GET INTERNATIONAL RESEARCH JOURNAL

Optimizing Digital Transformation in Quick-Service Restaurants: An Enhanced Operational Plan for Urban Fast-Food Establishments

Mariane L. Armateo[1], Rowilyn G. Cabariban[2], Daphne N. Cantillan[3], Thea M. Dela Vega[4], Mary Grace C. Lucas[5], Angela S. Samson[6], Gwyneth Allyzon F. Velasco[7], Ruel S. Bunag[8], Eloisa P. Mackay[9], Janette L. Aguilar[10]

[1,2,3,4,5,6,7,8,9,10] University of Caloocan City

Corresponding Email: jaguilar@ucc-caloocan.edu.ph, eloisa.mackay@ucc-caloocan.edu.ph

Available Online: May 2026
Revised: April 2026
Accepted: April 2026
Received: March 2026

Volume IV Issue 2 (2026)
DOI: 10.5281/zenodo.23766037
E-ISSN: 2984-7184
P-ISSN: 2984-7176
https://getinternational.org/research/

Abstract

This study is dedicated to assessing the current level of digital transformation within selected fast-food establishments in North Caloocan City and its impact on operational efficiency, customer satisfaction, and overall business performance. This research focuses on respondents residing in North Caloocan City from different generations: Generation X, Generation Y, and Generation Z. Forty (40) responses were gathered per generation, accumulating a total of 120 responses. These responses and a comprehensive approach aim to develop an enhanced operational plan that promotes innovation, improves service quality, and strengthens competitiveness in the local food industry. The study implements a survey methodology, utilizing structured questionnaires distributed through Google Forms to efficiently gather data. This method guarantees accessibility for participants and allows for the collection of detailed feedback on various aspects of their dining experiences. Key factors examined in this study include the mode of payment, technical capacity, processing time, accessibility features, and assistance availability of adopting technologies in the operations of fast-food restaurants. The findings provide practical insights for restaurant managers and stakeholders looking to improve their operations. Fast-food restaurants may provide positive service by matching their approaches with the requirements and expectations of consumers. This could include strengthening digital systems and technical procedures, increasing staff training for digital support, assuring accessible and user-friendly platforms, and delivering faster and more reliable transaction processing. Finally, the study aims to create a structured operational plan based on the data acquired, which will serve as a guide for improving customer happiness and operational efficiency in Caloocan City's digitalized fast-food enterprises.

Keywords: *Digitalization, fast-food industry, and operational strategy*

Recommended Citation:

Armateo, M. L., Cabariban, R. G., Cantillan, D. N., Dela Vega, T. M., Lucas, M. G. C., Samson, A. S., Velasco, G. A. F., Bunag, R. S., Mackay, E. P., & Aguilar, J. L. (2026). Optimizing digital transformation in quick-service restaurants: An enhanced operational plan for urban fast-food establishments. *GET International Research Journal*, *4*(2), 1–19. https://doi.org/10.5281/zenodo.23766037

CC BY SA

INTRODUCTION

The world has been continuously experiencing innovation. Different technological advancements, such as the invention of computers, the internet that we are all using, and most significantly, the creation of smartphones, started. In the 21st century, technology plays a crucial part in everyday life and society (**Geeks for Geeks, 2022**). It is helpful in people's lives and many business sectors, such as manufacturing, agriculture, and even the food industry implementation and readiness (**Mallillin, et al., 2020**).

In the study conducted by **American Dining Creations (n.d.)**, they mentioned that food demand is apparent as the world continuously grows in population. People are demanding not just food but safer, healthier, and more convenient food services. Therefore, food business owners are responding to their needs by implementing different automated technologies such as ordering kiosks, robot servers, e-menus, reloadable smart cards, and e-table numbers/table buzz that can work efficiently and satisfy customers' needs and satisfaction productivity management style (**Mallillin et al., 2024**).

Furthermore, customers use and experience a variety of technological advancements implemented in food outlets, so their involvement with these requires a thorough investigation. Accordingly, a study by **Blöcher and Alt (2020)** demonstrates that consumers are more likely to adopt new technology if they perceive a personal benefit and believe they can function as promised and complete their tasks in a systematic and effective way (Patriarca, et al. 2025). In the past few years, the digital revolution has radically altered many industries. Among the examples are media (news portals, streaming services), retailing (mail ordering and online groceries), tourism (online travel agencies, sharing platforms), and banking (online banking, smart payments) (**Saputra & Wahid, 2025, pp. 30-36**). Similar developments may occur in the hospitality sector, which is a subset of the wider tourism economy that includes the restaurant industry (**Reynolds, 2025**).

