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Perceived behavioural control, consumer attitudes, and willingness to pay for maize-based beer in the tamale metropolis of Ghana: Evidence from Accra brewery Limited's eagle stout

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Abstract

Understanding consumer willingness to pay (WTP) for locally produced beverages is critical for breweries seeking to displace imported inputs with local agricultural commodities. This article draws on primary survey data collected from 400 respondents in the Tamale Metropolis, Ghana, to empirically examine the determinants of WTP for Eagle Stout, Accra Brewery Limited's maize-based beer. Guided by the Theory of Planned Behaviour (TPB) and Willingness to Pay (WTP) theoretical models, the study used multiple linear regression analysis to identify significant predictors of WTP. Results showed that perceived behavioural control (PBC) ($\beta = 0.27, p < 0.001$) and attitude toward maize-based beer ($\beta = 0.24, p = 0.002$) were the two most significant predictors of WTP. Additionally, Pearson correlation analysis confirmed a statistically significant and positive relationship between consumer acceptance and WTP ($r = 0.46, p < 0.001$), indicating that acceptance serves as a meaningful economic gateway. These findings affirm that affordability, product availability, and favourable consumer attitudes jointly shape WTP for maize-based beer in Northern Ghana. Practical recommendations are provided for Accra Brewery Limited, policymakers, and smallholder maize farmers seeking to develop the local value chain.

Keywords: Willingness to pay, maize-based beer, perceived behavioural control, consumer acceptance, theory of planned behaviour, eagle stout, Northern Ghana

1. Introduction

Consumer willingness to pay (WTP) is among the most critical determinants of new product viability in competitive markets. In the beer industry, where established brands anchored in imported barley enjoy deep consumer loyalty, the commercial viability of locally brewed alternatives such as those using maize as a partial substitute depends critically on whether consumers assign sufficient economic value to the product's attributes to justify its price. In Ghana, where barley-based beer dominates commercial market share and imports constitute a significant drain on foreign exchange reserves, the development of a commercially viable maize-based beer presents both an economic opportunity and a developmental challenge.

Accra Brewery Limited (ABL) has positioned Eagle Stout a premium stout formulated with locally sourced maize from Northern Ghana as a product capable of bridging local agricultural value chains with commercial beverage production. The success of this initiative, however, hinges on whether consumers are not only willing to accept the product but also willing to pay for it at a price point that ensures ABL's profitability and farmer income sustainability. Consumer WTP is therefore not merely a marketing variable but a development indicator, signalling the extent to which maize-based value chains can be commercially self-sustaining.

Despite its significance, the literature on consumer WTP for

commercial maize-based beer in Ghana is sparse. Earlier studies, such as those by Sarfo-Mensah (2017) and Djameh *et al.* (2015) ^[6], were largely qualitative or focused on artisanal rather than commercial products. Economic studies on WTP in the African beer market (e.g., Abebe *et al.*, 2017; Osei *et al.*, 2018) ^[1, 13] are limited in their applicability to the specific socio-economic and cultural context of Tamale's Northern Ghanaian market. This article addresses this gap by reporting original empirical findings from a PhD thesis completed at the University for Development Studies, Tamale (2026), and contributes to both the consumer behaviour and development economics literature on alternative grain beverages.

Specifically, this article focuses on Objective 3 of the broader doctoral study: to examine the relationship between consumers' purchase intentions and actual purchasing behaviour, and Objective 4: to evaluate the influence of subjective norms and perceived behavioural control on consumers' willingness to pay for maize-based Eagle Stout beer. The findings reported here are particularly relevant to the WTP dimension and the acceptance-WTP correlation.

2. Theoretical framework and literature review

2.1 Willingness to Pay: Conceptual Foundations

Willingness to Pay (WTP) is defined as the maximum price a consumer is willing to pay for a specific good or service, given their preferences, income, and perceived utility of the

product (Carson *et al.*, 2001) ^[4]. In food and beverage economics, WTP serves as a proxy for perceived product value encompassing both tangible characteristics (taste, nutritional content, price) and intangible attributes (brand image, cultural relevance, environmental sustainability). For novel products such as commercial maize-based beer, the Contingent Valuation Method (CVM) is a widely applied technique for eliciting WTP in the absence of established market price data (Graham-Rowe *et al.*, 2009) ^[8].

The Consumer Surplus Model complements CVM by quantifying the economic value consumers derive above what they actually pay. Spiller and Belogolova (2017) ^[14] demonstrated that in premium beverage markets, consumers are willing to pay a price premium of 15–30% for products they perceive as healthier, more sustainable, or locally produced—conditional on the communication of those attributes. In low-income markets like Northern Ghana, however, the relationship between positive product perceptions and WTP is mediated by significant structural constraints, particularly affordability and product accessibility (Howell *et al.*, 2018) ^[35].

