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Optimizing Food Safety and Quality in MSMEs through Customer Feedback Integration and TQM Strategies

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Abstract: ***The purpose of this study, "Optimizing Food Safety and Quality in MSMEs through Customer Feedback Integration and TQM Strategies," is to determine whether or not customer feedback integration has any significant impact on improvements in food safety and quality in MSMEs. Although feedback collection is a common phenomenon, MSMEs frequently lack the systematic processes necessary to convert findings into workable operational plans. The study assesses consumer attitudes towards food safety and quality, the contribution of regulatory compliance (such as ISO and FSSAI) on trust, and consumer willingness to pay for high quality food items. It also analyses the feedback systems implemented by MSMEs and their degree of congruence with the principles of Total Quality Management (TQM). By testing the hypothesis that feedback integration does not significantly impact food safety and quality, the study explores the extent to which structured feedback mechanisms influence MSME operations. Findings are expected to offer actionable insights for MSMEs, enabling them to adopt customer-centric approaches, enhance compliance, and compete effectively in the food industry. This study enhances the overall understanding of TQM in MSMEs by investigating the overlooked potential of organized feedback systems to promote sustainable growth and address evolving customer expectations.***

Index Terms: Micro Small and Medium Enterprises, Food Quality, Food Safety, Customer Feedback, ISO, FSSAI, Total Quality Management

I. INTRODUCTION

The expansion of cultivated land is reaching its limits, which presents an imminent challenge to the global food production system. (Food and Agriculture Organization of the United Nations, 2021)[1] The unprecedented demand for safe and high-quality food is being driven by global population growth, growing incomes, and expanding urbanisation, placing tremendous strain on the world's food systems. (M. Nyström, 2019)[2]

Food is a fundamental requirement of all living organisms, and it is consumed on a daily basis for optimal health and productivity. The nature and nutritional value of food have a direct impact on the population's well-being. Food producers often compromise quality when food production costs exceed consumer willingness to pay. This has resulted in the widespread distribution of adulterated food products, which can result in mild-to-severe health consequences and financial losses. Governments have consistently promoted the preservation of food safety and quality, enacting legal provisions to protect these essential standards. (Anagaw, et al., 2024)[3] In 2018, the Food Safety and Standards Authority of India (FSSAI) started the Eat Right India movement, which is part of a larger effort to ensure that food in India is safe and standardised; this effort is closely related to public health. Efforts to promote healthy eating, reduce illness, and use environmentally friendly food production methods are in perfect harmony with TQM's guiding principles. Supporting MSMEs in meeting customer expectations and improving product quality, Eat Right India promotes compliance with food safety requirements and raises consumer awareness. (Chowbe, 2023)[4]

Micro, Small and Medium Enterprises are essential to many different industries, and the food processing industry in particular makes a substantial contribution to the Indian economy. The food industry in particular underwent a paradigm shift post-1991 liberalization reforms, driven by the availability of cold storage facilities and food packaging technologies. The food processing

[1] (Food and Agriculture Organization of the United Nations, 2021)
[2] (M. Nyström, 2019)
[3] (Anagaw, et al., 2024)
[4] (Chowbe, 2023)

