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PERCEIVED FRESHNESS, INGREDIENT TRANSPARENCY AND CONSUMER TRUST IN READY-TO-COOK MEALS

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Keywords	Abstract
Ready-to-Cook Meals, Structural Equation Modelling, SmartPLS	The popularity of ready-to-eat and ready-to-cook foods has risen over the last few years, with the busy lifestyle, shifting food preferences and need for convenient meal options contributing to the trend. Comfort is key to the prepared meals and their importance has risen over the years due to the demand for a convenient meal option. The aim of this study is to better understand the effect of perceived freshness and ingredient transparency on consumer confidence, which will enable food manufacturers to enhance product quality, communicate with the consumers in an honest manner and build consumer trust. The purpose of conducting this study is to examine the relationship between perceived freshness and consumer trust in ready-to-cook meals. The data analysis technique employed in this study was the Structural Equation Modelling (SEM) technique that was applied to the SmartPLS software. The results show that perceived freshness and consumer knowledge about ingredients have strong positive correlations with consumer trust. The study emphasizes the need to keep the product fresh and offer transparent information on the ingredients as part of the strategy to increase customer confidence and trust in ready-to-cook products.

Introduction:

Ready-to-cook (RTC) foods are ready to eat meals that have been pre-processed either in the amount of cooking steps not known or, at least, well described (Giatrakou, V. et al. 2010; Bhatt, & Jyothi 2022). People prefer this type of food because of its convenience and freshness (Zhang, H. et al 2019).



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The primary advantage of RTC food is that it can be cooked in relatively short span of time using simple cooking techniques, such as ovens, microwaves, pans, etc. and fulfill the demand of fast and healthy eating by the modern consumer (Kanatt, et al. 2013; Vaishnav, et al. 2015). The term 3R food was first proposed by Professor Masayuki Yoshikawa from Japan in 1980s, which refers to ready to eat, ready to heat and ready to cook food. The concept of 3R food, “ready to eat”, “ready to heat” and “ready to cook” were first proposed by Prof. Masayuki Yoshikawa, Japan in 1980s (Gunes, G., et al. 2011; Temgire, S., et al. 2021). The concept of 3R food had its roots in the HMR (home meal replacement) concept in the United States. The industrialization of prepared foods in the United States was given a boost by the number of standardized enterprises that came about in the 1960s. In the 80s, prepared food spread to Japan and began to grow from supermarkets, convenience stores, etc., to catering companies. A third type of dining in Japan is called “Nakanoshoku” meaning “eating” in the middle way, between meals outside the house and home-cooked meals. With the development of modern global supply chain and the rapid transformation of lifestyle, the diversification and internationalization of 3R foods have become even stronger than ever before, and the market of RTC food is booming (Temgire, S., et al. 2021; Yi, B., & Xu, H.). 2023).

The “global RTC market has seen significant expansion, with the market size projected to grow at a compound annual growth rate (CAGR) of 6.83% from 2019 to 2025, approximate valuing \$156.8 billion by end of 2025”. As per the Market.us report, North America is the biggest market with a share of 41.0% followed by Europe (24.0%) and Asia-Pacific (20.0%) and the rest of the world (15%) [10]. It's an emerging market and a tech driven market, driven by urbanization and rising DI's in China. The prepared foods market, including the RTC market in China, is expected to rise to more than USD 144.8 billion by 2026 and will be growing at an average annual rate of 25% (Yi, B., & Xu, H. It shows a significant increase in growth rate and great potential for RTC products (2023; Xiong, Y., et al. 2023).

Although there are plenty of interests and significant revenues to the development of RTC meals, there are some challenges in the industry as well, including absence of a uniform industry standard (Yi, B., & Xu, H.). However, food safety and health concerns are set to be as widespread as they are at present (Rizzo, V., et al. 2021; Khushboo, et al. 2023), and the ability to maintain sensory quality is always a challenge that must be addressed. A product that will be successful in RTC should have “good overall quality close to the fresh ingredients when it arrives to the consumers, acceptable sensory quality after cooking and affordability” for both the manufacturer and the consumer. Thus, technological solutions at a high level are needed in the development of RTC products. “To the table from the farm, 2023 optimized level of food processing and packaging technologies. Typically, RTC foods need to be pretreated to remove dirt, microbial loads, etc., prior to removal of unused parts and processing into desirable shapes or cuts”. Depending on the ingredients and needs for dishes before the cooking, ancillary processing can be added, such as marination, frying, fermentation, etc. is also optional. Currently, the effectiveness and feasibility of these additional processes are not well established and need to be improved, including marination, frying, and sanitation, both of which are also energy and labour intensive and have high losses of mass (Allende, A., et al. 2008; Singh, A. K., et al. 2021; Ngadi, M. O., et al. 2011; Zhou, Y. H., et al. 2022; Ehsanur Rahman, S. M., et al. 2023).



