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Sorit Bread Production in Nigeria: A Cost Analysis

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Abstract
This paper analyses the cost-effectiveness of the commercialization of SORIT bread in Nigeria. The high cost of wheat flour ends up increasing the cost of production and thus reducing the profitability of bread production, hence, this study was carried out to find a suitable partial replacement of wheat flour from local raw material to help boost bread production profitability and reduce demand shortages for wheat flour. SORIT bread is bread made from the composite of wheat flour, local rice flour, and soybean flour. Thus, the paper sought to determine if SORIT bread production is a commercially profitable venture. The Study employed a cost analysis technique in determining the profitability of commercializing SORIT bread. Analysis of the production and sale of 1000 units of SORIT bread weekly gives a profit margin of N5,015,000.00 in a year which indicates that the commercialization of SORIT bread is a very profitable venture. The cost-benefit ratio indicates that for every ₦1 spent on the production of SORIT bread, the investor receives a benefit of ₦1.16. Also, the cost efficiency shows that the cost of producing one unit of SORIT bread is ₦603.56 thus indicating a 14% profit margin which falls within the industry standard of 10 - 15%. Thus, this paper concludes that the commercialization of SORIT bread is a very profitable venture as it has proven to be a very cost-efficient enterprise. It is recommended that SORIT bread production be encouraged since it is a profitable business in Nigeria.

Keywords: Bread Production, Commercialization, Cost Analysis, SORIT Bread.

Introduction

Bread is a widely accepted food and it is eaten all over the world (Ijah et al., 2014; Saranraj & Sivasakthivelan, 2015; Akhtar et al., 2015). Bread is reported to be a very good source of carbohydrates thus making it a good source of energy (Amaral et al., 2022) and nutrients, such as protein and fibre (Eduardo et al., 2013). Generally, wheat flour is the most widely used ingredient for bread production because is has a low gluten content (Anwar et al., 2017). Similarly in Nigeria, after rice, bread is the most consumed food product. It is regularly eaten as part of breakfast or supper in homes, restaurants, hotels and other places where food is served. Due to soil type and climate constraints, wheat production is not a major agricultural activity in Nigeria, thus wheat flour is usually imported by marketers to meet local demands. Thus, due to the volume of importation of wheat annually, Nigeria's net foreign exchange balance is adversely impacted (Folorunso et al., 2019). Consequently, efforts from the government and researchers have been geared toward identifying a good and cost-effective replacement for wheat flour. Amal (2015) and Yuliana et al. (2018) have reported on the adoption of sweet Potato flour for bread production, however, they reported that it is not quite suitable for bread production. Gallagher et al. (2014) explained that technological issues observed in the substitution of wheat flour with other flour from local produce are mainly due to their protein content, it makes it difficult to bind the ingredient together during baking.

Repeated drawbacks from the direct replacement of wheat flour in bread production led to the development and use of composite flour from mostly locally grown agricultural produce for partial replacement of wheat flour in bread production (Noort et al., 2022). The Food and Agriculture Organization (FAO) is responsible for the innovation of the composite flour technology. The research and development process was fueled by the organization's desire to assist regions (Africa and the middle East) where wheat production is difficult to grow to reduce the cost of importation and in turn, reduce their dependence on wheat flour. The use of composite flour in bread production has drastically reduced the demand for wheat, thus reducing the overall cost of production. Composite flour technology has encouraged the

adoption of locally grown crops in the tropics and temperate regions such as cassava, yam, maize, and others in partial replacement of wheat flour in bread production (Dala & Bobade, 2018).