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MSME's have been driven by the rise of retail food chains, the acceptance of packaged foods, and the expansion of food courts in metropolitan areas. Furthermore, the trend of eating out has been strengthened by modernization and the influence of Western culture, which has accelerated sectoral expansion. The market size of India's food processing industry, which includes restaurants, dairy products, snacks, beverages, confectionery and spices, accounts for 31% of India's total consumption. (The News Desk, 2017)[5]
Customer feedback has a significant impact on the food safety and quality culture in food processing. It is an effective technique for reinforcing positive behaviours while also emphasising areas for development. (Foodindustryhub, 2024)[6]
Despite the increasing focus on food safety, a considerable portion of India's food supply still goes through Micro, Small, and Medium Enterprises (MSMEs), many of which have low resources and unreliable quality assurance systems in place. While big companies are getting better at following global standards, small and medium-sized businesses generally have a hard time keeping up with strong food safety and quality management systems over time. This position is becoming even harder because of informal business models, fiscal limitations and the fact that laws are only sometimes enforced especially during inspections and only then quality is only sometimes given first priority. ("Government of India, n.d)[7] (Nair, Katarzyna, Mazurek-Kusiak, Trafialek, & Kolanowski, 2023)[8] (International Finance Corporation, 2012) (International Finance Corporation, 2012)[9]
Recent studies and even official reports highlights the continued exposed vulnerability of Indian consumers to food safety lapses and adulteration, particularly among those people purchasing from smaller, unregistered and unorganized outlets. According to the Food Safety and Standards Authority of India (FSSAI, 2021), although regulatory supervision and enforcement activities have increased, there are significant challenges that persist in monitoring the vast and diverse network of food businesses, especially MSMEs and informal vendors. Large-scale awareness campaigns and compliance drives have not yet ensured that the majority of the population, especially those who are economically disadvantaged or have lower literacy levels, routinely check for certifications or expiry dates on food products (Kumar & Mishra, 2018). Saha and Agarwal (2021) further stated that very little consumer knowledge of food safety risks and the ability to identify adulterated products exists and that is leaving many individuals exposed to potential health hazards. These findings suggest that, in spite of having legal regulatory efforts and regular public awareness structural and behavioral gaps persist in the Indian food ecosystem gaps that is randomly affecting vulnerable groups and who are particularly having consumption for food items supplied by MSMEs and local producers. TQM is a management philosophy that measures how committed an organization is to continuously improve and meet the customer expectations. Quality management is a management philosophy that aims to increase productivity by making everyone aware of the importance of quality in today's competitive market. Success in this century or any coming centuries will go to the business that has figured out what it takes to achieve quality excellence, both in terms of addressing existing issues and developing new ones.. (Gould, 1992)[10]
In the context of MSMEs, the incorporation of Total Quality Management (TQM) principles along with assimilation of structured customer feedback mechanisms offers a very promising pathway to reduce adulteration and elevate the level of food safety standards essential for a healthy population of a country. Foundational theories by (Crosby, 1979)[11], (Deming, 1986)[12] and (Juran & Godfrey, 1999)[13] argue that a culture of continuous improvement and open communication is essential for sustainable quality. Furthermore, internationally recognized certifications such as ISO 9001, as well as FSSAI compliance and quality awards, not only signal trust and transparency to consumers but also provide operational discipline and competitive advantage (Yusof & Aspinwall, 2010)[14] (Manders, Vries, & Blind, 2016)[15]. When MSMEs systematically collect and act on customer feedback, they are better equipped to identify quality gaps and prevent the risks of adulteration at the source.
Despite these advances, there still remains a very visible gap in research and what is put into practice regarding how MSMEs in India can fully take advantage of these tools to ensure safer, higher-quality food for all segments of the population apart from competitive advantage. This study aims to bridge that gap by examining the interrelatedness between customer feedback integration into actionable TQM strategies and regulatory frameworks in MSMEs ultimately contributing to a safer and more resilient food ecosystem.

[5] (The News Desk, 2017)
[6] (Foodindustryhub, 2024)
[7] ("Government of India, n.d)
[8] (Nair, Katarzyna, Mazurek-Kusiak, Trafialek, & Kolanowski, 2023)
[9] (International Finance Corporation, 2012)

[11] (Crosby, 1979)
[12] (Deming, 1986)
[13] (Juran & Godfrey, 1999)
[14] (Yusof & Aspinwall, 2010)
[15] (Manders, Vries, & Blind, 2016)

A. *Rationale of the Study*

1) More and more customers are putting food safety and quality first, even from MSMEs about which they have mixed feelings and that don't always have formal quality procedures in place.
2) A lot of MSMEs don't use consumer feedback enough and don't have any organized way to enhance quality of operations and products.
3) MSME owners typically see certifications like FSSAI and ISO as burden of regulatory compliance instead of effective option to gain consumer trust and reputation.
4) Total Quality Management (TQM) is very useful, but small businesses don't use it as often as they are not generally familiar with it or have access to any Quality Support Mechanism.
5) This study looks at how structured feedback and quality frameworks can help MSMEs raise product standards, compete with confidence and earn consumer trust through indigenous quality excellence moreover this is in line with the government's Vocal for Local objective.