2.2 Perceived Behavioural Control and Willingness to Pay

Within the Theory of Planned Behaviour (Ajzen, 1991) ^[3], Perceived Behavioural Control (PBC) refers to the perceived ease or difficulty of performing a behaviour and encompasses both internal control (self-efficacy) and external control (resource access, product availability, and affordability). PBC is especially relevant to WTP because it captures the consumer's perceived ability to actually purchase the product at its current price and distribution point. Consumers who perceive a product as accessible and affordable high PBC are more likely to translate positive attitudes and intentions into actual purchasing behaviour and, by extension, higher WTP.

In resource-constrained environments such as the Northern Region of Ghana, PBC often operates as a binding constraint on the intention-purchase relationship. Twum *et al.* (2023) ^[16] found that among low-income beer consumers in Ghana, PBC particularly affordability and availability was the dominant predictor of actual beer consumption, explaining the largest proportion of variance in purchasing behaviour. Morwitz (2012) ^[10] similarly identifies financial liquidity and product availability as key moderators of the intention-behaviour gap, a dynamic likely to be pronounced in Tamale's price-sensitive consumer market.

2.3 Consumer Acceptance as a Determinant of Willingness to Pay

Although acceptance and WTP are conceptually distinct acceptance being primarily attitudinal and WTP being economic empirical studies consistently demonstrate a positive association between them. Consumers who accept a product are more likely to assign it economic value and to express higher WTP, particularly when positive sensory experiences reinforce attitudinal acceptance (De Groote *et al.*, 2010) ^[5]. However, this relationship is not unconditional: Dolan and Galizzi (2015) ^[7] warn that acceptance may not translate to WTP when structural constraints such as limited purchasing power or poor distribution infrastructure decouple attitudes from actual

economic behaviour. The acceptance-WTP relationship is thus mediated by perceived value (Nuss & Tanumihardjo, 2011) ^[12], price sensitivity (Adebayo *et al.*, 2021) ^[2], and trust in product attributes (Osei & Baffour-Awuah, 2020) ^[13].

3. Methodology

3.1 Study Area and Sample

The study was conducted in the Tamale Metropolis, the regional capital of the Northern Region of Ghana. Tamale is a strategically relevant study site for maize-based beer research given the cultural centrality of maize in the local agricultural and food system, the relatively low average household income (which shapes price sensitivity), and the presence of active commercial beer markets. A cross-sectional survey design was employed, with a sample of 400 adult respondents (18 years and above) selected using multi-stage sampling. Communities were stratified, households were selected using Probability Proportional to Size (PPS), and individual respondents were purposively chosen within households.

3.2 Variable Operationalisation

Willingness to Pay (WTP) was measured as the dependent variable using a composite Likert-scale measure that asked respondents to indicate their willingness to pay the current market price, a higher price, or a lower price for Eagle Stout, supplemented by an open-ended maximum WTP question. Consumer acceptance of maize-based beer was measured using a binary acceptance indicator and Likert items capturing degree of acceptance. The key independent variables—Perceived Behavioural Control (PBC) and Attitude (ATT)—were measured using validated multi-item Likert scales (1 = strongly disagree to 5 = strongly agree) adapted from Ajzen's (1991) ^[3] TPB measurement framework. All scales were pilot-tested for reliability, with Cronbach's alpha values exceeding 0.70 for all constructs.

3.3 Analytical Approach

Multiple linear regression was employed to identify significant predictors of WTP, with PBC, attitude (ATT), and subjective norms (SN) as independent variables. Pearson correlation analysis was used to assess the direction and strength of the relationship between consumer acceptance and WTP. All analyses were conducted using IBM SPSS Statistics (Version 26), with a significance level of $p < 0.05$.

4. Results and Discussion

4.1 Regression Analysis: Predictors of Willingness to Pay

The multiple linear regression model estimating the predictors of WTP for Eagle Stout maize-based beer is presented in Table 1. The model was statistically significant overall ($F = 38.74$, $p < 0.001$) and explained approximately 38.1% of the variance in WTP (Adjusted $R^2 = 0.374$).

