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Wheat or cassava flour? Marketing and willingness to pay for cassava flour confectionery in Nigeria

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Abstract

Food systems and diets are constantly evolving, and the contributing factors are complex and have remained controversial among researchers. While studies have considered and compared utilization of wheat flour and High Quality Cassava Flour (HQCF) in confectioneries, no study has assessed willingness to purchase confectioneries made from cassava flour in relation to the global supply disruption emanating from the Russia-Ukraine war, leading to high demand and pressure on wheat flour. This study examined consumers' perception of cassava flour confectioneries and estimated contributing factors. A cross-sectional survey and multi-stage random sampling technique were employed to select 120 respondents from Abia State, Nigeria, while the Researchers analyzed the data with descriptive and regression statistics. Findings show that taste, awareness, odour, and availability of confectioneries with cassava flour inclusion shaped consumers' perceptions. The majority of the samples from our study believe that the taste and odour (aroma) of the product must be tweaked to suit global best practices, as well as the need to make the product readily

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available at strategic location and at the right price to reflect the prevailing income and economic realities in Nigeria. Therefore, these factors can be improved and used to build a positioning and brand strategy.

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Introduction

One of the significant lessons from both the Covid-19 pandemic and the Russia-Ukraine war is that the global food system is broken (Arndt *et al*., 2020). This is hardly surprising given the relationship between adverse economic and social shocks on the one hand and conflicts related to food and nutrition insecurity on the other (D'Souza & Jolliffe, 2013), which further exacerbate food insecurity, child malnutrition, hunger, poverty, and other health-related crises (Headey *et al*., 2020). Ukraine and Russia are the major exporters of agricultural commodities worldwide, including wheat, a major food security crop (Acevedo *et al*., 2018), supplying more than 45% of the global wheat market (FAO, 2022). Unfortunately, the war has disrupted the supply of wheat and the global supply chain in a magnitude the world has not experienced since World War II and Covid-19 (Jagtap *et al*., 2022), with a spillover effect on the price of essential commodities and energy crisis in Europe and America (Mbah & Wasum, 2022). This has further increased food insecurity in many parts of developing economies such as Africa, including those with a severe humanitarian crisis like Ethiopia (Analytica, 2022; Ben-Hassen & Bilali, 2022), since they import more than 85% of their wheat for value-added production from Russia and Ukraine (Kammer *et al*., 2022), despite their capacity to produce wheat in large quantity.

Although Nigeria produces wheat and has fertile soil under irrigation in most parts of the northern geopolitical zones, its combined production capacity is low (Hesser, 2019) compared with countries with less agricultural land mass. According to Nigeria Bureau of Statistics (NBS) report, in 2021, despite annual wheat demand of between 4.5 million to 5 million metric tons, Nigeria produced only 36,943.8 metric tons (Okojie, 2022), hence it is dependent on importation of wheat to meet local demand of its confectionery and food market. The implication is a demand-supply gap with spillover effect on the price of Nigeria-produced wheat; hence unattractive to large agribusiness enterprises that depend on wheat for production (Hesser, 2019). Wheat importation in Nigeria rose from 78,000 metric tons in 1960 to 4,051,000 MT in 2010; to 4,800,000 MT in 2018 (Shittu & Sowunmi, 2019), with estimated import cost of over $ 2.15 billion in 2020 (Balana *et al*., 2022). This shows that as the population and demand for wheat by-

products increases, importation also increases, with its attendant effect on the consumer food price index, foreign exchange reserve and the drive for wheat self-sufficiency plans. Unfortunately, this import trend will continue unless there is a potential change in strategy and policy that ensures higher availability of improved seeds and the adoption of mitigation and adaptation strategies for climate change (Balana *et al.*, 2022; Tadesse *et al.*, 2018; Falola *et al.*, 2017).