Recent changes in the food service industry mainly due to globalization have prompted manufacturers and food marketers to respond to the consumer demand for a wide variety of food with different nutritional needs or requirements. Now, bakeries are mandated as part of quality control and assurance to produce bread which are gluten-free comparable to that of whole wheat bread (Nunes et al., 2016). However, apart from the energy content of wheat, wheat has relatively low nutritional value when other nutrients are considered (Dhingra & Jood, 2011; Dhingra & Jood, 2012; Khalid et al., 2023), this is also why the partial substitution of wheat flour to produce healthier and nutrient-packed bread varieties is embarked upon by numerous researchers (Adeleke &Odedeji, 2010; Pérez et al., 2017; Mitiku et al., 2018; Nogueira et al., 2018). It has been established that increasing the nutritional value of wheat products requires mixing wheat flour with inexpensive staples like grains and pulses (Sharma et al., 2010). SORIT bread is a research outcome that seeks to partially replace wheat flour while improving on its nutritional lapses, thus providing an affordable bread with several nutritional qualities that set it apart as a healthy bread that can be used as a nutritional intervention for quite a few illnesses (Richard-Nwachukwu et al., 2022).

SORIT bread is bread made from the composite of wheat flour, local rice flour, and soybean flour (SO= soybean; RI= rice; T= wheat). SORIT fibre content of 3.2% indicates that SORIT is beneficial for those who have constipation. SORIT bread has a protein content of 26% shows that it can become a nutritional intervention for protein deficiency in children (Olugbemi et al., 2017). SORIT bread has a lipid content of 1.6% thus making it quite useful for resolving indigestion and hormonal imbalance it is also a source of a high amount of energy and possesses enticing characteristics like colour, texture, structure, mouth feel, etc.; which helps with the bread's sensory evaluation and acceptability ((Richard-Nwachukwu et al., 2022). Due to its nutritional potential, SORIT bread has been recommended for diabetic patients. SORIT bread has been proven to be an excellent replacement for wheat bread with even better nutritional qualities when compared to wheat bread; however, the commercialization of SORIT bread depends mainly on its profitability as a business venture in meeting the needs of diabetic patients and the general population. Thus, this study is aimed at commercializing the production of SORIT bread by determining the profitability of its production to attract entrepreneurs (bakery owners) into the production of SORIT Bread for the benefit of all.

Cassava flour is a widely used replacement for wheat flour in most parts of Nigeria due to its readily availability and affordability. Thus, there are several studies on the cost or economic analysis of bread production made from cassava flour. Mgbakor et al. (2014) evaluated the profitability of bread produced using good quality cassava flour in Ndokwa West LGA of Delta State, Nigeria. The researchers employed a combination of primary and secondary data collection methods. Oral interviews, personal observations, and structural questionnaires were used at the primary level, while secondary data were gathered from relevant literature. The majority of bread producers in the area were between the age range of 36-45 years, thus indicating that bread production is carried out by young people. The study identified inadequate electricity supply, poor road network, lack of capital and low awareness of the use of cassava flour in bread production as challenges that affected bread producers in the area of study. The gross margin, a measure of cost and returns, was used to assess the profitability of bread production with cassava flour of high quality. The study reported a gross margin of 18,088,000 and a benefit-cost ratio of 3.3. The gross profit margin is high which means that production processes are cost effective. The benefit-cost ratio portrays that ₦3.3 is the expected return for every ₦1 spent in bread production, this also implies that the return on investment is about 230% which should suggest that the business is economically viable, however, it seems highly unrealistic.

Similarly, Adewole and Omowole (2018) assessed the profitability of bread made with cassava flour in Akure South Local Government. Gross margin analysis was used in estimating the profitability of the venture. The results reported a mean monthly profit of N1,546,657.00 which when compared with the initial startup cost and total fixed cost for one year indicates that the venture is economically viable. A descriptive analysis of the impact of demographic factors on the operations of bakeries in the study area revealed that revenue generated is positively associated with age. This means that bakery owners who are older and more experienced generated more revenue than their counterparts who were less old and less experienced. In contrast, the study showed that the educational level of bakery owners was negatively associated with revenue generation. This implies that bakery owners with lower educational levels or qualifications generated more revenue than their counterparts who were more educated or had higher educational

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qualifications. In summary, the findings of the study suggest that bread production with cassava flour is a profitable venture in Akure South Local Government, Ondo State, Nigeria.