II. REVIEW OF LITERATURE

A. *Food Safety and Security*

Food safety and food security are deeply connected and both are very crucial to public health worldwide. While food safety primarily focuses on prevention of any harm from adulterated food, food security is about enough nutritious food for all. This is shaped by multiple factors starting from the farmland to logistics to storage to table. The two issues are interdependent unsafe food not only harms health but also undermines food security by reducing productivity and trust. Although every country faces challenges, problems like contamination and pesticide residues are especially common in developing nations, making it essential for all countries to work together and involve every part of the food chain in ensuring safe, sufficient food for all. (Lee, Neonaki, Alexopoulos, & Varzakas, 2023)[16]

B. *Food Quality Management System*

A Food Quality Management System (FQMS) includes all organizational actions aimed at consistently producing quality products at minimal cost. This study introduces an FQMS framework specifically for agri-food SMEs, covering five key management functions: design, control, improvement, assurance, and strategy. While FQMS can boost quality, they does reduce costs and foster customer loyalty for SMEs and most European food SMEs do not implement it fully mainly due to limited resources and a lack of training but still Medium-sized firms are comparatively more advanced in FQMS maturity than smaller ones, highlighting the need for practical, user-friendly solutions tailored to the sector. Similar challenges and needs are observed among Indian MSMEs, making these insights directly applicable to the present study. (Dora, Kumar, Goubergen, Molnar, & Gellynck, 2013)[17] The Total Quality Management (TQM) system in food production is a customer-centric and Plan-Do-Check-Action (PDCA) cycle provides in-depth understanding of the entire food production process and feedback, leading to a new situation of high quality, low cost, strong competitiveness, and good economic efficiency. (Li, 2017)[18]

C. *Government Initiatives*

The government's strategy against food adulteration combines innovative solutions with strong legal enforcement initiatives to curtail and put end to food adulteration in MSMEs. Mobile "Food Safety on Wheels" labs now deliver basic testing to even the most remote communities and at the same time, the FSSAI helpline and the Food Safety Connect app enabled consumers to instantly report food safety concerns which has empowered public engagement like never before. All food businesses are required to register or obtain licenses via the FoSCoS portal of Food Safety and Standards Authority of India (FSSAI) for food licensing and registration, with requirements that are tailored by turnover and continually refined through stakeholder feedback. The enforcement part remains robust as between 2020-21 and 2023-24, FSSAI tested over 599,000 food samples, identified more than 139,000 violations of food safety regulations and initiated over 124,000 civil and 18,000 criminal cases against offenders who were involved in food adulteration. Collectively, these steps show that India is taking a proactive and changing approach to food safety, which is based on both careful monitoring and active public participation. (Ministry of Health and Family Welfare, Government of India, 2025)[19]

[16] (Lee, Neonaki, Alexopoulos, & Varzakas, 2023)
[17] (Dora, Kumar, Goubergen, Molnar, & Gellynck, 2013)
[18] (Li, 2017)
[19] (Ministry of Health and Family Welfare, Government of India, 2025)

D. Food Adulteration

As the global population is rising so quickly, food is often adulterated to satisfy the needs of this growing population and feed such a vast population. Adulteration of food and beverages is driven by a mix of economic and practical factors. It often occurs when market demand outstrips supply, pushing producers to cut corners. Many businesses adulterate their products to reduce production costs and keep up with competitors, all in pursuit of larger profit margins. For some, offering pure products is simply not viable, as the common consumer may not be able to afford them. The issue is made worse by a lack of trained staff and outdated food processing techniques, along with limited understanding of the health dangers and disease outbreaks that adulterated foods can cause. (Choudhary, Gupta, Hameed, & Choton, 2020)[20]

E. Certifications, Consumers and Owners

Food certifications are mostly seen as signs of quality and a sign of sustainable supply chain by customers. Studies related with this domain demonstrate that people think certified products are safer and better quality, and safety is a big reason why people buy them. A significant proportion of customers are willing to pay more for premium certified products since they sense trust and assurance seeing those certifications. Consumer's willingness to pay is strongly linked to their perceptions of safety, quality and the authenticity of the product's origin and heritage. Also, having clear and extensive information on a product helps fill in the gaps in knowledge between producers and consumers, which builds trust and makes people more likely to buy. For small and medium-sized food enterprises, certifications are an essential instrument to stand out and develop a good name for earning a competitive edge in the market. They help companies stand out in the market, show off their products' unique qualities based on location and traditions and improve the general reputation of their brand. Certifications help with social sustainability by safeguarding local cultural and biological resources and creating jobs in rural areas. (Bravo, Colamatteo, Balzano, Cappelli, & Iannucci, 2024)[21]

III. PROBLEM STATEMENT

Therefore, the problem chosen for this article is “Optimizing Food Safety and Quality in MSMEs through Customer Feedback Integration and TQM Strategies.”