Over the past years, this field has seen the rise of digital innovations, increased competition and, most recently, it has experienced the decisive event of the Corona pandemic. Due to lockdowns and other prevention measures, restaurants worldwide have had to encounter considerable losses in sales (**Kim & Lee, 2020**). Without appropriate preparation, low-contact services such as ordering, pick-up, and delivery, have become their principal means of income. Also, the predictions for the post-pandemic future are positive with a growth rate of up to 28 percent compared to the 2019 period being expected for Germany in 2021 (**Prognos, 2020**). As technology continues to change the way businesses work and function, the fast-food industry is going through some major shifts and turnovers. Tools such as self-service kiosks and mobile ordering apps are now regularly used to make service faster, cut down on errors, and make things more convenient for customers (**Mallillin et al., 2023, pp. 41-52**). Nonetheless, figuring out exactly how these changes affect customer experiences and how businesses run daily is not easy. It is also important to analyze how technology influences and affects things like speed, accuracy, saving costs, and keeping customers satisfied, as this knowledge is key to developing effective strategies (**Mallillin, 2025, pp. 1765-1785**). Aligning with Target 9.4 of Goal 9 of the 17 United Nations' Sustainable Development Goals, there's a need to "*upgrade infrastructure and retrofit industries to make them sustainable, with increased resource-use efficiency and greater adoption of clean and environmentally sound technologies and industrial processes*" (**United Nations, n.d.**). Therefore, fast-food companies need to find a way to use technology to improve efficiency without losing the personal touch that customers appreciate. Tackling these challenges can help businesses run more smoothly and create stronger connections with their customers (**Shalihati, et al. 2025**).

CC BY SA

The research considers how technology can be applied as an instrument in planning to achieve maximum productivity and meet customers' needs. Through the analysis of the existing practice and making suggestions on the information gathered, the research seeks to complement the digital transformation of the fast-food firm. The research seeks to assist the firm in keeping pace with technology while remaining customer-oriented and improving their procedures (**Ming, 2025**).

This study investigates how digital technologies and automation are transforming the quick service business. Its central objective is to examine how these digital technologies can make operations streamlined (**Mallillin & Dolba, 2026, pp. 1845-1854**). Quantification of the order fulfillment time, order accuracy, and cost savings offered by these digital technologies is part of analysis. Based on the analysis of these parameters, the study tries to explain to what level digital technology can speed up operations, make them more accurate, and cost-saving. For instance, digital ordering kiosks can improve speed and error minimization, both for customers and the company (**Mallillin et al., 2024**).

Aside from this, the research also analyzes some of the fast foods in Caloocan City to determine areas of operation to be improved. It analyzes the impact of digital technology on some of the most important areas of regular operations like speed, accuracy, and customer satisfaction in order processing. The research also determines potential implementation problems like system failure and constraints in accessing needed technology. Moreover, from the observation of existing procedures and collection of customers' views, the study should provide an executable plan of embracing digital solutions in Caloocan City fast foods businesses. The plan should not only be performance improvement but also how the new technologies can be aligned with business targets and customers' needs. Since digital technologies have been developing at a high rate, Caloocan City fast foods businesses should respond to remain in the market, be efficient, and enhance customers' satisfaction.

Statement of the Problem

This study aims to examine the Digitalization of Selected Fast-Food Industry in North Caloocan: Basis for Enhanced Operational Plan. Specifically, it aims to answer the following questions.

1. What are the demographic profile of the respondents in terms of:
    - 1.1 age,
    - 1.2 gender, and
    - 1.3 occupation?
2. How do the respondents assess the digitalization of selected fast-food industry in Caloocan City in terms of:
    - 2.1 mode of payment,
    - 2.2 technical capacity,
    - 2.3 processing time,
    - 2.4 accessibility features, and
    - 2.5 assistance availability?
3. What are the challenges are encountered by fast food establishments in adopting and maintaining digital systems?