Yahaya et al. (2017) carried out a profitability assessment of cocoa bread production using Gross Margin Analysis. The study found that the Gross Return on CRIN (Cocoa Research Institute of Nigeria) Bread production for the specified period was N2,889,880. This represents the total revenue generated from cocoa bread production during the study period. Additionally, the total variable cost incurred in the production process was reported to be N1,855,400. The Benefit-Cost Ratio was calculated to be 1.142. A BCR greater than 1 suggested that the benefits outweigh the costs, indicating a positive economic feasibility for cocoa bread production. The study reported a positive Net Present Value. A positive NPV implies that the present value of cash inflows exceeds the present value of cash outflows over the project's lifespan. The Internal Rate of Return was determined to be 38.82%. In this case, the IRR of 38.82% suggested that the cocoa bread production project was economically viable, as it exceeds the typical cost of capital. The overall results and investment parameters (positive NPV, BCR > 1, and a significant IRR) suggest that cocoa bread production, as studied by Yahaya et al. (2017), is considered worthwhile and economically viable. These findings indicate that the benefits generated from bread production using cocoa flour outweigh the associated costs, making it a profitable venture.

Olumuyiwa and Ellawule (2020) performed a feasibility and economic analysis of a modern cottage bread production business in Gashua, Yobe State. The bakery was estimated to require an initial capital investment of about ₦10,316,303.00. Based on the selected operational capacity, the bakery is expected to have annual production costs between ₦30,776,550.00 to ₦45,059,946.85 over a 5-year period which signifies the business development stage. Based on the prevailing market price and some assumptions, the cash flow for the 5 years was estimated to be ₦41,395,161.00, and the break-even point was at 27,705 units. Based on the financial measures, the study reported a profit after tax between ₦12,783,071.00 to ₦18,878,298.79 over the five years. The fact that the profit after tax is higher than the initial capital investment is a positive indicator of the economic viability of the venture. Abdullahi (2016) assessed the economic viability of bread production in Kaduna and Zaria Metropolis of Kaduna State, Nigeria. The study employed the stochastic frontier production function to analyze the economic aspects of bread-baking enterprises in the specified locations. The results indicate that that both capital, human and material resources were underutilized in bread production in the study area, this affects profit maximization and suggests that there is potential for optimizing the use of inputs to enhance efficiency.

The gross profit margin for every 50kg of flour used in production was estimated to be ₦6270. This means that an increase in the level of production will increase profit returns. The level of production is determined by customer demand, supply chain management and marketing strategy. The cost-benefit ratio indicated a return of ₦0.58 for every ₦1 spent on production. This indicates a return on investment of about 58% thus making the bread production venture a very profitable one. Conclusively, the results suggest that bread production in the study area is profitable but can be more profitable by interrogating resource utilization techniques in the operations of the bakeries. The review shows that economic analysis of bread production from wheat flour and cassava flour were profitable, thus the determination of the profitability of a composite bread like SORIT bread provides an avenue to compare for investment purposes.

Materials and Methods

The Study employed a cost analysis technique in determining the profitability of SORIT bread. Cost analysis is a financial analysis technique that is associated with determining the costs of a project and how costs are allocated to drive profit generation (Koopmans & Mouter, 2020). There are several cost analysis methods, however in this paper, the following are considered: Gross Profit margin analysis, Cost-benefit Analysis, and Cost Efficiency.

Gross Profit Margin: The Gross Profit Margin analysis tool is designed to show ventures with higher return on investment rates. According to Mahruzal and Khaddafi (2020), Gross profit margin is the arithmetic difference between revenue and the variable costs associated with the production of goods. It is mathematically expressed as:

$$\text{Gross Profit Margin (GPM)} = \frac{\text{Net revenue} - \text{Cost of Goods}}{\text{Net Revenue}} \times 100\% \qquad (1)$$

Cost of goods sold (COGS) is the costs associated with the production of goods and services. It is mainly made up of costs of raw materials, labour costs and other costs required in the actual production process. It varies depending on

the quantity of production (Goestjahjanti & Widayat, 2019). It does not include statutory administrative expenses such as office expenses, staff salaries or marketing costs.