Wheat production and consumption in Nigeria are not mutually exclusive. Two key factors are mentioned in this context. First, the high demand for confectioneries such as bread, cake, meat-pie, doughnut and others (Ohimain, 2014; Shittu & Sowunmi, 2019), has led to the proliferation of fast-food restaurants in major cities across Nigeria (Mustapha *et al.*, 2014). Second is the issue of low production capability of Nigeria because it is produced by resource-poor farmers who constitute more than 60% of all farm holdings in Nigeria (Oteh & Nwachukwu, 2014), lack of availability of improved seeds (Tadesse *et al.*, 2018) leading to inability of the local farmers to meet with rising demand. These impacts negatively on access, availability, and affordability of wheat by agribusiness enterprises, with spillover effect on the price of essential food products in Nigeria.

High Quality Cassava Flour – A viable food security alternative

For several years now, Nigeria government has consistently tweaked its policy to reduce wheat importation since the gap between local production and importation is wide. In order to reduce importation of wheat by 50%, the government launched the Presidential Cassava Master Plan in 2003, which targets the inclusion of 10% High Quality Cassava Flour (HQCF) in confectioneries (Ohimain, 2015), because pieces of evidence have shown that wheat flour can be successfully substituted with cassava flour in bread and other confectioneries (IITA, 2002; Giami *et al.*, 2004; Nangano *et al.*, 2005). This potential strategy was strategic to the 2011 cassava master plan under the Agricultural Transformation Agenda (ATA) to improve the cassava value chain and replace imported wheat flour in confectioneries with a USD 60 million cassava bread fund (Hesser, 2019).

Cassava is an essential staple and cash crop providing diets to billions of people globally (Zhu *et al.*, 2015). Nigeria is the world's highest cassava producer (Ikuemonisan *et al.*, 2020) because its agroecological terrain favours its cassava production (Akinwale *et al.*, 2010). In Africa and many developing countries, most people depend on and consume it to obtain their daily 40-50% calories (Oteh & Nwachukwu, 2014). As a food security crop (Wilson *et al.*, 2015), cassava is produced widely by poor resource food producers in many rural areas of Nigeria (Adepoju &

Oyewole, 2013), producing more than 60 million metric tons (FAOSTAT, 2019). Unfortunately, about 90% of the combined production is consumed locally (Ikuemonisan *et al.*, 2020), so Nigeria is not considered a major global player in the global cassava trade (Hesser, 2019).

In recent time, as food system and diets are evolving due to enhanced globalization and rapid urbanization, improved value addition in cassava products have made cassava now more popular. and demand has continued to rise, creating economic opportunities and incentives for economic agents in the cassava market system (Ezedinma *et al.*, 2007). This has led to a significant focus on cassava diversification to industrial-scale food and value addition such as soy-cassava flour (Ugwu & Ukpabi, 2002), 10% ethanol in gasoline (Olakunle, 2016), and replacing up to 20% of imported wheat flour with cassava flour (Hershey, 2017). Thus, helping to alleviate poverty and improve food security for consumers and producers in Nigeria (Adebayo & Siberberger, 2020). Therefore, introduction of cassava floor in confectioneries aimed to utilize cassava in bridging food security, rural development, and economic growth in Nigeria (FAO, 2018).

Cassava flour food system and challenges

Although challenges of cassava production and marketing have been extensively researched (See, Nwachukwu & Oteh, 2014; Ezedinma *et al.*, 2007; Akerele *et al.*, 2019; Agbaeze *et al.*, 2020; Elegbede *et al.*, 2018; Ehinmowo *et al.*, 2015), also, cassava flour in Nigeria (Otekunrin & Sawicka, 2019; Adefisayo *et al.*, 2022; Ohimain, 2014), there is a need for further insights as food systems evolve to incentivise local production of alternatives to wheat flour following the disruption in wheat supply in recent time (Ben Hassen & Bilali, 2022; Liadze *et al.*, 2022). Globally, the demand-supply gap on wheat has opened economic opportunities for Nigeria's cassava value chain, including enhancing value and access for HQCF, starch, ethanol and animal feed. Particularly on the producer side, HQCF faces demand/supply and acceptance issues (Lamboll *et al.*, 2018). It is not enough to produce a unique product and price it attractively (Kotler & Armstrong, 2015); central to demand is consumer capabilities in terms of availability of resources, knowledge and mindset to purchase (Oteh *et al.*, 2020). As such, willingness is at the bedrock of consumer demand (Ahmad-Hanis *et al.*, 2012). Given this, the study considers the willingness of Nigerians to accept, in absolute value terms, the inclusion of cassava flour in the production of confectioneries.