A. Research Objectives

1. To assess consumer perceptions on the safety and quality of MSME products.
2. To evaluate the impact of compliance with ISO, FSSAI, or quality awards on customer perception of MSME products.
3. To investigate consumer knowledge and readiness to pay for high-quality, safe food products offered by MSMEs.
4. To examine the impact of consumer feedback systems on improving food safety and quality in MSMEs).
5. To identify and evaluate customer feedback methods employed by MSMEs for improvements in quality and safety.

B. Hypotheses

H0: Customer feedback integration does not significantly influence on the improvement of food safety and quality in MSMEs.

IV. RESEARCH METHODOLOGY

This study embarks to explore the impact of customer feedback integration and quality assurance systems (FSSAI, ISO, and awards) on the improvement of food safety and quality among MSMEs in the food sector using a descriptive and analytical cross-sectional design.

A. Sample and Data Collection

Primary data were collected from two groups using structured questionnaires:
Consumers of MSME food products (n =135)
MSME Owners/Managers (n = 15)
Respondents were selected intentionally using purposive sampling to ensure relevance and representation.

[20] (Choudhary, Gupta, Hameed, & Choton, 2020)
[21] (Bravo, Colamatteo, Balzano, Cappelli, & Iannucci, 2024)

B. Research Instruments and Data Analysis

Two structured questionnaires were administered:

Sr. No.	Respondent Group	Focus Areas	Question Types
1.	Consumers	Food safety perception, certification awareness, feedback experience, and willingness to pay	Likert scales, multiple-choice, and semi-structured items.
2.	MSME owners	Quality practices, customer feedback systems, TQM alignment	Likert scales, multiple-choice, and semi-structured items.

C. Data Analysis

Descriptive statistics outlined key trends. Cross-tabulations and Chi-square tests explored categorical relationships. Regression tested the effect of feedback integration on quality, while thematic coding supported qualitative insights.

D. Limitations of the Study

1) The study is geographically limited to Maharashtra, so it may not reflect MSME practices in other parts of India.

2) The sample size is modest, with only 135 consumers and 15 MSME owners, which may make it harder to apply to a larger demographic.

3) The data are cross-sectional and based on self-reporting, so they only capture people's opinions at only one point in time and don't reveal any trends over time.

V. DATA INTERPRETATION

This section gives a detailed interpretation of survey data collected from both 135 consumers and 15 MSME owners, including descriptive statistics, cross-tabulations, inferential conclusions, and relevant theoretical points of view. Each objective is analysed after taking into consideration the relevant question and their responses from both the question sets form empirical basis for the research. The scholarly context adds to the research narrative and its contribution to quality management literature.

A. Objective 1: Consumer Perceptions of Safety and Quality

An overwhelming majority of respondents reported that the food safety and product quality are either “very important” or “extremely important" when purchasing any product from MSMEs. This increased consumer awareness and quality consciousness can be interpreted as a direct result of evolving public health scenario, rising middle-class expectations and increasing news and media coverage of food adulteration cases in India which is further complemented by educated Indian population. As (Crosby, 1979)[22] rightly stated in his “Quality is Free” thesis that consumer expectations set the standard for what is acceptable in the market and failure to match up these standards results in hidden costs for producers. Despite this awareness, a non-negligible proportion of consumers have experienced safety or quality issues (C2), and satisfaction levels, though generally positive, show a spread from neutral to highly satisfied (C3). This suggests that while MSMEs are closing the expectation gap for many consumers, inconsistencies continue to persist just possibly due to the unorganised, informal, resource-constrained and sometimes ad hoc operational nature of the MSME sector. Thus, MSMEs face both an opportunity and a challenge, those who prioritize systematic quality improvement stand to gain a significant trust advantage.

B. Objective 2: Impact of Certifications (ISO, FSSAI, Quality Awards)

Descriptive analysis reveals that awareness of certifications such as FSSAI and ISO is widespread among the consumers (C4). Among those aware, the presence of such certifications or awards has a strong and positive influence on their purchase decisions (C5). This finding aligns with ISO 9001’s principle of customer focus and documented benefits in the work of (Yusof & Aspinwall, 2010)[23] , which show that visible compliance can drive both external trust and internal process discipline. Almost all MSME owners are having the quality certifications (O2) and all of them believe that these have been instrumental in improving customer trust and sales (O3). However, for some consumers, certifications don’t fully erase doubts about quality of the product, and a few MSME owners see them more as a extra formality rather than a true mark of excellence. This highlights the need for visible compliance and genuine, ongoing commitment to maintain and incorporate quality standards.