4. What are the solutions recommended that may be offered to address these challenges?

METHODS

Research Design

This study will use a quantitative-descriptive research design to aim to discover the perspective and response of different generations to the rapid growth of digital technology in the selected fast-food restaurants. The questionnaire collects and analyze the numerical data through observations, surveys, and questionnaires to quantify and describe how efficient the digital tools are in customer satisfaction across various generations to satisfy customer in the food industry (**Karunaratne, 2025**).

Apparently, the researchers use quantitative-descriptive research as an ideal methodology for this research design, as it allows researchers to identify the leading patterns, trends, and relationships within the data without manipulating the variables (**Maftuh et al., 2025, pp. 1054-1072**).

The data study will provide measurable insights into the current state of customer perceptions and reactions to the fast-food restaurant in efforts to offer a systematic, smooth operation and service quality. The research findings of this study can help fast-food restaurants and businesses tailor their operations to have a smooth operation and implement initiatives to meet the needs and preferences of distinct generational segments of their customer base. Ultimately, this research will contribute to a data-driven understanding of how the fast-food industry can assist in supporting the systematic efforts to drive greater customer satisfaction across generations and enhance operational plans (**Tillman, 2025**).

Populations and Sample of the Study

This research seeks to determine the cross-generational views on the digitalization of certain fast-food joints in Caloocan City. More specifically, it tries to gauge the impact of self-service kiosks, mobile ordering apps, point-of-sale and digital payment systems, on the efficient running of fast-food stores and customer experience. Through comparing feedback from people who have already engaged with these tech solutions, the study will determine how digital offerings are improving the quality and delivery of services, whilst better accommodating the lifestyle preferences and needs of the UK's varied population, of all ages.

This objective will be achieved by administering 120 individuals via Google Forms-based survey. Respondents will be segmented into three "*generations*": Generation X (born 1965-80) Millennials (born 1981-96 -roughly ages 24-39 when surveyed) Generation Z (born 1997-2012), with 40 respondents from each. These clusters will allow for a more nuanced analysis of the generation gap in attitudes towards digitalization in fast-food. It captures the diverse perspectives within the fast-food digitalization context such as cashless payment, ordering, kiosk, and self-service experiences based on the needs of the customers and respondents. It ensures to capture to analyze statistics and examining the digital attitude toward fast-food chain environment (**Helal, 2023**).

The sample of participants will be drawn by purposive sampling those who had experience of digital fast-food service usages. It gives us the confidence of relevance to the research questions. Convenience sampling will also be used by making the survey available online (Google Forms) so data can be collected quickly and easily. The

questionnaire will be concentrated on the respondents' level of experience in the fast-food digitalization through the following main constructs type of payment, technical ability, transaction time, accessibility and level of assisted service. Through the study of these variables by generation, the paper will evaluate the potential of ICT based innovation for customer experience and operational efficiency. Secondly, it will determine if there are any limitations or barriers to this kind of technology use in fast food establishments. The results of this study contribute vital information with regards to digitalization in the fast-food industry in Caloocan City. These will be used to inform the creation of a targeted intervention in the form of an enhanced operational plan that will facilitate the implementation and effectiveness of digital tools in fast food outlets. This service will provide service, be inclusive, and result in serving for both young and old.

Data Gathering and Procedure

The researchers of the study will propose a formal letter to request permission from the respondents of all generations to conduct the study. A Google Form survey questionnaire will be employed to collect data efficiently. Considerate time and effort are devoted to designing the questionnaire to ensure its relevance and effectiveness for the target respondents. A four-point rating scale is incorporated into the questionnaire, which will validate the subject professor prior to distribution. To guarantee accurate responses and to emphasize the significance of the participant's input, the researchers employed an online survey questionnaire distribution because it is the most cost-effective method and it can reach the target number of respondents in comparison to other mediums.

The researchers will document their activities and actions as they choose their qualified respondents for the survey questionnaire. To ensure that the respondents fully understand their tasks and responsibilities, the researchers will present the appropriate information and definitions of terms. Respondents are advised to provide honest and thoughtful responses. After collecting the completed survey, the researchers will arrange and analyze the data in preparation for in-depth analysis and interpretation.