Generally, food system is complex (De Carvalho *et al.*, 2021), with several trade-offs (Mausch *et al.*, 2020) and often challenged by inconsistent policies (Hoes *et al.*, 2019). Over the years, Nigeria has witnessed a plethora of agri-

food policies that changes frequently (Arif, 2019; Owolabi *et al.*, 2016). This was the experience of the composite flour and cassava flour with government policies in Nigeria. Prior evidence shows that incoherent policies affected the adoption of Nigeria's national food policy on the use of composite flour; hence millers are reluctant to implement it in their production (Ohiamain, 2014). The initial 5 year implementation gap of mainstreaming cassava flour into confectionery products created mistrust among stakeholders, negatively impacting investment in cassava production and processing by large integrated processors. Only one of the 12 processing factories operated above 50% capacity (Hesser, 2019). Delayed implementation of policies leads to policy failure, market access and supply chain dynamics (Ambali & Murana, 2017; Blizkovsky *et al.*, 2018) and an exacerbate food security crisis (Eme *et al.*, 2014). Although the USAID-funded program called MARKET II, which developed a Cassava Supply Management System to manage supply chain activities in the cassava value chain (Hesser, 2019), has been successful and has increased production and adoption of cassava flour by confectioneries from 3.3% in 2010 to over 90% in 2017; recent evidence shows the initial reluctance persists. The reluctance to adopt is attributed to the producers' perception and quality assurance crisis (Onyekuru *et al.*, 2019), availability and price of cassava (Lamboll *et al.*, 2018; Hershey, 2017), lack of collaboration between the public and private sector in the food ecosystem (Pereira, 2019), including lacks market infrastructures.

Marketing issues: Consumer willingness

This current study is based on the premise that consumer demand determines supply. Therefore, the theoretical basis hinged on consumer willingness to buy confectioneries made with cassava flour. Consumers are critical to adopting confectioneries made from cassava flour as they represent the market for such products and determines its adoption. From the marketing perspective, consumer willingness to buy is explained from the lens of intention to purchase (Phau *et al.*, 2009; Purnama *et al.*, 2021), and lies between attitudes and behaviour (Yadav & Pathak, 2016), which is influenced by convergence of factors.

The adoption process follows diverse patterns and involves complex interactions of factors. They involve the convergence of social, economic and environmental factors such as seen and unseen relative cognitive values that includes taste, colour, odour (Nwachukwu *et al.*, 2010; Ohiamain, 2014), socioeconomic factors (Kohansal & Firoozzare, 2013) and food safety (Yang & Fang, 2021) that shape food choices. Other factors include certification and regulatory system (Yormirzoev & Teuber, 2021), perception of benefits and risk (Ali & Ali, 2020; Zhu *et al.*, 2018), economic and environmental

factors (Kucher *et al*., 2019; De Steur *et al*., 2019) such as consumer response to price (Kamaludin *et al*., 2013), trust (Purnama *et al*., 2021), information and consumer knowledge (Zhu *et al*., 2018; Piha *et al*., 2018), and food expenditure and budget (Buder *et al*., 2014), market structure and infrastructures (Elemo, 2013).