[22] (Crosby, 1979)
[23] (Yusof & Aspinwall, 2010)

C. Objective 3: Knowledge and Willingness to Pay

Beyond regular awareness, consumers do exhibit a very visible willingness to pay more often in the range of 5–20% extra for products that are certified safe or have earned quality awards (C7). This finding is significant for MSMEs, as it debunks the myth that "price is everything" in value-sensitive markets. Conversely, a meaningful part of the consumer base values trust and traceability and are willing to reward MSMEs in form of higher price who can demonstrate commitment to these principles. This is consistent with findings by (Manders, Vries, & Blind, 2016)[24], who observed that third-party certification can unlock premium pricing and support market differentiation. It is worth notingthat this willingness to pay is closely tied to visible, trustworthy signals not to the shallow claims of quality, which are insufficient. The implication is that investments in credible certification, branding, and transparent quality practices can yield a price premium and foster repeat patronage.

D. Objective 4: Impact of Feedback Systems on Quality and Safety

A major intent of this research is the investigation of whether structured feedback mechanisms actually drive quality improvements within products manufactured by MSMEs. While close to half of consumer respondents reported having provided feedback at some point of time (C8), many express frustration that such input is not always acknowledged or they do not see any visible results (C9), and only few opportunities exist for sharing feedback (C10). Still, a whole majority of the respondents continue to believe that organized feedback has the potential to catalyse product improvement (C11). MSME owners echo this sentiment as those who engage more systematically with feedback (O5, O7, O10) report higher perceived effectiveness in improving product safety and quality (O8). This dynamic illustrates (Deming, 1986)[25] perspective that feedback loops are central to the Plan-Do-Check-Act (PDCA) cycle a core tenet of Total Quality Management (TQM). To statistically test this relationship, a cross-tabulation was performed between whether consumers had given feedback and their belief in its impact. The resulting table (see below) makes clear that participatory consumers are much more likely to "Agree" or "Strongly Agree" that feedback drives improvement. A chi-square test confirmed the significance of this relationship ($\chi^2 = 37.85$, df = 8, $p < 0.001$), leading to the rejection of the null hypothesis and validating the role of customer feedback integration in TQM-oriented MSMEs.

Table X: Cross-tabulation of Feedback Provided vs. Belief in Feedback's Impact

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Total
Gave Feedback	2	4	5	14	25	50
Did Not Give	6	7	12	6	2	33

Chi-square test: $\chi^2 = 37.85$, df = 8, $p < 0.001$

This table and the statistical conclusion show that experiential involvement, which is offering feedback, not only makes customers more likely to believe that these systems work, but it also probably makes them expect and notice good changes.

E. Objective 5: Feedback Methods in MSMEs and Demographic Effects

MSMEs owners responded that they use a spectrum of feedback channels, from online surveys and social media to in-store forms and direct dialogue (O6). Interestingly, the data indicate that those MSMEs employing three or more feedback channels are more likely to review and act on customer suggestions consistently. However, significant barriers exist in operational complexity, cost pressures and difficulties in engaging customers meaningfully (O14). Owners highlight that feedback related to taste, shelf life, and packaging is the most valuable (O11), aligning with consumer comments and contemporary quality literature. The importance of adapting feedback systems to customer segment needs is highlighted in the work of (Juran & Godfrey, 1999)[26], who emphasize that continual improvement must be tailored to the customer's "voice." Additional Cross-tabulation is done to assess the Consumer Willingness to Pay (C7) by Education Level

To triangulate and add depth, an additional cross-tabulation was performed between education level (demographic variable) and willingness to pay for certified MSME products:

	0%	5% more	10% more	15%+	Total
Below Graduate	8	14	3	2	27
Graduate & Up	4	17	9	9	39

[24] (Manders, Vries, & Blind, 2016)
[25] (Deming, 1986)
[26] (Juran & Godfrey, 1999)

This table shows that consumers with higher education have more willingness to pay a premium price, supporting the idea that market segmentation and focused communication can improve MSME pricing and positioning tactics.

