases	100		

a. 4 cells (33.3%) have expected count less than 5. The minimum expected count is 2.28.

$X^2 = 2.908$, p-value = 0.82 df=6

This value shows that 'Income range' and 'Convenience to pay a full dollar than other price tags' is not related in anyway. Any relationship could be a matter of chance.

- a. Age X Customers' taste on bread will remain the same

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	5.270 ^a	4	.261
Likelihood Ratio	5.411	4	.248
Linear-by-Linear Association	.020	1	.888
N of Valid Cases	100		

a. 0 cells (.0%) have expected count less than 5. The minimum expected count is 7.04.

$X = 5.270$, P-value = 0.261 < 0.50, df=4

P-value of 0.261 is less than 0, 50. This shows that an association of the age and taste changes exist on the part of respondents. The elderly people and young people might predict the bread taste changes differently. However a p-value > 0.05 is considered statistically not enough to yield a conclusion on the perception of taste changes one time.

a. Income X Bread is seen as value for money

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	21.003 ^a	6	.002
Likelihood Ratio	21.384	6	.002
Linear-by-Linear Association	9.511	1	.002
N of Valid Cases	100		

a. 2 cells (16.7%) have expected count less than 5. The minimum expected count is 3.80.

$X^2=21.003$, P-value = 0.002,

A p-value of less than 0.05 is statistically significant that the association between "Income" and "Bread is seen as value for money" is not a matter of chance. Those with higher income could perceive the bread as value for money.

Gender x Customers are not sensitive to Prices

Chi-Square Tests

	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	7.053 ^a	4	.133
Likelihood Ratio	7.208	4	.125
N of Valid Cases	100		

a. 2 cells (20.0%) have expected count less than 5. The minimum expected count is 1.44.

$X^2= 7.053$, P-value=0.133 DF=4

The p-value is less than 0.50 meaning that there is some practical relationship between gender and price sensitivity. However the p-value of 0.133, which is greater than 0.05 means that it has no statistical significance to conclude that the relationship and association of variables, is not a matter of chance. The women respondents perceived bread consumers as more price sensitive to the male responses.

This analysis shows a possibility that gender might influence taste and purchase behaviour of bread customers.

6.0 CONCLUSIONS AND SUMMARY

6.1 Purchasing

It can be concluded that purchasing side of bread manufacturers is generally costly due to critical shortage of bread flour, linked to forced use of expensive suppliers and high transport charges faced by both wheat and millers. Depth interview results with farmers and millers representatives indicated that local shortage of wheat is influenced by unpredictable climatic behaviour, lack of adequate agricultural financing and water shortages in wheat farms.

The key supply chain strategies established in the study include use of new suppliers, contract farming of wheat by millers, lobbying for government subsidies and negotiating for lower prices with existing suppliers.

Depth interviews specified that USA, Canada, Brazil and Asian countries were key sources of low priced bread wheat.

6.2 Production

The research concludes by stressing that bread manufacturing sub-chain are leading to high bread prices due to shortage of electricity and other power supplies, failure by machinery, material wastage and defects in production, use of low capacity machinery, use of semi-skilled and unmotivated employees, high labour costs and problems in bread production scheduling and operations management. Depth interviews indicated that use of own electricity generators are more expensive to bakeries and supermarkets. The conversion inefficiencies in preparing the dough and mixing were noted as key cost drivers in the production level (value chain) supply chain.

Strategies for upgrading the cost structure at this stage of the supply chain include use of cheaper energy sources, use of large capacity machinery, and use of long production runs, implementing strict quality assurance approaches and engaging highly skilled labour.

The distribution and logistics cost in Zimbabwe is higher than it is in other countries. The price of fuel is hiking on a monthly basis in Zimbabwe, additionally maintenance and storage costs are also very high. These impacts greatly on the price of bread, most of these costs are incurred in the acquisition of raw materials which as noted in (5.1) above are imports. Hence duty and tariffs are added to the basic transportation costs.

6.3 Consumers and Demand

The study found out that bread consumers are not sensitive to price increases. The bread was not seen as a basic product by consumers. It was established that consumers can conveniently pay a full dollar price than other possible price tags at the moment in Zimbabwe. Customers' income was perceived as inadequate to purchase high priced bread. Customers want attractive brands and packaging. This might be adding to overall bread costs and price. Bread is not somehow seen as value for money by consumers. The study somehow established that there are less customers of bread than what bread manufacturers and retailers expected. There was generally a weak positive correlation on the perception of bread bakeries/retailers and bread consumers on the customer and demand issues that influence pricing of bread ($r = +0.38$).