Progress in scaling up the adoption and marketing of HQCF made confectioneries must focus only on understanding dynamics of consumer demand. This understanding is consequential in improving marketing and investment in the cassava value chain. This study examines the need to understand consumer attitude towards confectioneries made with HQCF, focusing on Nigeria inclusion and use of cassava flour as an alternative to wheat. The analysis of this study from the perception and estimated factors are critical as it provides information to address policy gaps, investment, and diversification of consumer food baskets. Therefore, this will help agri-marketing institutions to be more effective in building a food system that delivers better outcome for both the consumer and firms.

1. Methodology

Study area

The study was carried out among consumers of cassava confectioneries in the three geographical zones of Abia State, Nigeria. Abia state is one of the states in Nigeria with high investment in cassava production and consumption; as a result, Nigeria Government planned to set up cassava processing plant in the State through the Federal Institute of Industrial Research Oshodi (FIIRO) (Abdulkareem, 2019).

Sampling procedure

In close consultation with the Small and Medium Enterprise Development Agency of Nigeria (SMEDAN) and the Agricultural Development Programme (ADP), a cross-sectional survey research design was developed for the target consumers. As a result, a multi-stage random sampling technique was employed in selecting locations and respondents. The first stage involved a purposive selection of major cities in each of the three agricultural and senatorial zones in Abia-Aba (Abia South), Umuahia (Abia Central) and Ohafia (Abia North). The selected locations were chosen based on their cosmopolitan nature and high consumption of cassava value additions.

The second stage involved a random selection of three axes from each of the elected cities; hence we have Aba-Ogbor-hill axis, Ngwa Road axis and

Osisioma axis; the Umuahia-Agbama Housing Estate axis, World Bank and Ehimiri Housing Estate axis; and Ohafia-Isiama axis, Arochukwu axis and Bende axis. The final stage involved a random selection of 15 households from each of these axes. A total of one hundred and twenty (120) respondents were targeted and used for this study.

Method of Data Analysis

A mixture of descriptive and inferential statistics such as logistic regression was used to analyse this study's data based on the study objectives' characteristics and nature.

The simple Probit regression model is specified as:

$$Y = \beta_i X_i + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 \ldots \beta_n X_n + U_i$$

Where Y = Consumers' willingness to pay for confectioneries with cassava flour inclusion (willingness to pay = 1, otherwise = 0)

The dependent variables are as earlier defined, and the explanatory variables are defined in Table 1. The explanatory variables constitute identified factors consistent with a *priori* theoretical expectations and the results from previous empirical factors that mitigate the production and marketing of food and cassava flour.

Table 1 - Description of Covariates used in the regression

Variables	Description	Type	Measurement	Expected sign
Household size (X1)	Number of household members living in the same house	Continuous	Number	+/–
Age (X2)	Age of head of household	Continuous	Number	+
Education (X3)	Years spent in school	Continuous	Number of years	+
Sex (X4)	Gender of the respondents	Binary	1 = male, 0 = female	+/–
Perception (X5)	Interpretation and feeling toward cassava made from HQCF	Binary	1 = favorable, 0 = unfavorable	–
Household income (X6)	Monthly income of the household	Continuous	Currency (Naira)	+/–
Share of food Expenditure (X7)	Share of expenditure spent on confectioneries	Continuous	Naira	–

Source: Computed by authors.

2. Results

Sample Descriptive

Analysis of the socio-demographics of the respondents reflects the diversity of the study population (Table 2) and shows that majority were young and within their economically active or working-age population. The majority of the respondents are female (57.5%), which shows that females dominate decision concerning food decisions in the family and reflects a typical household reality (See, Sariyev *et al*., 2020; Wood *et al*., 2018). Most of the

Table 2 - Socio-demographic characteristics (n = 120)

Socio-demographic variables	Frequency	% of sample n = 120
Age		
20-29	38	31.7
30-39	38	31.7
40-49	22	18.3
50-above	22	18.3
Sex		
Male	51	42.5
Female	69	57.5
Household size		
0-3	49	40.8
4-7	63	52.5
8-10	8	6.7
Educational level		
FSLC	7	5.83
WAEC/GCE	77	64.2
OND/NCE	31	25.8
HND/B.Sc	5	4.2
Income (₦)		
Less than 3000	2	1.7
3,000-30,000	44	36.7
31,000-43,000	39	32.5
44,000-150,000	29	29.2
Marital Status		
Married	70	58.3
Single	50	41.7

