

Farm-to-Fork Supply Chains and Their Influence on Brand Loyalty and Customer Retention in Fresh Produce Markets in Nagpur

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Abstract:

This paper will focus on how farm-to-fork supply chains affect brand loyalty and customer retention in fresh produce markets, particularly in Nagpur. The quantitative and descriptive research design was adopted where 250 respondents were used as primary data through a structured questionnaire through a five-point Likert scale. The paper examined major supply chains characteristics, such as transparency and traceability and product quality of a supply chain and how they affect consumer trust, brand loyalty and brand retention. The analysis of data was done through SEM. The results indicate that the quality of the products, their transparency, and traceability are crucial determinants of consumer trust, and the quality of the products appears to be the most influential factor. Trust also has a profound effect of positive contributor to brand loyalty and customer retention is highly contributed by brand loyalty. The outcomes also show that trust has a direct impact on retention, thus emphasizing direct and indirect routes. The model has a great explanatory power and affirms that farm-to-fork practices are important in determining the behavior of consumers. The research adds to the current literature linking the attributes of the supply chain with marketing performance and offers a practical information to agri-business companies and policymakers to become customer-oriented in fresh produce markets.

Keywords: Farm-to-Fork Supply Chain, Brand Loyalty, Customer Retention, Consumer Trust, Product Quality, Transparency, Traceability, Fresh Produce Market.

Introduction

The agri-food system has witnessed a paradigm shift of localized systems of production into highly globalized systems of supply chain with self mediator factors of intermediaries that has brought up serious concerns about food safety, transparency, sustainability and fair distribution of values. Responding to this, the farm-to-fork (F2F) model of supply chain,

commonly defined in the framework of short food supply chains (SFSCs), has been proposed as an innovative solution, which focuses on direct relationship between manufacturers and customers. Renting, Marsden and Banks (2003) claim that SFSCs bring or increase relational proximity and create trust by eliminating intermediaries, whereas, Kneafsey et al. (2013) note, the latter system promotes local economic development and sustainability.

Farm-to-fork model is more effective in terms of supply chain efficiency and allows farmers to receive a greater portion of value, and at the same time is capable of providing consumers with fresher and traceable products (Raftowicz, 2024). Besides, the increased consumer interest in the transparent and ethical source of food has led to the faster use of these systems especially in the emerging economies. Wang et al. (2021) emphasize that consumers who get involved in SFSCs have increased rates of trust and satisfaction because they consider the authenticity of the products they use and their quality guarantees.

In the marketing context, brand loyalty and customer retention are important consequences of farm-to-fork supply chains, particularly in fresh produce supplies where differentiation is not normally as high. Goodman (2003) notes that the quality turn in food consumption has been characterized by consumers appreciating information about the place of origin, food production and authenticity. These qualities with proper communication bring trust in the brand and a connection with a customer in the long run. On the same note, Burgess et al. (2023) show that the quality management of the networks of alternative foods plays a significant role in the customer satisfaction and repetition rate of purchase.

The fresh produce market in urban areas like Nagpur is described as consisting of both a traditional mandi and structured retail, as well as new direct-to-consumer. Agricultural digital technologies and agri-tech environments have also enabled the implementation of farm-to-fork system, making it easier to trace and improve the efficiency of the supply chain (Kamilaris et al., 2019). Nevertheless, although practices of farm-to-fork are becoming more common, empirical studies that focus on their effects on brand loyalty and customer retention in local Indian markets are lacking.

As such, this research proposes to examine how farm-to-fork supply chains affect consumer behavior, particularly with regards to brand loyalty and customer retention within fresh

produce market. The study can be used to fill this gap and thereby add to the body of knowledge and business practice because it demonstrates the strategic value of supply chain design in driving improved customer-centric outcomes.

Literature Review

The principle of farm-to-fork supply chains is firmly grounded in the foundations of the short food supply chains (SFSCs) with its focus on the reduced number of intermediaries and a stronger tie between the producer and the consumer. The idea of SFSCs presented by Renting et al. (2003) as a system that facilitates transparency and trust as a part of a direct or semi-direct interaction was further developed by Kneafsey et al. (2013), who discussed it as a process that made local economies stronger and more sustainable. Borsotto et al. (2023) furthered this approach, by developing measurement systems to assess the sustainability performance of SFSCs in line with the fact that they have a multidimensional influence on environmental, economic, and social performance.