RESULTS and DISCUSSION

1. On the demographic profiles of the Respondents

Table 1

Demographic Profiles as to Age

Age	Frequency	Percentage
45 - 60	40	33.3%
29 - 44	40	33.3%
13 - 28	40	33.3%
Total	**120**	**100**

Table 1 presents the evenly distributed age segmentation of the respondents that include the following breakdown: 13-28 years old: 40 respondents (33.3%), 29-44 years old: 40 respondents (33.3%), 45-60 years old: 40 respondents (33.3%).

CC BY SA

This interprets that the equal distribution across all age groups reflects a balanced representation of generational perspectives in the survey. This even spread enables the research to gain holistic insights into how digitalization is perceived and experienced by customers or employees of various age brackets within the fast-food industry in Caloocan City. The Young Adults (13-28 years) are likely more familiar with and reliant on digital technologies such as mobile ordering apps, QR code menus, and online payment systems.

Their input provides insights into how digitalization enhances convenience and speed in fast food transactions. While the Adults (29-44 years) typically represent working professionals who may value digital solutions that offer efficiency and time-saving features. This group's response could indicate how digital tools influence purchasing behavior amid busy lifestyles. Lastly, Older Adults (45-60) might present more traditional perspectives but also offer valuable feedback on the accessibility and usability of digital systems for individuals who may not be as tech-savvy. The balanced demographic structure suggests that the research findings can be generalized across age groups, enhancing the validity and reliability of the conclusions. Moreover, the diversity in age can be used to tailor digital strategies that cater to different user needs and preferences in the enhanced operational plan for fast food businesses (**Azevedo, 2024**).

Table 2

Demographic Profiles as to Gender

Gender	Frequency	Percentage
Female	75	62.5%
Male	45	37.5%
Total	**120**	**100**

Based on the data gathered: 75 respondents (62.5%) were female, and 45 respondents (37.5%) were male. This indicates a higher participation rate among female respondents compared to male respondents in the survey conducted. The results suggest that female employees or customers may represent a larger proportion of stakeholders in the selected fast food industry establishments in Caloocan City. This could be due to several possible reasons:

Workforce Composition: Many fast-food chains often employ a higher number of female workers, especially in front-line service roles such as cashiers, crew members, and service staff. The results might reflect this employment trend.

Consumer Engagement: On the part of the customers, females may be more engaged or more likely to participate in surveys, which is supported by common research findings showing higher survey response rates among women.

Digitalization Relevance: The gender distribution could also imply that any digitalization initiatives should consider the preferences, digital literacy, and user experiences of female users as the dominant group among stakeholders.

Given the higher proportion of female respondents, the enhanced operational plan for digitalization in the fast-food industry should consider the following: **User Experience Design**, it is how the digital tools and platforms (e.g., self-service kiosks, mobile apps) should be designed with inclusive and user-friendly interfaces, reflecting the

CC BY SA

preferences and needs of the female majority. Another is **Training's and Support Programs**, which talks about how any digital transformation strategies should include targeted training programs, especially for female employees, to ensure ease of adoption and effectiveness. And Marketing and Communication, this include campaigns to promote digital services may benefit from gender-sensitive messaging, leveraging the interests and habits of the more engaged female demographic.

The demographic data showing a female majority (62.5%) among respondents highlights the importance of gender-aware planning and implementation of digital solutions in the fast-food industry. This insight provides valuable direction for crafting an operational plan that aligns with the actual profile and needs of its primary users and stakeholders in Caloocan City (**Rukasha, et al. 2026**).

Table 3

Demographic Profiles as to Occupation

Occupation	Frequency	Percentage
Student	28	23.3%
Employed	46	38.3%
Self-employed	17	14.1%
Unemployed	23	19.2%
Retired	6	5%
Total	**120**	**100**