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Review of Literature:

The consumer perception and purchasing behaviour of ready-to-cook and ready-to-eat food products has been expanding area of focus of recent studies on product quality, health-related attributes, convenience, food safety and transparency. **Mary, Thapa et al. (2026)** studied the impact of health-based branding on the purchasing intention of healthy 'dosa mix' brands. They found that consumers were receptive to the health related brand attributes, especially functional and wellness benefits, like using ingredients made from millet and the fibre content. Perceived health benefits significantly mediated the association between health-based branding and purchase intention, and repurchase intention was an emerging factor in the relationship between health-based branding and health consumers' behaviour. Likewise, **Seng, Osman et al. (2025)** examined the factors affecting the intention to purchase ready-to-eat food product which includes price, product quality and convenience. Their study considered the consumer attitude as a mediating variable between these product attributes and behavioural intention. This study emphasises the role of consumers' assessment of food products in their purchase intentions. These studies illustrate that, when judging a food product as convenient, consumers attend to multiple attributes of the product, and that their trust in product quality and information available about food products can also be significant.

Other studies that have been conducted recently have focused on food safety, processing methods, and ingredient issues. **Zhang et al. (2025)** examined the advancement of the safety technology of ready-to-eat meals during the whole supply chain, from raw material procurement to end consumption. They considered innovative technologies for sterilisation such as irradiation, microwave and radio-frequency technologies, with particular emphasis on implications to microbial safety and product quality. The study highlights the need for food safety and quality assurance during food production and distribution processes. **Tseklevs and Pollastri (2025)** explored the link between sustainable innovation and consumer acceptance of ready-to-cook fish products among older consumers in the UK in another study. Their conclusions indicated convenience and accessibility were valued, but processing methods, transparency, and additives were issues that may impede product uptake. Likewise, **Tang, Yang, et al. (2025)** analyzed food safety governance in the context of pre-made meals in the Chinese context by comparing the legislative documents, food safety incidents, and regulatory strategies in the European Union and the United States. They highlighted the importance of regulatory change and technology solutions to boost consumer confidence and enable sustainable industry growth. Moreover, the growth of ready-to-cook food in Beijing was explored by **Cui, Gine, et al. (2024)** in terms of ingredients, packaging, storage environment, products and product types, technological innovations, etc. Their research identified the need for packaging and storage in the development of ready to cook food market. All of these studies demonstrate the significance of food quality, food safety and food transparency for convenient consumption. But the detailed connection between perceived freshness and transparency regarding ingredients and consumer trust of ready-to-cook meals calls for specific investigation, which the present study aims to fill.

Objectives of the Study:

1. To examine the relationship between perceived freshness and consumer trust in ready-to-cook meals.



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2. To assess the relationship between ingredient transparency and consumer trust.

Hypothesis:

H₁: Perceived freshness has a significant positive relationship with consumer trust in ready-to-cook meals.

H₂: Ingredient transparency has a significant positive relationship with consumer trust in ready-to-cook meals.

Research Methodology:

The study was a descriptive and explanatory research study which aimed at exploring the links between perceived freshness, ingredient transparency and trust in ready-to-cook meals. A minimum number of 173 respondents were required for the present study and 200 respondents were actually targeted. In order to have sufficient statistical power to assess the proposed relationships, the sample size was estimated based on “an effect size of 0.30, a statistical power of 0.90, a significance level of 0.05, four latent variables and 13 observable variables”. The study used non-random purposive sampling method in the selection of respondents. “Both primary and secondary data were used. Structured questionnaire was used to collect primary data and secondary data were gathered from relevant academic publications and research studies. The data collected was then processed using Structural Equation Modelling (SEM) method using SmartPLS software”. In order to achieve research aims and purposes, it is crucial to use appropriate statistical method to the nature and purposes of research, as noted by Piriana (2024a). Likewise, Pirani (2024b) highlights the importance of adhering to research ethics and integrity during collecting, analyzing and reporting data.