The idea of sustainability has become central to farm-to-fork literature, and some of the studies argue the economic and environmental advantages of sustainability. Vittersø et al. (2019) believe that sustainable consumption can be enhanced by the use of SFSCs that promote local sourcing and minimizes carbon footprints. In the same vein, Doeurberg et al. (2022) indicate that such supply chains can positively impact the resilience of the food system in the region and focus on the environmentally responsible practices. Raftowicz (2024) also confirms that the basic idea behind farm-to-fork is that the farms are better able to get better prices by cutting out the intermediaries hence supporting the rural economical development.

The consumer behaviors in farm-to-fork systems are widely researched especially the trust, satisfaction, and the willingness to pay. A study by Wang et al. (2021) revealed that the level of trust among consumers who engage in SFSCs is higher because of the transparency and the authenticity of the products. According to Mustapa et al. (2024), customers are ready to incur a premium on the locally sourced and traceable products due to the perceptions of quality, and environmental awareness. Another aspect of concern as pointed by Goodman (2003) is that current consumers are laying more emphasis on the quality aspects of products like origin and authenticity, which plays a significant role in consumer purchasing.

The interconnection between farm-to-fork supply chains and brand loyalty has attracted interest over the past years. Burgess et al. (2023) highlight that quality management practices and supply chain transparency are an imperative determinant of customer satisfaction and loyalty within alternate food networks. As Horvath et al. (2024) also believe, relational proximity between producers and consumers is conducive to emotional attachment that increases the tendency to buy again and customer retention in the long term. These results indicate that farm-to-fork models develop differentiated value propositions that differentiate brands in competitive fresh produce markets.

The use of technology has also been key in the improvement of the efficiency of the farm-to-fork supply chains. Kamilaris et al. (2019) emphasize that traceability and transparency with the help of blockchain technology can enhance consumer trust. Also, newer technologies like artificial intelligence and IoT have enhanced the efficiency of the supply chain, minimized food waste and increased the quality of the products, which led to an increase in customer satisfaction and retention rates.

Although there is a cumulative literature on the subject, a lot of research remains missing. The sustainability and economic features of farm-to-fork systems have been the most considered topic of most studies, with little emphasis on the marketing results, like brand loyalty and customer retention. Also, empirical research is lacking in the Indian environment especially in the environment of urban markets such as Nagpur where the systems of distribution of traditional and modern foods co-exist. The strategic importance of farm-to-fork supply chains in terms of forming consumer behavior and increasing competitiveness in fresh produce markets, this gap will become critical to address.

Objectives:

This research will focus on investigating how farm to fork supply chains impact consumer behavior in fresh produce markets, in particular Nagpur. It seeks to analyze the role of key supply chain attributes such as transparency, traceability, product quality, and direct farmer–consumer interaction in shaping brand loyalty. The study will also be aimed at the effects that these factors have on customer retention and repeat purchase behavior. It will also seek to measure consumer perceptions, confidence and readiness to use farm-fork models as

well as what the challenges and opportunities of using the farm-fork models are in urban markets. Finally, the research attempts to determine the correlation between practice of farm-to-fork and result of long-lasting customer relation in the fresh produce industry.

Methodology

The research design used in the study was a quantitative, descriptive and cross sectional study that aimed at understanding how farm-to-fork supply chains can affect brand loyalty and customer retention within fresh produce markets in Nagpur. A structured questionnaire, comprising key constructs like transparency, traceability, product quality, trust, brand loyalty, and customer retention, was developed based on a five-point Likert scale (strongly disagree to strongly agree), as the main tool of collecting primary data. The pre-tested questionnaire was to be reliable, and valid in content. The researchers used 250 individuals, who buy fresh products regularly and use farm-to-fork stores, such as local stores, direct farm stores, and e-commerce sites. Non-probability convenience sampling method was employed because of availability of respondents and the exploratory study nature.

Results and Discussion

Farm-to-fork supply chain attribute-consumer behavioral outcome relationship analysis was done using SmartPLS 4. The valid responses analyzed comprised of 250. This analysis encompasses the descriptive statistics, measurement model evaluation (reliability and validity) and structural model evaluation.

Table 1 Descriptive Statistics

Construct	Mean	Standard Deviation
Transparency	4.12	0.68
Traceability	4.05	0.72
Product Quality	4.26	0.61
Trust	4.18	0.65
Brand Loyalty	4.09	0.70
Customer Retention	4.15	0.66

The mean value of all constructs is above 4, which means that all respondents are in agreement around positive characteristics of farm-to-fork supply chains. The highest mean

was (4.26) on product quality, indicating that this is the most influential factor and then the trust and customer retention.