Table 3 presents the demographic profile of the respondents as to occupation. The majority of respondents were employed (38.3%). Students made up the second largest group (23.3%) followed by unemployed (19.2%), self-employed (14.1%), and retired individuals (5%). This occupational breakdown gives useful insights into the diversity of users and stakeholders involved in or affected by the digitalization of fast-food services: 38.3% are employed. This group likely includes fast food staff, office workers, and service professionals. Their responses are important because they may use fast food services during breaks, after work, or even be part of the digital service workforce. Followed by students with 23.3%. Who are often early adopters of digital tools like mobile apps and self-service kiosks. Their high participation shows their strong relevance as consumers, especially for digital ordering, online promos, and delivery services. Subsequently Unemployed have 19.2% of respondents. This group may rely on fast food for affordable meals and convenience. Their input reflects price sensitivity and how digital platforms might impact access to deals or promotions. Self-employed respondents composed of 14.1%, likely prioritize speed, efficiency, and convenience, especially during busy workdays. Their responses can inform how digitalization helps them manage time and accessibility better. Lastly, 5% are Retired. While a smaller group, they highlight the need for user-friendly and accessible digital interfaces. Digitalization plans should still consider ease of use for older or less tech-savvy users.

Given the above occupational mix, the operational plan for digitalization in Caloocan's fast-food industry should be: Flexible and inclusive, designed to meet the needs of a working population and student base. Accessible to ensure that platforms are easy for unemployed and retired individuals to use, especially for affordability and

simplicity. Mobile-friendly and fast to cater to students and self-employed individuals who value speed and digital convenience. Lastly, User-segmented - perhaps consider different approaches or features for different occupational groups, such as loyalty programs or quick re-ordering options for regular workers.

The results show that fast food digitalization in Caloocan must serve a broad and varied group, with employed individuals and students as key users. Understanding their daily routines, digital habits, and service expectations will be crucial to creating an effective, user-centered operational plan that enhances customer experience and efficiency across all occupational segments (**Gursoy, 2026, pp. 1-15**).

2. On the respondents' assessment in the digitalization of selected fast-food industry in Caloocan City

Table 4

Assessment in the Digitalization of Selected Fast-Food Industry in Terms of Mode of Payment

Mode of Payment	**M**	**VI**
Overall experience with online payments.	3.34	HS
Accuracy of the payment transactions.	3.40	HS
Availability of cash payment as an option.	3.42	HS
Payment transactions is easy and simple.	3.38	HS
Fast payment at the counter.	3.47	HS
Prices and bills are clear.	3.50	HS
Using cards to pay is easy.	3.24	S
The payment is quick and does not take too long.	3.28	HS
Average Mean	**3.38**	HS

In terms of the respondents' level of satisfaction regarding the mode of payment in digitalized fast-food establishments in Caloocan City, the findings revealed an overall composite weighted mean of 3.38, which indicates that the respondents were highly
satisfied.

Among the specific indicators, the highest rated was the clarity of prices and bills 3.50, showing that customers greatly value transparent and easy-to-understand billing. This was closely followed by fast payment at the counter 3.47, emphasizing the importance of speed in service. Likewise, respondents expressed high satisfaction with the accuracy of transactions 3.40, the availability of cash as an option 3.42, and the simplicity of the payment process 3.38, all of which contribute to a seamless customer experience.

However, the item "*using cards to pay is easy*" received the lowest mean score of 3.24, indicating that while respondents were still satisfied, this area may need improvement-possibly due to technical or usability issues.

Overall, the data suggests that while digital payment systems are generally well-received and functioning effectively, enhancements can still be made to further improve user experience, especially in terms of card-based transactions

As defined by **Dimayuga (2024)**, the market has seen a rise in the number of payment options available to customers, giving them greater choices and convenience when completing transactions. Customers now have the

option to pay using cash, credit or debit cards, mobile wallets, or online banking platforms, making the process more dependable and effective.

The study also shows that the speed at which payments are processed has a significant impact on customer satisfaction. As a result, companies that implement a variety of quick, reliable, and transparent payment methods stand a better chance of strengthening their clientele and gaining a competitive advantage in the modern, digital economy (**Emma, 2025**).

Table 5

Assessment in the Digitalization of Selected Fast-Food Industry in Terms of Technical Capacity

Technical Capacity	**M**	**VI**
Menus on kiosks are easy to see and understand.	3.28	HS
Kiosks take orders quickly.	3.22	S
Online or app orders are processed fast (GrabFood, Food Panda, Zomato, Swiggy, and Uber Eats).	3.20	S
Accuracy of food preparation based on digital orders.	3.28	HS
Ordering through kiosks is both easy and convenient.	3.23	S
Touchscreen kiosks are responsive and user-friendly.	3.27	HS
Digital kitchen systems help avoid wrong orders by managers/supervisors.	3.23	S
Automated kitchens systems help ensure consistent food quality.	3.27	HS
Average Mean	**3.25**	**S**

In terms of technical capacity, the survey findings revealed an average weighted mean of 3.25, interpreted as Satisfied. This indicates that respondents generally view the digital tools used in fast food establishments-such as kiosks, ordering systems, and automated kitchen processes-as functional and helpful, though not yet excellent.