NB: FSLC = First School Leaving Certificate; WACE = West Africa Examination Certificate; GCE = General Certificate Examination; OND = Ordinary National Diploma; HND = Higher National Diploma, B.Sc = Bachelor of Science Degree.

respondents' highest education level was secondary school level (64.2%), with about 36% earning at least the National minimum wage of NGN 30 000. Interestingly, most of them are married (58.3%), which implies that they have added responsibility in terms of increased food expenditure. Evidence shows a nexus between family size, food expenditure and food security (Ahmed *et al*., 2017; Zani *et al*., 2019).

Confectioneries preferred by consumers

Regarding the type of confectioneries preferred by consumers, on average, consumers prefer bread more than other types of confectioneries in the study area, as shown in Table 3. The four significant preferences are bread (58.3%), egg rolls (10.8%), Chin-Chin (A famous Nigerian fried snack) (9.2%) and meat pie (7.5%). This result suggests that majority of the respondents would also prefer bread to other cassava flour confectioneries given that it is a choice food due to its accessibility, affordability, and preference among all age brackets and because it delivers daily energy requirements for households (llktac *et al*., 2021).

Table 3 - Types of confectioneries preferred by consumers

Types	Frequency	Percentage
Bread	70	58.3
Chin-Chin	11	9.2
Cake	5	4.2
Doughnut	4	3.3
Meat pie	9	7.5
Egg roll	13	10.8
Buns	8	6.7
Total	*120*	*100.0*

Source: Author's computation.

Perception of Consumers

Regarding consumer perception of confectioneries made from cassava flour, Table 4 shows consumer disagreement based on some sensory evaluation of the confectioneries, awareness and economic factors such as price. Most consumers (66.7%) perceived cassava confectioneries are not tasty, while a small proportion, 33.3%, perceived the confectioneries to be tasty. The high percentage difference indicates a more profound concern

for the taste of confectioneries made with cassava flour. More so, there is poor awareness of cassava flour confectioneries among consumers (60.3%), which has affected its popularity and limited knowledge of its advantages and nutritive properties. The lack of awareness has affected the popularity of cassava flour-baked confectioneries.

Regarding smell and odour, 62.5% of the sample complained that confectioneries with cassava flour have unpleasant smells or odours which are unattractive to them. This could be a result of the poor quality of the cassava and the supply of partially fermented cassava to bakers; this affects the product quality hence the offensive odour (Ohimain, 2014; UNIDO/FGN, 2006).

Despite the criticism and efforts by the government to improve knowledge, the majority of the sample (72.5%) complained of the unavailability of baked goods with cassava flour; most bakers deny the use of cassava flour in baking and this has increased the scarcity of cassava baked products in the study area. A plausible explanation could be the lack of differentiation between confectioneries made from wheat and cassava due to the absence of labelling information. Finally, the respondents were indifferent to the price of cassava-baked products in the study area. This could result from the relatively low price paid for cassava flour confectioneries, as wheat importation has made the confectioneries highly expensive (Maziya-Dixon *et al.*, 2017).

Table 4 - Perception of consumers on the purchase of cassava flour confectioneries

Perception		**% of sample**
Taste	Tasty	33.3
	Not tasty	66.7
Awareness	Poor awareness	60.3
	High awareness	39.2
Odour	Bad odour	62.5
	Odour free	37.5
Availability	Available	27.5
	Unavailable	72.5
Price	Expensive	50.0
	Not expensive	50.0

Source: Author's computation.