Cost Benefit Ratio (CBR): The cost-benefit ratio (CBR) is a financial ratio that establishes the association between production cost and financial benefits of the product (Jiang & Marggraf, 2021). In practice, a commodity with a CBR greater than 1.0, product is anticipated to generate a positive net present value to a firm and its investors. It is expressed as:

$$\text{Cost Benefit Ratio (CBR)} = \frac{\text{Total Revenue}}{\text{Total Cost}} \quad (2)$$

Cost Efficiency (cost per unit): According to Narawisha et al. (2021), cost efficiency is defined as *the ratio of cost to a product*. It is a measure of how much resources are used to produce a given quantity of goods. It is expressed as

$$\text{Cost Efficiency} = \frac{\text{Total Cost of Production}}{\text{Total Quantity of Output}} \quad (3)$$

Results

Calculations were done on the assumption of a weekly output and sale of 1000 units per week of SORIT bread and an annual depreciation of 10%.

Table 1: Cost analysis for fixed cost for the bakery unit.

Item	Quantity	Unit Cost (N)	Total Cost (N)	Life Span	Annual Depreciation (N)
Bakery House Rent)		450,000.00	450,000.00	-	45,000.00
Oven	4	300,000.00	1,200,000.00	10	120,000.00
Pan	1200	550.00	660,000.00	5	66,000.00
Water tank	2	80,000.00	160,000.00	10	16,000.00
vehicle	1	850,000.00	850,000.00	15	85,000.00
Kneading Machine	2	143,000.00	286,000.00	15	28,600.00
Industrial Mixer	1	900,000.00	900,000.00	20	90,000.00
Art Cooler	1	68,000.00	68,000.00	8	6,800.00
Table	5	5,000.00	25,000.00	5	2,500.00
Basin	5	1,000.00	5,000.00	5	500.00
Knives	5	1,000.00	5,000.00	5	500.00
Bread Slicer	1	400,000.00	400,000.00	4	40,000.00
Total			**5,009,000.00**		**484,900.00**

Table 1 indicates that the total capital cost for setting up a bakery with the capacity to produce 1000 units of Sorit bread per week is N5,009,000.00. This cost is relatively affordable. The cost is low because the volume of production is very low. The volume of production was determined using the lowest possible market entry position.

Table 2: Cost analysis for operating cost for the bakery unit per week.

Ingredient	Quantity	Unit Cost (N)	Total Cost (N)
Wheat flour	2 bags	40,000.00	80,000.00
Rice flour	2 bags	32, 000.00	64,000.00
Soya bean flour	2 bags	28,500.00	57,000.00
Sugar	1 bag	12,000.00	12,000.00
Butter	4 buckets	6,000.00	24,000.00
Yeast	12 sachets	3,000.00	36,000.00
Flavor	20 bottles	1,000.00	20,000.00
Egg	12 crates	4,000.00	48,000.00
Salt	2 bags	9,000.00	18,000.00
Baking powder	6 big cans	3,000.00	18,000.00
Milk	5 cartons	4,000.00	20,000.00
Others			30,000.00
Total			**427,000.00**

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Table 2 indicates the total operating cost per week for the production of 1000 units of Sorit bread. Therefore, the operating cost for a month will be N427,000.00 x 4 weeks Operating cost/month = N1,708,000.00.

Table 3: Cost analysis for variable cost for the bakery unit per month

Item	Unit Cost/ week (N)	Total Cost (N)
Light Bill	15,000.00	60,000.00
Alternative Power		100,000.00
Labour (5)		75,000.00
Maintenance		50,000.00
Miscellaneous		80,000.00
Total		**490,000.00**

Total variable cost is the sum of the operating cost plus the variable cost.

$$\text{Total variable Cost} = \text{N1,708,000.00} + \text{N490,000.00} = \text{N2,198,000.00}$$

Thus, the total variable cost is N2,198,000.00 per month. Thus, the total variable cost for the year is N26,376,000.00 (2,198,000 x 12).

The total cost of production is

$$\text{Total Cost} = \text{total fixed cost} + \text{total variable cost}$$

$$\text{Total cost} = \text{N5,009,000.00} + \text{N26,376,000.00}$$

$$\text{Total Cost} = \text{N31,385,000.00}$$

Table 4 is the cost analysis for total revenue per week from the sale of SORIT bread based on total production and sales of 1000 units per week at the cost price of N700.00 per unit

Table 4: Revenue from the sale of 1000 units of SORIT bread per week

Item	Unit Sales Price (N)	Total Sales Price (N)
1000 units of SORIT Bread	700.00	700,000.00

Thus, total revenue for a year is equal to N700,000.00 times 52 weeks which is N36,400,000.00 in a year.