Data Analysis and Interpretation:

Table No: 1 Reliability and validity

Construct	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
Consumer Trust	0.787	0.789	0.557
Ingredient Transparency	0.884	0.883	0.605
Perceived Freshness	0.902	0.902	0.648

Source: Compiled from Primary Data

The results of reliability and validity show satisfactory internal consistency and convergent validity for Consumer Trust, Ingredient Transparency, and Perceived Freshness. Consumer Trust has a “Cronbach's alpha of 0.787, composite reliability of 0.789, and an AVE of 0.557”. The Cronbach's alpha of Ingredient Transparency is 0.884, the composite reliability score is 0.883, and the AVE score is 0.605. Likewise, the Cronbach's alpha, composite reliability, and AVE for Perceived Freshness are 0.902, 0.902, and 0.648, respectively. All three constructs have “Cronbach's alpha values and composite reliabilities higher than the recommended level of 0.70”, indicating that they are reliable. In addition, the AVE values are greater than 0.50, which indicates good convergent validity. Overall results indicate good measurement model reliability and convergent validity.



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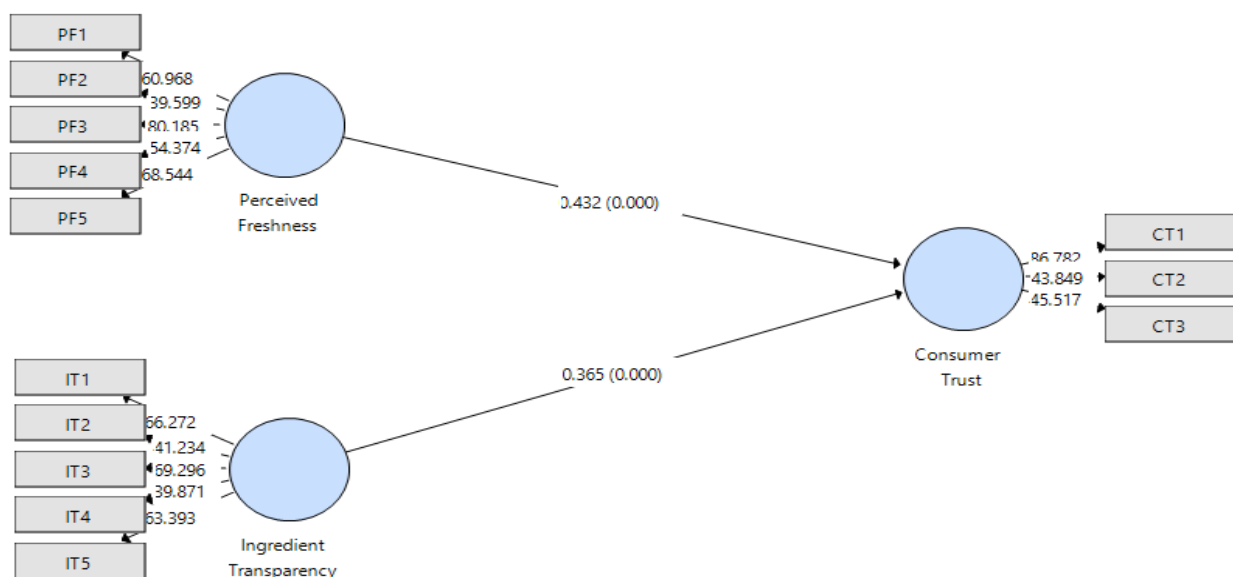
Table No: 2 Discriminant validity

Construct	Consumer Trust	Ingredient Transparency	Perceived Freshness
Consumer Trust	0.746		
Ingredient Transparency	0.723	0.778	
Perceived Freshness	0.710	0.734	0.805