Factors influencing Consumer's willingness to pay for Cassava Confectioneries

A probit regression was performed to identify impact of explanatory variables on the likelihood that consumers would be or not be willing or indifferent to pay for confectioneries baked with cassava flour. The result of the Probit regression, including the estimates (Exp (β)) and their confidence intervals and significance levels, and Chi-square of the model are presented in Table 5. The full model with all eight predictors was statistically significant as shown by the $\chi^2 = 110.64$ ($p < 0.001$), indicating that it captures the preference of consumers who are willing and those not willing to pay for confectioneries made form cassava flour.

Table 5 - Factors influencing consumer's willingness to pay for Cassava confectioneries

Variable	Estimate	Std. Error	Z-statistics	Sig
Age	-0.0008	0.066	-1.383	0.167
Sex	-0.229	0.091	-2.516**	0.010
HHS	0.049	0.025	1.988*	0.054
Education	-0.003	0.025	-0.103	0.918
Income	1.354	0.303	4.469***	0.000
Size of Bread	-0.844	0.311	-2.714***	0.000
Cassava flour perception	0.745	0.37	5.440***	0.000
Marital Status	-0.023	0.093	-0.250	0.803
Chi-square	110.638**			

* Significant 10%, ** Significant 5%, *** Significant at 1%.

Source: Author's computation.

Table 5 shows that five independent explanatory variables were found to be significant, and they include sex, household size, education, income, size of bread, and perception. From the result, consumers are less likely to purchase confectioneries made from cassava flour if they are male than female; because female consumers make most of the household food decisions or when their household size is large, as economic benefits will determine their purchase more than other factors. The result shows that a unit increase in income will increase the likelihood of paying for confectioneries made from cassava flour by a factor of 1.35, or 0.84 for a unit decrease in size of the bread or 0.75 for each unit increase in how consumers perceive cassava flour as shown by the co-efficient.

3. Discussion

Consumers are vital when discussing potential strategies to scale up demand for any product because they constitute the market for goods and services (Kotler & Armstrong, 2015; Plasek & Temesi, 2019). Our study examined the key factors influencing willingness to purchase confectioneries made from cassava flour. Cassava flour is among the alternatives to wheat flour and provides many economic benefits such as availability and affordability, including nutritional benefits and advancing food security conversation (Eleazu *et al*., 2014; Maziya-Dixon *et al*., 2017; Lamboll *et al*., 2018). This research contributes to measures to scale up cassava diversification and identify the right market for this product. In doing this, we examined the potential market opportunity for cassava flour and confectioneries' potential alternatives. Our study area is a strategic cassava hotspot in Nigeria, with huge production and consumption of cassava; therefore, our findings provide important insights that will improve marketing, diversification and investment in the cassava value chain in Nigeria.

Perception of consumers on confectioneries made from cassava flour

Taste is an important consideration that people bring to food decisions, including cost and health (Sobal & Bisogni, 2009), even among children (Pearce *et al*., 2020). Our study shows that consumers believe that confectioneries made from cassava flour are not as tasteful as those from wheat flour. This finding is disturbing and does not agree with other sensory studies on HQCF in Nigeria and other African countries. Prior studies show that sensory evaluation shows a high level of acceptance in terms of aroma, taste, colour and crispiness (Sampson, 2020; Maziya-Dixon *et al*., 2017; Nurdjanah *et al*., 2020). The study of Owusu *et al*. (2017) observed that consumers are aware of products made from cassava flour and, based on their taste, are willing to purchase it. The plausible explanation for this difference is the subjective nature of taste and consumer preference (Chen, 2010). This study, therefore, highlights the importance of using taste as a critical element in branding and positioning strategy in order to build a strong perception (Ghose & Lowengart, 2001) for cassava flour blended confectioneries, given that evidence shows that consumers will buy and pay a premium more cassava based product if they are tasty (Adepoju, & Oyewole, 2013; Akanwasa, 2007).