Table 5: Summary of the cost analysis showing the result for gross margin, cost-benefit ratio and cost efficiency.

Cost Analysis	Value (N)
Gross Profit Margin	5,015,000.00
Cost Benefit Ratio	1.16
Cost efficiency	603.56

Table 5 indicates that the production and sale of 1000 units of SORIT bread weekly gives a profit margin of N5,015,000.00 in a year which indicates that the commercialization of SORIT bread is a very profitable venture like that of cassava flour-based bread (Yahaya, 2016).

Discussion

The capital cost in Table 1 is N5,009,000.00 while the operating cost per week was estimated to be N427,000. This implies that the minimum start-up cost for the bakery is about N12,331,000. This is the sum of the capital cost, variable cost and operational costs for three months. This is because, in practice, there are unplanned production and other challenges that may arise to halt production, thus having this fund available helps in addressing these challenges quickly to ensure that production is continuous during the market entry stage (Yahaya et al., 2017). Evaluation of the variable cost indicates that about 75% of the costs are associated with the provision of alternative power mainly through gasoline or diesel generators. Thus, in a country with an adequate power supply, such costs would have been

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avoided. Consequently, it is responsible for about a 10% increase in the start-up cost for this bread enterprise. This agrees with the continuous reports of the Manufacturers Association of Nigeria (MAN) that inadequate power is the biggest challenge facing the SMES industries in Nigeria and is also a main channel for the transfer of inflation from rising costs of petroleum products into food items (Adewole & Omowole, 2018). An evaluation of the operational costs indicates that the purchase of flour is responsible for about 47% of operational costs per week, this is more favourable when compared to the use of only wheat flour which amounts to about 60% of operational costs per week. Thus, the use of composite flour results in a 13% savings in operational costs.

Comparing the total cost and total sales indicates a breakeven period within 9 months which is very good noting the scale of production, this implies that increasing the scale of production may increase the breakeven period as capital costs increase with the scale of production though production costs may reduce. Table 5 indicates that the production and sale of 1000 units of SORIT bread weekly gives a profit margin of N5,015,000.00 in a year which indicates that the commercialization of SORIT bread is a very profitable venture like that of cassava flour-based bread (Yahaya et al., 2017). The cost-benefit ratio indicates that for every N1.00 naira spent on the production of SORIT bread, the investor receives a benefit of N1.16. This is high when compared to the cost-benefit ratio for other types of bread production (Mgbakor et al., 2014). This implies that this bread enterprise has a return on investment of about 16% which is satisfactory as it is in line with industry standards Also, the cost efficiency shows that the cost of producing one unit of SORIT bread is N603.56 thus indicating a 14% profit margin when compared to the industry standard of 10 - 15% (Olumuyiwa & Ellawule, 2020).

Conclusion

This paper has successfully implemented a cost analysis of Sorit bread production. The analysis was done using the least possible market entry position of 100 units of Sorit bread per week The findings of the cost analysis carried out for the production of SORIT Bread have shown that it has a higher profitability margin when compared with other bread production which were reviewed in the literature. Thus, this paper concludes that the commercialization of SORIT bread is a very profitable venture as it has proven to be a very cost-efficient enterprise.

Recommendations

Based on the conclusion, the following recommendations are made:

- This paper strongly recommends proceeding with the commercialization of SORIT bread, as it has been demonstrated to be a highly profitable venture
- Brand Promotion: Implement robust marketing strategies to raise awareness and promote the benefits of SORIT bread. Utilize digital marketing channels, social media platforms, and traditional advertising methods to engage with consumers and communicate the value proposition of the product.
- Partnerships and Collaborations: Explore opportunities for strategic partnerships or collaborations with other food manufacturers, suppliers, or industry stakeholders to leverage synergies, streamline operations, and expand market opportunities.

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