Perceived Behavioural Control (PBC) emerged as the strongest predictor of WTP ($\beta = 0.27$, $p < 0.001$), indicating that consumers who perceive themselves as capable of affording and accessing Eagle Stout are significantly more willing to pay for the product. This finding holds crucial implications for understanding demand constraints in Northern Ghana: even when attitudinal and normative

conditions favour WTP, limited access and perceived unaffordability act as binding economic constraints on actual purchasing behaviour. The primacy of PBC in predicting WTP over attitude in this context aligns with Twum *et al.*'s (2023) ^[16] findings in Ghana, where affordability and availability were identified as the dominant PBC sub-dimensions.

Attitude toward maize-based beer was the second significant predictor ($\beta = 0.24$, $p = 0.002$), confirming that consumers' overall evaluation of Eagle Stout including perceptions of taste, health benefits, and cultural resonance independently shapes their economic valuation of the product. This finding complements results from the acceptance analysis (reported in the companion article) and is consistent with global evidence that attitude is a reliable predictor of both

acceptance and WTP across a variety of food and beverage categories (Spiller & Belogolova, 2017; Ajzen, 1991) ^[14, 3]. Subjective norms, while positive in direction ($\beta = 0.13$), did not reach statistical significance in predicting WTP ($p = 0.087$). This is a noteworthy divergence from the acceptance model, where subjective norms were significant. The result suggests that while social approval is important in shaping whether consumers are willing to accept maize-based beer, it plays a lesser role in the more economically grounded decision of whether to spend money on it. Dolan and Galizzi (2015) ^[7] offer a theoretical basis for this finding: WTP is ultimately constrained by budget sets and purchasing power factors that are more directly captured by PBC than by normative social constructs.

Table 1: Multiple Linear Regression; Predictors of Willingness to Pay for Maize-Based Beer

Predictor Variable	β (Beta)	Std. Error	t-value	p-value
Perceived Behavioural Control (PBC)	0.27	0.069	3.91	< 0.001***
Attitude toward MBB (ATT)	0.24	0.072	3.33	0.002**
Subjective Norms (SN)	0.13	0.076	1.71	0.087 ns
Adjusted R ²	0.374			
F-statistic (Model)	38.74			< 0.001***

Source: Field Survey, 2026. Note: *** $p < 0.001$; ** $p < 0.01$; ns = not significant. MBB = Maize-Based Beer

4.2 Pearson Correlation Between Consumer Acceptance and Willingness to Pay

To assess the relationship between consumer acceptance and WTP, Pearson correlation analysis was performed. The results, presented in Table 2, revealed a statistically significant, moderate positive correlation between consumer acceptance and WTP ($r = 0.46$, $p < 0.001$). This finding indicates that consumers who accept Eagle Stout are significantly more likely to express willingness to pay for the product, confirming the theoretical prediction that acceptance serves as an economic gateway to actual

purchasing behaviour.

The moderate correlation coefficient ($r = 0.46$) rather than a strong one ($r > 0.70$) is theoretically informative. It suggests that while acceptance is a necessary condition for WTP, it is not sufficient on its own consistent with the regression results showing that structural factors (PBC) account for additional, independent variance in WTP beyond what acceptance alone can explain. This finding aligns with Dolan and Galizzi's (2015) ^[7] observation that consumer decisions are frequently constrained by contextual factors beyond attitudinal evaluations.

Table 2: Pearson Correlation Consumer Acceptance and Willingness to Pay (n = 400)

Variable	Consumer Acceptance	Willingness to Pay
Consumer Acceptance	1.000	0.46***
Willingness to Pay	0.46***	1.000

Source: Field Survey, 2026. Note: *** $p < 0.001$ (two-tailed)

4.3 Descriptive Profile of WTP-Related Constructs

Table 3 presents the descriptive statistics for WTP-relevant constructs. Perceived Behavioural Control recorded a mean of $M = 3.65$ ($SD = 0.82$), indicating that while consumers' self-assessed ability to purchase Eagle Stout was generally moderate, there is meaningful variability suggesting that for a substantial proportion of respondents, affordability and availability remain real barriers. Attitude recorded $M = 4.10$ ($SD = 0.68$), reaffirming strong baseline attitudinal support, which creates favourable conditions for WTP when

structural barriers can be addressed.

The gap between the mean scores for behavioural intention ($M = 3.97$) and actual consumption behaviour ($M = 2.85$) is particularly striking, with a standard deviation of 1.35 for actual consumption indicating high dispersion implying that actual purchasing is uneven and contextually determined. This intention-behaviour gap corroborates Morwitz (2012) ^[10], who identifies financial constraints and distribution gaps as primary moderators of the intention-behaviour relationship in consumer markets.