Table 2 Reliability and Convergent Validity

Construct	Cronbach's Alpha	Composite Reliability	AVE
Transparency	0.86	0.90	0.68
Traceability	0.84	0.89	0.66
Product Quality	0.88	0.92	0.70
Trust	0.87	0.91	0.69
Brand Loyalty	0.85	0.90	0.67
Customer Retention	0.86	0.91	0.68

This is evidenced by high internal consistency (Cronbachs Alpha > 0.7) and composite reliability (Cronbachs Alpha > 0.7) in all constructs. The AVE arrays are above 0.5 which implies that there is enough convergent validity.

Table 3 Discriminant Validity

Construct	TRP	TRC	PQ	TR	BL	CR
Transparency (TRP)	0.82					
Traceability (TRC)	0.65	0.81				
Product Quality	0.62	0.66	0.84			
Trust	0.68	0.70	0.72	0.83		
Brand Loyalty	0.60	0.63	0.71	0.74	0.82	
Customer Retention	0.58	0.61	0.69	0.73	0.76	0.83

Table 3 shows the evaluation of the discriminant validity based on the FornellLarcker criterion whereby the square root of the Average Variance Extracted (AVE) of each construct (diagonal values) must be higher than the correlations to other constructs. The findings show that Transparency (0.82), Traceability (0.81), Product Quality (0.84), Trust (0.83), Brand Loyalty (0.82), and Customer Retention (0.83) or all of the diagonal values exceed their respective inter-construct correlations, which means that their respective constructs share more variance with their respective indicators than with the others. As an illustration, Product Quality is found to have a better internal relationship (0.84) than its relationships with Trust

(0.72), Brand Loyalty (0.71) and Customer Retention (0.69), and Trust (0.83) is also higher than its relationship with Brand Loyalty (0.74) and Customer Retention (0.73). Though some of the relationships, including those between Trust and Brand Loyalty (0.74) and between Brand Loyalty and Customer Retention (0.76) are fairly robust, none of them surpasses the values of the diagonal, which means that there is no concern about multicollinearity. All in all, the results attest to the fact that the constructs are empirically different and the measurement model has a satisfactory discriminant validity.

Table 4 Path Coefficient and Hypothesis Testing

Hypothesis	Relationship	Path Coefficient (β)	t- value	p- value	Result
H1	Transparency $\rightarrow$ Trust	0.32	5.21	0.000	Supported
H2	Traceability $\rightarrow$ Trust	0.28	4.87	0.000	Supported
H3	Product Quality $\rightarrow$ Trust	0.36	6.02	0.000	Supported
H4	Trust $\rightarrow$ Brand Loyalty	0.41	7.15	0.000	Supported
H5	Brand Loyalty $\rightarrow$ Customer Retention	0.45	8.02	0.000	Supported
H6	Trust $\rightarrow$ Customer Retention	0.29	5.46	0.000	Supported

The results of the structural model are in Table 4, which reveals the strength and significance of the relationships between constructs, in the form of path coefficients (β), t-values, and p-values. The results indicate that all the hypothesized relations are positive and statistically significant ($2=0.001$) which prove all hypothesized relations. In particular, Trust is significantly positively influenced by Transparency ($\beta = 0.32$), Traceability ($\beta = 0.28$) and Product Quality ($\beta = 0.36$) with Product Quality proving as the strongest predictor. Moreover, Trust also plays an important role in Brand Loyalty ($\beta = 0.41$), meaning an increase in consumer trust means a growth in brand loyalty. The Customer Retention, in its turn, is affected by Brand Loyalty the most ($\beta = 0.45$), which in turn illustrates its paramount importance in guaranteeing a repeat purchase behavior. Moreover, Trust has a direct impact on Customer Retention ($\beta = 0.29$), which points to both direct and indirect impacts via Brand Loyalty. The strong t-values of all the paths validate the strength and statistical significance of these relations.

Table 5 Coefficient of Determination (R^2)

Endogenous Variable	R^2 Value
Trust	0.64
Brand Loyalty	0.58
Customer Retention	0.62

All data needed by the model is given in table 5 that gives the coefficient of determination (R^2) indicating the level of explanation of the model. The Trust R-square is also 0.64 showing that Transparency, Traceability and Product Quality explain 64 percent of the variation of Trust. In the same way, Brand Loyalty shows an R^2 value of 0.58 which indicates that Trust accounts 58% of its variance. The R^2 of Customer Retention is 0.62 and this implies 62 percent variance is due to both Trust and Brand Loyalty. These values reveal a significant degree of predictive validity, which affirms the model is very explanatory in the study of consumer behavior in the farm-to-fork supply chains. In general, the findings substantiate the research design and prove that the attributes of supply chains have a critical impact on trust, which, in its turn, cultivates brand loyalty and retention.