In general, these results show that making food safer and better in MSMEs isn't only about following the rules or getting feedback every now and then. It is the strategic combination of open, multi-channel feedback systems and real quality management practices that includes customer participation and adherence to international standards set by Deming, Juran, and Crosby that builds trust, sets the organization apart from the competition, and leads to long-term growth.

VI. FINDING

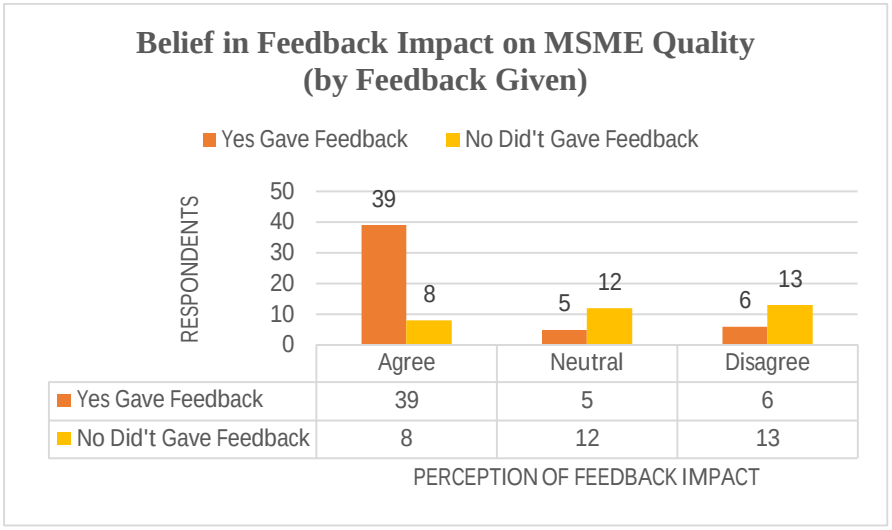
1) Consumer Priorities and Perceptions: Customers who consume food items manufactured by MSMEs often place a very high importance on product quality and food safety. Although the overall satisfaction is high, a sizable minority points out at earlier concerns, demonstrating ongoing variations across MSMEs with regards to consistency in maintaining food quality standards.

2) Influence of certifications (ISO, FSSAI, Quality Awards): In accordance with the data, customers are well-informed of certifications such as FSSAI and ISO, and those who are knowledgeable about the certifications are substantially more likely to be affected by them than those who are altogether ignorant about them. All MSME owners in the study responded having certificates and attributed greater consumer trust and sales to these evident quality indicators. However, not all customers think that certification means that the product is always of the highest quality. This shows how important it is to always follow the rules.

3) Willingness to Pay and Market Segmentation: The majority of consumers are willing to pay a premium price of around (5–20% more) for MSME food products that are certified or recognized for quality certifications and awards. This willingness is particularly seen among consumers with higher educational qualification, indicating an opportunity for MSMEs to target promotion and pricing strategies for more margins effectively.

4) Impact of Feedback Integration: A statistically significant association was found between consumers who have given feedback and those who believe feedback leads to MSME quality improvement ($\chi^2 = 37.85$, df = 8, $p < 0.001$). The majority of feedback participants agreed that their input could drive changes in safety and quality, while non-participants were much less likely to hold this belief. This result confirms the positive role of feedback systems in fostering consumer trust and perceived quality.

This can be expressed visually as follows:



To further clarify this process, Figure Y presents a conceptual flow chart that illustrates the pathway from customer feedback to enhanced food safety and consumer trust in MSMEs, grounded in TQM principles.



PROCESS OF CONSUMER FEEDBACK

5. Feedback Mechanisms and Barriers in MSMEs

MSME owners use a number of ways to get feedback, such as online surveys, social media, and talking to customers directly. Those who use more than one approach are more likely to act on consumer suggestions. There are still problems, including how hard it is to run and how much it costs, and much of the useful criticism is about taste, shelf life, and packaging.