On the expectations of bread consumers, the study established that consumers want improvement in ingredients. Consumers somehow agreed that a reduction in price can lead them to purchase more bread. Consumers were uncertain on whether they will allocate more money to bread if its price falls. The study can conclude that bread consumers were generally saying their taste will change over time.

6.3 Policy framework

The policy is not supporting the bread industry at all. There is lack of policy consistence and a good business culture. Policies influencing VAT and import tariffs are hiking the price of imported raw materials. Customs duty on things such as wheat flour was increased from 5% to 20% by the finance minister in his fiscal policy. This increase affected the bread industry immensely since 50% input into bread production is flour [VAT on flour and yeast is 15% while bread is zero rated meaning it does not carry VAT].

7 RECOMMENDATIONS FOR THE BAKERY INDUSTRY SUPPLY CHAIN

7.1 Policy change

The bread flour should be imported duty free so as to encourage more quantities of wheat to be attracted in the Zimbabwean bread value chain. Price and standard control of bread can yield effective lower prices.

7.2 Collaboration and Cooperation

There is need for companies in the baking industry to have some sort of collaboration in order to solve the bottlenecks in the supply chain and overcome bumps in demand or supply chain. Business to business relationships should be created between suppliers of raw materials and bakeries by having better information, integration enables the improvement of customer service and production cost reduction which will in turn reduce the retail price of bread.

7.3 Innovation

There is need to manage all aspects of the supply chain to improve customer services levels and reduce costs. There is need to engineer the supply chain to be highly efficient. Bakeries, millers and retailers must be able to

engineer their activities to meet each other's demand at all times at the lowest cost possible this can only be done through integration as stated in (6.2) above. An intergraded supply chain gives room for innovation agreements between retailers and bread producers, and those of millers and bakeries give room to strategies such as Just In Time which will cut on storage costs and zero lead-time leading to a reduction of waste and inefficiencies hence lowered retail price.

7.4 Planning and control of the supply chain

There is need for every player in the supply chain to carefully plan their activities, well planned wheat supplier activities means the outbound logistics are well organised to meet the needs of the purchasing companies in this case the millers. The supply chain should be controlled at every point; this can be achieved by every player making informed decisions on both their supplier side and demand side.

7.5 Rationalisation of supplier base

Who exactly is the supplier in the bread industry? This is a very pertinent question in answering the efficiency problem in the supply chain. The answer is to be customer focused. The best suppliers are those that provide customer satisfaction. A backward integration approach is required to analyse the suppliers, screening of the suppliers. The most efficient are those who supply raw materials on time and at low cost, and meet demand for bread. This can be achieved by reducing the number of sprouted suppliers at every level of the supply chain; this can be done by maintaining good relationships which will put pressure on the supply side to have a social responsibility effort towards their purchasing company. In the long run this will give rise to benefits such as quantity discounts.

7.6 Customer relationship

The supply chain must emphasise on creating B2B (Business to business) relationships along the chain and B2C (business to customer) at the end of the chain. Customer loyalty should be created between suppliers who provide inputs; this will enable a consistent and permanent supply of raw materials into the supply chain. Retailers should also have close relationships with the ultimate consumers importer to understand their purchasing patterns and hence control the level of stock in the shop or in the case of in- house bakeries the amount of bread baked will match customer demand at all times reducing waste and inefficiencies and hence enabling a lower priced loaf of bread.

7.7 Supply chain best practice

Best practices means understanding your operations and your costs thoroughly, getting the best return on investment, satisfying your customers and understanding that you are never done with the job. Best practices involve making the right choice of suppliers and supplier routes that are less costly and provide more efficiency for the bread industry. It also involves an element of sustained effort that attempts to stick to a permanent and adaptive supply chain.

7.8 Adaptive and flexible supply chain

The Zimbabwean supply chain needs to be organised in such a way that it is open to change. An integrated supply chain does not need to be rigid. The purchasing firms in this case bakeries/retailers should be in a position to have supplier databases and customer organisation databases. This will enable information on issues such as demand and costs of raw materials to assist in the planning and forecasting. Supplier data bases will also assist in establishing the lowest possible switching costs in cases where the situation demands for a switch in suppliers.

7.9 Capital Injection

There is need for a capital injection into the supply chain in order to improve on liquidity. The entire supply chain is faced with a high liquidity crisis. Government intervention is required in the form of capital injection in order to boost the bakery industry's operations.

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