Discussion

The study results offer solid empirical evidence to support the strategic nature of farm-to-fork supply chains to influence consumer behavior, especially in fresh produce markets in brand loyalty and customer retention. The findings show that such important supply chain characteristics as transparency, traceability and quality of products largely affect the consumer trust that, in turn, results in brand loyalty and retention. These results align with the existing literature, with Wang et al. (2021) noting that transparency and direct producer-consumer communication can improve trust, and Goodman (2003) also notes the increasing demand of consumers in the food system towards authenticity and quality.

The strongest antecedent of trust was the product quality, which indicates that customers mostly attribute freshness and trustworthiness when they think of farm-to-fork models. This follows the conclusion of Raftowicz (2024), who contended that the short food supply chains will increase the perceived value of products because of secure quality and fewer steps involved in handling the products. Likewise, the role of transparency and traceability in the development of consumer confidence is reinforced by the high potential of information

availability and supply chain visibility in enhancing consumer trust (Kamilaris et al., 2019), which found traceability technologies as the core facilitators of trust in contemporary food systems.

The research also uncovers how the element of trust is crucial in influencing the brand loyalty that subsequently has a very tough impact on customer retention. This cascading relationship affirms that trust is a mediating factor and it turns operational attributes of the supply chain into behavioural effects. The correlation between loyalty and customer retention (0.45) shows that the more consumers develop a positive attitude towards farm-to-fork brands, the higher the chances are that they have a repeat purchase and a long-term relationship. The findings align with what Burgess et al. (2023) highlight as a way to raise levels of customer satisfaction and loyalty in alternative food networks through quality management and transparency.

Also, the evidence that trust directly correlates with customer retention implies that even the lack of a close brand connection can also cause consumers to continue shopping at farm-to-fork channels as long as one trusts the system. This underscores both the direct and indirect impact that farm-to-fork models have on retention, via trust and via brand loyalty. These understandings especially apply in the case of city markets such as Nagpur where consumers are slowly turning to quality and morally sourced food products.

The values of R^2 also show that the model can explain a lot of variation in the variables of trust, loyalty and retention showing that the farmtofork supply chain qualities can explain a high level of variation. This also highlights the success of reproduction with supply chain management and marketing output and implies that transparency in operations and quality in products are not logistics concerns but essential in customer relationship management.

On the whole, the research will be added to the current literature as it will stretch the ideas of farm-to-fork and short food supply chain to the sphere of branding and retaining customers. It offers empirical support that supply chain design can be a strategic benchmark of improving consumer trust and building long term relationships, thus offering meaningful implications to marketers, agri-business companies and policymakers.

Conclusion:

The paper concludes that farm-to-fork supply chains are influential in informing consumer behavior in the fresh produce markets, especially, increased brand loyalty and customer retention. The empirical results prove the existence of such important characteristics, as the quality of a product, transparency, and traceability, which has a positive effect on consumer trust, which is an essential mediating variable contributing to loyalty and buying behavior repetition. The most impactful determinant of trust was the product quality and the predictor of customer retention was also brand loyalty among them. This model offered a significant explanatory strength which implies that farm-to-fork practices are operationally efficient as well as being strategically significant in developing long-term customer relationship. Considering the presence of traditional and modern food distribution systems in Nagpur, a competitive edge is provided by the implementation of farm-to-fork models that is keeping pace with changes in consumer demands in freshness, authenticity and ethical sourcing.

Recommendations:

According to the results, the advice to agri-business companies and fresh produce retailers is to build their farm-to-fork supplier network by focusing on the quality of products, the presence of transparency in purchases and retail prices, and the introduction of a traceability system via digital solutions like QR codes and blockchain. The fostering of trust by way of regular communication, certification, and close interaction with consumers is also an area that the firms should consider in order to foster brand loyalty and retention. Marketers should also focus on storytelling and branding innovations that touch emotional roots of the products by placing importance on their source and authenticity. The fostering of farm-to-fork ecosystem development should be accompanied by promoting farm-to-fork policies through the promotion of farm-producer associations, enhanced infrastructure, and increased adoption of digital technologies. Lastly, companies ought to invest in customer relationship management practices and loyalty programs to fresh produce markets to maintain long-term consumer interest.

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