VII. CONCLUSIONS

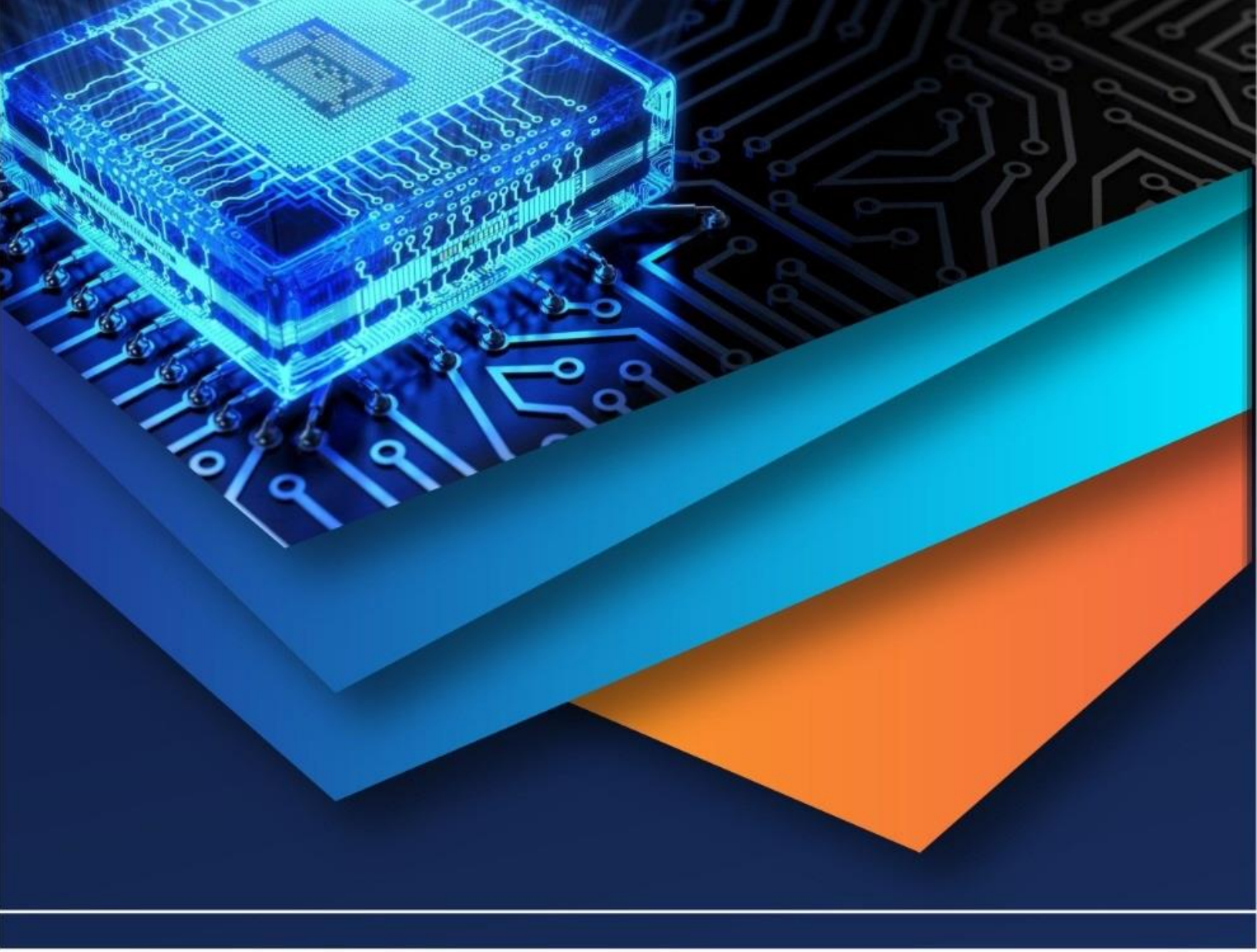
This study highlights that while structured feedback systems and credible certifications do significantly improve MSME food quality and safety, deeper challenges persist at the ground level. Too often, quality is enforced only when food inspections are expected, and many of the poorest, least-aware citizens including children and families unknowingly regularly consume MSME breads, biscuits and snacks without ever checking for expiry or certification or any quality award. In reality, products from large corporations often contain fewer questionable additives than many small-scale MSMEs. Yet, MSME foods quietly reach far and wide: not just to local households, but into the hands of street vendors, school canteens, office and hospital cafeterias places where consumers seldom question the source. As a researcher who has witnessed these realities firsthand, I had come to believe true progress demands not just systems and standards, but genuine accountability and awareness at every step, from the grassroots seller to the last consumer.

And yes there is a scope for research and innovation in the field of holistic food production for ever growing population which is not addressed yet, TQM induced certifications and awards are the first step if that is initiated then only then can the promise of safe, high-quality food become a reality for all.

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