Concerning awareness, consumer knowledge about cassava flour blended confectioneries is poor. This study highlighted this poor awareness, as more than half of the sample (60.3%) confirmed. The poor awareness level may be

because the machinery of communication employed by both government and private businesses is not deep enough to steer overwhelming patronage (Oteh *et al*., 2020), affecting the drive to scale up demand and change consumer perception (Elemo, 2013). Evidence indicated a nexus between awareness and food acceptance (Foley *et al*., 2021; Zhang *et al*., 2020). This result indicates that knowledge about cassava flour inclusion can be improved and supports the need to enhance consumer education and information machinery to change consumer perception and enhance demand for confectioneries with cassava flour inclusion. While our study established that a majority of consumers are concerned about the product's odour, which makes it unattractive to them. A plausible explanation could be the poor quality of the cassava and the supply of partially fermented cassava to bakers, leading to an offensive odour (Ohimain, 2014; UNIDO/FGN, 2006). However, recent studies such as Sampson (2020) show a high level of acceptance based on its sensory properties. Improvement in cassava varieties and methods of production of cassava flour over the years and in recent times may have contributed to improving the quality of HQCF because evidence shows that bread from HQCF is not different from those made from 100% wheat flour in texture and colour though the flavour may not be the same (Akintayo *et al*., 2020). Therefore, quality cassava flour can serve as a viable alternative to wheat (Sampson, 2020) with good outcomes.

The availability of cassava flour is determined by two factors – investment and production of cassava and supply of HQCF in the market. Unfortunately, policy inconsistency, demand and supply of HQCF, and seed and energy issues disrupt the availability of HQCF and its utilisation in confectioneries (Lamboll *et al*., 2018). Evidence shows that bakers are willing to use and include HQCF in their operations if it is readily available in the market (Olayimika *et al*., 2015). Our study suggests that improving the supply of HQCF may also result in improved utilisation and consequent consumer demand. Lack of availability creates scarcity and an impact on price. Although the result shows that consumers are indifferent concerning price, it contradicts Adepoju & Oyewole (2013) and Chabikuli (2011) findings. The cost of production determines the price. A producer will conduct a cost-benefit analysis to determine an acceptable price for its product taking into cognisance other factors. Evidence shows that the market price for HQCF is lower than wheat flour (Olayimika *et al*., 2015) and this may impact on final price consumers pay for choice confectioneries, given that a typical Nigeria consumer is price sensitive (Nwachukwu *et al*., 2011) and want to maximise value for amount paid. However, where product information is absent, consumers may not be averse to changes in production and may base their decision on experience. The reality of Nigeria's confectionery market shows that most consumers are unaware that most bread they consume is blended with cassava flour in line with Nigeria's agricultural food policy.

Factors influencing willingness to purchase

Our study identified several factors that influence willingness to pay for cassava flour blended confectioneries and advanced the conversation around building a strong positive perception for novel food to enhance its brand image (Owusu *et al*., 2017). The perception coefficient was positive and significant at a 1% level, indicating that as perception increase, more consumers will be willingness to pay for the product (Oni *et al*., 2005). This could be sustained by improving awareness and food literacy through advertising and other communication machinery. Also by positioning the brand using identified intrinsic and extrinsic value of cassava flour to Nigeria cassava diversification and food systems.

From the result, gender significantly affected the likelihood to pay for confectioneries made from cassava flour. This suggests that though both genders make household food decision, females as homemakers and caregivers will be more likely to pay for cassava confectioneries than their male counterparts. This contradicts other studies where a positive effect of gender on willingness to pay was established (Osuji, 2010). Our result lends credence to the difference that manifest in overall preference between male and female in food selection and aligns with the view that preference for snacks is influenced by social-environmental and biological factors than based on gender (Alamu *et al*., 2020).