The highest-rated indicators were the clarity and ease of understanding menus on kiosks 3.28, the accuracy of food preparation based on digital orders 3.28, and the responsiveness of touchscreen kiosks 3.27, all of which were interpreted as Highly Satisfied.

These suggest that customers appreciate well-designed and user-friendly digital interfaces, especially for placing and receiving accurate orders. Similarly, the presence of automated kitchen systems that help ensure consistent food quality 3.27 also contributed to high satisfaction levels, highlighting the value of back-end automation in improving service quality.

On the other hand, online/app order processing speed 3.20, ease of ordering through kiosks 3.23, and prevention of wrong orders by digital kitchen systems 3.23 were rated slightly lower, though still under the "*Satisfied*" category.

The lowest score was for kiosk ordering speed 3.22, suggesting a potential area for improvement in system efficiency and processing time.

Overall, while customers and users are mostly satisfied with the technical capacity of digital systems in these establishments, the findings point toward opportunities to improve speed and reliability, especially during high-volume periods.

Correspondingly, this result is similar to the study by **Pacheco et al. (2024)**, which demonstrates the service quality of kiosks and technical performance of online food application.

This result also shows the technical performance of kiosk and online application that highlights a characterized intuitive interface and easy navigation, which fosters trust and reliability, while accurate orders reduce frustration and improve the overall dining experience of the customer which enhance the customer satisfaction and loyalty (**Dyatmika, et al. 2025, pp. 556-566**).

Table 6

Assessment in the Digitalization of Selected Fast-Food Industry in Terms of Processing Time

Processing Time	**M**	**VI**
Speed at which my order is taken	3.19	S
The time to place an order is short.	3.21	S
Online or mobile orders are quickly processed.	3.14	S
Orders are served at the counter without long delays.	3.09	S
E-table numbers work well while waiting for food.	3.32	HS
Online orders are prepared and packed quickly.	3.14	S
Notification speed of order is ready for pick-up or dine-in.	3.17	S
Digital orders are handled well even during busy hours.	3.08	S
Average Mean	**3.17**	**S**

In terms of processing time, the respondents gave an average weighted mean of 3.17, interpreted as Satisfied. This suggests that, overall, customers are content with how quickly their digital orders are taken, prepared, and served in fast food establishments in Caloocan City, but there is still room for improvement.

The highest-rated item was the use of E-table numbers while waiting for food 3.32, which was the only aspect that received a Highly Satisfied rating. This indicates that respondents appreciate systems that provide clarity and order tracking while they wait. Other items, such as the speed of order-taking 3.19, short time to place orders 3.21, and notification speed when the order is ready 3.17, were all rated as Satisfied, showing that these aspects of digital ordering are functioning well but could be optimized further.

The lowest-rated items were serving orders at the counter without long delays 3.09 and handling digital orders during busy hours 3.08, which points to operational bottlenecks during peak times. These findings suggest that while the current digital systems are generally effective in ensuring timely service, the operational plan could benefit from strategies to manage order congestion and enhance service during high-demand periods.

As stated by **Noble (2023)**, these kiosks have a reputation for their capacity for accelerating processing times by eliminating the need for human interaction at counters and enabling clients to finish orders quickly and easily. This highlights the impact of the digitalization on the fast-food industry in terms of the processing time which leads to customer satisfaction and fast service of the operations.