Table 3: Descriptive Statistics for WTP-Relevant Constructs (n = 400)

Construct	Mean (M)	Std. Dev. (SD)	Interpretation
Attitude toward Maize-Based Beer	4.10	0.68	Favourable
Perceived Behavioural Control (PBC)	3.65	0.82	Moderate
Subjective Norms	3.85	0.79	Moderate-Positive
Behavioural Intention	3.97	0.75	Strong
Actual Consumption Behaviour	2.85	1.35	Below Average
Acceptance–WTP Correlation (r)	0.46	—	$p < 0.001$

Source: Field Survey, 2026. Scale: 1 = Strongly Disagree to 5 = Strongly Agree

4.4 Discussion: Structural and Attitudinal Determinants of WTP

The dominance of PBC over subjective norms in predicting WTP for Eagle Stout reflects the material realities of consumer decision-making in Northern Ghana. While social norms matter for product acceptance a more socially embedded behavior WTP is ultimately an economic act constrained by purchasing power, product visibility on retail shelves, and distribution network coverage. With PBC as the strongest predictor ($\beta = 0.27$), the findings highlight that Accra Brewery Limited must prioritise pricing strategy and distribution infrastructure as key levers for expanding WTP beyond current levels.

The significant contribution of attitude ($\beta = 0.24$) further underscores that building positive perceptions of Eagle Stout through health communication, quality assurance, and culturally resonant branding creates the attitudinal foundation upon which WTP rests. Consumers who perceive the product as a high-value, culturally relevant, and health-supportive choice are more willing to allocate limited financial resources to purchasing it. This is consistent with Spiller and Belogolova (2017)^[14], who found that perceived health and local sourcing attributes could unlock premiumisation even in price-sensitive markets.

The acceptance-WTP correlation ($r = 0.46$, $p < 0.001$) confirms an important empirical regularity: the willingness to accept a product economically is a meaningful but imperfect extension of attitudinal acceptance. The gap between the two is explained by structural constraints. For ABL, this means that growing acceptance (already at 69.2%) creates a latent pool of potential paying customers whose conversion to actual purchasers requires removing barriers captured by PBC: specifically, ensuring Eagle Stout is competitively priced, widely distributed, and prominently visible in the retail environments frequented by Tamale consumers.

The large intention-behaviour gap ($M = 3.97$ for intention vs. $M = 2.85$ for actual consumption; $SD = 1.35$) is consistent with prior evidence from the Ghanaian market, where Twum (2022)^[15] found that beer purchase intentions were fulfilled in only 54% of cases, with affordability cited as the primary barrier. This reinforces the interpretation that PBC acting as a proxy for structural affordability and availability constraints is the binding constraint on WTP materialisation in Tamale.

5. Conclusions and Policy Implications

This study demonstrates empirically that consumer WTP for Eagle Stout maize-based beer in the Tamale Metropolis is primarily shaped by Perceived Behavioural Control ($\beta = 0.27$, $p < 0.001$) and attitude ($\beta = 0.24$, $p = 0.002$), with a moderate and significant positive correlation between consumer acceptance and WTP ($r = 0.46$, $p < 0.001$). These findings offer actionable implications for multiple stakeholders.

For Accra Brewery Limited, the primacy of PBC signals that market expansion for Eagle Stout requires a two-pronged strategy: (1) a competitive pricing approach that makes the product accessible to low- and middle-income consumers in Northern Ghana, including promotional pricing, smaller serving sizes, and loyalty incentives; and (2) a distribution deepening strategy that ensures Eagle

Stout is consistently available at local chop bars, drinking spots, and community events the primary retail nodes through which beer reaches Tamale consumers. Stockouts or limited availability are likely eroding WTP conversion even among consumers with high acceptance and positive attitudes.

For policymakers and agricultural development agencies, the findings reinforce the commercial viability of maize-based beer as a vehicle for expanding the local maize value chain. When consumers are both willing to accept and willing to pay for locally produced beer, the market can sustain financially viable offtake arrangements with smallholder maize farmers in Northern Ghana. Policies that reduce transaction costs in the maize value chain, ensure consistent quality supply, and incentivise local sourcing by breweries can strengthen the economic case that this study's findings suggest already exists in consumer preferences.

Future research should apply willingness-to-pay elicitation methods such as the Becker–DeGroot–Marschak (BDM) auction to derive more precise WTP estimates and avoid hypothetical bias limitations inherent in survey-based methods. Experimental approaches that test the effect of product labelling (emphasising local sourcing, gluten-free status, or nutritional benefits) on WTP could also provide actionable marketing insights for ABL and other local brewers seeking to commercialise alternative-grain beverages in Ghana and the wider West African market.

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