Cassava is known to possess a high level of starch. With this quality, the consumption of it can take care of family needs in terms of satisfaction. Besides, evidence shows that cassava flour blended confectioneries are cheaper than those made from 100% wheat due to the cost of HQCF (Olayimika *et al*., 2015). Therefore, this may appeal to large families due to current food inflation and general economic situations in Nigeria, leading to demand for alternatives (Adeyonu *et al*., 2021) to escape the food insecurity trap. This underpins the importance of advancing conversation for buying locally to grow the local economy and also segmenting this product as a cost-effective food alternative because it provides economic value and other benefits, hence serving as a motivating factor (Klümper& Qaim, 2014). This result justified the significant positive effect of income on the likelihood of paying. Evidence shows a nexus between income growth and willingness to pay for food items (Wang *et al*., 2020). As income increases, the probability of a household's willingness to pay for cassava flour confectioneries increases because they consider them as better alternatives. From the economic theory perspective, an income increase will result in higher demand for food. Therefore, given Nigeria's population and income growth, cassava flour blended confectioneries have huge market potential, as an example of China shows (See Riccioli *et al*., 2020), as they may see this product as a novel

brand, thus enhancing its value (Lusk, 2019). Therefore, like other brands, it needs to enhance its packaging and ensure availability.

From this result, our sample believed that the breads' size is unimportant given the significant negative value it commands. This implies that, on average, if an extra size is to be added to bread, it will lead to a decrease in willingness to pay in the area, but concerns about quality and satisfaction obtainable from consuming good bread may compensate for the quantity.

Conclusion and implication on agri-marketing

The Russia-Ukraine war is having a direct effect on most agricultural commodities, especially wheat. This has put a lot of strain on the confectioneries industry, which depends on wheat to bake confectioneries. This study has, however, opened conversation on the value of cassava flour as a viable alternative to wheat flour. Importantly, it gave insight into the willingness of Nigerian consumers to pay for it and escape the food insecurity trap occasioned by disruption in global food supply. The majority of the samples from our study believe that the product's taste and odour (aroma) must be tweaked to suit changing global best trends, as well as the need to make the product readily available at strategic locations, with improved marketing communication strategy. Therefore, these factors can be improved and used to build a good positioning and brand strategy. Cassava is a staple food with numerous uses and by products; The same is true of confectionery foods with diverse uses, such as bread, biscuits, cakes, and Chin-chin and could be made from cassava flour and consumed by people of different classes, as evidence shows that it is not different from 100% wheat flour. However, in most places, there is low awareness of its existence and nutritional and economic values. Increasing knowledge about this product, packaging and labelling improves consumer's attitudes toward cassava flour blended confectioneries.

Based on preference and evidence, this product has high market potential, but its success will not hinge only on consumers; the government needs to improve policies around the cassava value chain and diversification. Poor policy and lack of consistency of policies towards the use of composite flour and cassava flour in baking has affected its use in baking, hence it is recommended that government should ensure implementation of its polcies on mainstreaming at least 20% cassava flour on confectioneries. This will drive demand and improve investment in cassava production and its value chain, with a spillover effect on other aspect of the marketing and market system.

Quality is a serious concern to consumers as it impacts their health. Improving quality through adopting modern cassava processing

infrastructures will enhance the development of composite flour and cassava flour confectioneries, and further influence consumer interest. Finally, government and other stakeholders should embark on rigorous campaigns and educate Nigeria's about the health benefits of consuming confectioneries with percentage of cassava inclusion. Our study provided valuable insight into the need to improve awareness and perception to improve demand for cassava-based confectioneries.

We acknowledged that our study faces some limitations. Our data was drawn from one State in Nigeria, which may raise a concern about its use in generalization but notwithstanding, our study achieved its objectives. The variables we have included also may not have captured all the basic values, but we are mindful that some of those have been taken care of by other studies including the issue of sensory evaluation and other properties and chemical. This study aims to identify fundamental contributing factors influencing willingness to pay and improve demand. It also serves as a major contribution to other studies in advancing conversation around cassava value chain diversification in Nigeria. Future studies may benefits from including more variables and test sensory attributes that are consistent with changing consumer trends. Importantly, increasing the sample may give the work a much different outcome.

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