Source: Compiled from Primary Data

The “discriminant validity was examined by using the Fornell–Larcker criterion” to assess whether the constructs of Consumer Trust, Ingredient Transparency, and Perceived Freshness are empirically distinct. The Average Variance Extracted (AVE) statistics as presented along diagonal values of the table are: 0.746 (Consumer Trust), 0.778 (Ingredient Transparency) and 0.805 (Perceived Freshness). The values are the amount of variance explained by each construct in each indicator. There is a strong inter-construct correlation between Consumer Trust and Ingredient Transparency (0.723) and between Consumer Trust and Perceived Freshness (0.710). Likewise, correlation between Ingredient Transparency and Perceived Freshness is 0.734. The diagonal value of Consumer Trust (0.746) is higher than the correlation values of Ingredient Transparency (0.723) and Perceived Freshness (0.710). Similarly, the diagonal value for Ingredient Transparency (0.778) is above that of its correlations with Consumer Trust (0.723) and Perceived Freshness (0.734). Perceived Freshness has a diagonal value of 0.805, which is higher than its correlations with Consumer Trust (0.710) and Ingredient Transparency (0.734). To this end, the square root of the AVE of each construct is higher than the respective correlations with the other constructs, which meets the Fornell-Larcker criterion. The results confirm that Consumer Trust, Ingredient Transparency, and Perceived Freshness have sufficient discriminant validity and that they represent separate concepts in the suggested research model.

Figure: SEM model



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Table No: Hypothesis testing

Path	Beta Coefficient	T-statistics	P-Value
Ingredient Transparency → Consumer Trust	0.365	7.976	0.000
Perceived Freshness → Consumer Trust	0.432	9.696	0.000

Source: Compiled from Primary Data

The hypothesis testing result shows that Ingredient Transparency and Perceived Freshness positively influence the Consumer Trust and this is significant. The result indicates that the variable Ingredient Transparency has a positive and significant influence ($\beta = 0.365$; $t = 7.976$; $p = 0.000$), as well as the variable Perceived Freshness with a positive and significant influence ($\beta = 0.432$; $t = 9.696$; $p = 0.000$). The p values for both relationships are below 0.05 so there is a clear support for both proposed hypotheses. In general, the results validate the hypotheses of the study that Ingredient Transparency and Perceived Freshness are significant factors that help to develop Consumer Trust, with a stronger positive impact of Perceived Freshness.

Conclusion:

The results of the study suggest that perceived freshness and ingredient transparency are significantly positively associated with consumer trust on the ready-to-cook foods. The results underscore the significance of these two aspects in building consumers' confidence in convenient food products. Perceived freshness is one of the important factors that influence consumer perceptions of the product quality, safety and suitability for consumption. If consumers feel the ready to cook food is fresh and correctly preserved, they are likely to have confidence in the product and the manufacturer. In a similar way, ingredient transparency boosts consumer trust by offering the consumer clear and readily available information about food ingredients. Transparent labelling allows consumers to make more informed decisions on what to buy, and helps to eliminate confusion about product composition. Based on these findings, manufacturers should focus on freshness-related quality aspects, suitable storage and packaging and correct labelling of ingredients. Consumers can be even more confident with good communication regarding the ingredients in a product and quality. Overall, the study highlights that consumer trust isn't just about convenience—it relies on consumers' perceptions of freshness and access to trusted product information. These factors highlight how ready-to-cook manufacturers can enhance their consumer relationships, boost product acceptance, and foster customer loyalty in today's competitive landscape.

Suggestions:

- Manufacturers need to adopt rigorous quality control practices, suitable storage environments, and temperature management to ensure the freshness and quality of their ready-to-cook products.



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- Food manufacturers should include clear, accurate and easily understood ingredient information on the food packaging so that consumers are able to make informed decisions about purchasing what they are about to consume.
- There is need to use appropriate packaging that helps to preserve food quality, ensure food freshness and provide reliable information on storage requirements and expiry dates.
- Ingredient labelling, nutrition information, allergen warning or other relevant product information must be clear, visible and up-to-date.
- Companies should assure consumers about product quality, ingredients, storage methods and preparation to remove consumer uncertainty and boost consumer confidence.
- Assessments of the product freshness, the packaging effectiveness and compliance with applicable food safety standards in food businesses.
- Manufacturers should be gathering consumer feedback on freshness perceptions, ingredient information and trust to be able to know how to improve and meet changing consumer expectations.
- Marketing communications must not contain misleading information regarding product freshness and composition that may have a negative effect on consumer confidence.

AUTHOR(S) CONTRIBUTION

The writers affirm that they have no connections to, or engagement with, any group or body that provides financial or non-financial assistance for the topics or resources covered in this manuscript.

CONFLICTS OF INTEREST

The authors declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

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