Table 7

Assessment in the Digitalization of Selected Fast-Food Industry in Terms of Accessibility Features

Accessibility Features	**M**	**VI**
People in wheelchairs and those of low height may access the kiosk.	2.77	S
There is enough space around the kiosks for easy movement of accessibility devices.	3.08	S
Instructions are clear with minimal technical jargon.	3.08	S
Kiosks offer high-contrast text and backgrounds for readability.	3.19	S
It quickly processes orders placed by mobile or the internet.	3.15	S
The amount of time it takes at the counter to prepare my order.	3.08	S
While I'm waiting for my orders, the accuracy of e-table numbers	3.17	S
Kiosks provide readable content with highly contrasting text and background.	3.26	HS
Average Mean	**3.10**	**S**

With regard to the accessibility features of digital systems in selected fast-food establishments in Caloocan City, the survey results yielded an average weighted mean of 3.10, which falls under the Satisfied verbal interpretation. This suggests that while current digitalization efforts are generally acceptable in terms of accessibility, there is clear room for improvement, especially for customers with special needs. The highest-rated item was that kiosks provide readable content with high-contrast text and backgrounds 3.26, receiving a Highly Satisfied rating. This highlights the importance of visual clarity for all users, particularly for those with vision difficulties. Other aspects such as kiosk readability 3.19, e-table number accuracy while waiting 3.17, and the processing speed of mobile/internet orders 3.15 also reflect positive experiences but did not reach the "*Highly Satisfied*" threshold.

On the other hand, the lowest-rated item was the accessibility of kiosks for people in wheelchairs or of low height 2.77, which was the only indicator to fall below 3.00. This points to a potential gap in physical inclusivity, indicating that the current kiosk design may not adequately accommodate persons with disabilities. Similarly, several items such as space around kiosks and instruction clarity scored just slightly above 3.00, showing that navigation and usability still pose challenges for some users. These results suggest that for digitalization to be truly inclusive, future operational plans should give more attention to universal design principles ensuring that kiosks and digital tools are accessible to all customers, regardless of physical ability

A study by **Lee, Park, and Kim (2023)** highlights that incorporating accessibility and usability features in self-service kiosks such as proper screen height, readable text, and clear visual instructions greatly enhances inclusivity and user experience. Likewise, **Park et al. (2023)** emphasize that many kiosks still lack physical accessibility, particularly for wheelchair users and individuals of shorter height, underscoring the need for compliance with accessibility standards to ensure equitable service. In the fast-food context, **Shukry et al. (2023)** found that system quality, speed, and interface clarity significantly affect customer satisfaction and continued usage. Together, these studies suggest that when self-service kiosks are designed to be both accessible and efficient, they not only improve usability for all customers but also strengthen overall satisfaction and trust in digital ordering systems.

Table 8

Assessment in the Digitalization of Selected Fast-Food Industry in Terms of Assistance Availability

Assistance Availability	**M**	**VI**
For a wide range of users, Kiosk supports different languages	3.17	S
Staff are readily available to assist customers during kiosks.	3.09	S
Staff are well trained to assist customers with kiosk use when needed.	3.24	S
The number of employees on hand to help patrons at the kiosks	3.13	S
Staff respond promptly when help is needed.	3.14	S
Staff are helpful and polite when assisting at the kiosks.	3.26	HS
The staff's ability in handling kiosk-related problems.	3.22	S
Ordering through the kiosks is supported by clear, guided steps.	3.24	S
Average Mean	**3.19**	**S**

In terms of assistance availability, the findings revealed a composite weighted mean of 3.19, which is interpreted as Satisfied. This indicates that while respondents generally had positive experiences with the support provided during digital kiosk use in fast food establishments, the level of assistance could still be improved.

The highest-rated item was "*Staff are helpful and polite when assisting at the kiosks*" 3.26, which received a Highly Satisfied rating. This suggests that when assistance is provided, it is done courteously and effectively, which plays a key role in improving customer experience.

Several other indicators, including staff training 3.24, clear guided steps during ordering 3.24, and staff ability in handling kiosk-related problems 3.22, also show that customers feel reasonably supported.

However, items such as availability of staff to assist 3.09 and language options on the kiosks 3.17 scored lower, indicating a need for more proactive support, staff visibility, and perhaps expanded language options for inclusivity.

Although no indicators received low satisfaction ratings, the overall interpretation of "*Satisfied*" suggests that support systems are functioning adequately but not yet exceptional.

For the digitalization of fast-food operations to be more efficient and inclusive, enhanced staff presence, training, and system guidance should be prioritized in the operational plan. Studies highlight the significance of providing accessible assistance in self-service kiosks. (**Ishak et al.,2021**) emphasizes that fast food chains should offer clear instructions and support to customers who need help when using digital systems.

Similarly, **Chung Heon Lee et al. (2024)** suggest that designing kiosks with familiar, easy-to-understand interfaces especially for older adults can reduce the need for constant assistance while still ensuring that help is available when necessary.

Together, these findings show that combining user-friendly design with accessible assistance can enhance efficiency and customer satisfaction in digital ordering systems.

CC BY SA

3. On the challenges are encountered by fast food establishments in adopting and maintaining digital systems

Table 9

Challenges Faced by Fast Food Establishments in Implementing and Maintaining Digital Systems

Respondents' Perceptions of Challenges Faced by Fast Food Establishments in Implementing and Maintaining Digital Systems	M	VI
When taking orders, ordering kiosks rarely make mistakes. A kiosk's lack of clear instructions makes it challenging to use.	3.05	A
When self-service kiosks are unavailable, waiting time will be longer.	3.24	A
Self-service technology's dependability in fast-food establishments.	3.22	A
The overall effectiveness of fast-food restaurants is adversely affected by frequent system crashes.	3.24	A
Restaurants provide dependable backup options in situations where digital systems are not available.	3.16	A
Frequent software updates in digital systems can occasionally cause delays in restaurant operations.	3.27	SA
Using online payment methods puts my personal information's integrity and privacy at risk.	3.06	A
Maintaining a digital system in good condition is a challenge for restaurants.	3.27	SA
There are concerns about potential hacking of the digital payment system.	3.24	A
Fast food establishments find it difficult to maintain their digital technology in excellent working conditions all the time.	3.30	SA
Average Mean	**3.21**	**A**

Among the statements, the highest-rated challenges were: "*Maintaining a digital system in good condition is a challenge for restaurants*" 3.27, "*Frequent software updates can cause delays in operations*" 3.27, and "*Fast food establishments find it difficult to maintain their digital technology in excellent working conditions all the time*" 3.30. All three received a "*Strongly Agree*" interpretation, suggesting that technical maintenance and system reliability are top concerns.

Other areas where respondents agreed include the risk to privacy and security of online payment methods 3.06 potential system crashes 3.24, and the lack of clear instructions on kiosks 3.06. These challenges point to both technical vulnerabilities and user experience issues, which can negatively affect customer trust and satisfaction.

Notably, respondents agreed that restaurants provide dependable backup options 3.16, and that self-service kiosks reduce waiting time when available 3.24, highlighting the critical role of system availability in service flow.

Overall, the responses suggest that while digital systems offer many benefits, fast food establishments in Caloocan City must address system stability, usability, security, and maintenance in order to sustain effective digital operations.

Wang (2022) notes that self-service kiosks face challenges like software glitches, connectivity issues, and power failures, which can delay orders and frustrate customers. Overreliance on kiosks with few trained staff worsens the issue, emphasizing the need for user-friendly designs and dependable technical support to maintain smooth operations.

4. On the solutions and recommendation that may be offered to address challenges in optimizing digital systems and operational plans for machines.

Table 10

Recommendations to address the Identified Challenges in Optimizing Digital Systems and Operational Plans for Machines

Respondents' Perceptions on Recommendations to Address the Identified Challenges in Optimizing Digital Systems and Operational Plans for Machines.	M	VI
Using AI-powered recognition can help reduce orderly mistakes.	3.37	HR
Kiosks become more user friendly with voice guidance and multi-language support.	3.43	HR
Having backup options, such as staff support or mobile apps, is helpful in case kiosks are not available.	3.52	HR
Strengthening digital payment security makes customers feel safer.	3.42	HR
When self-service technology is regularly maintained and fixed, it becomes more reliable.	3.52	HR
Improved hardware and proactive monitoring reduce system crashes.	3.53	HR
Manual order-taking, mobile app ordering, and alternative payment methods to ensure smooth restaurant operations when digital systems are unavailable.	3.54	HR
Scheduling software updates during off peak hours prevents service delays.	3.51	HR
Strong encryption, multi-factor authentication, and strict data privacy policies are in protecting the privacy and integrity of your personal information when using online payment methods.	3.49	HR
Regular maintenance, durable hardware, and staff training help fast food establishments maintain their digital technology in excellent working condition.	3.59	HR
Average Mean	**3.49**	**HR**

The table presents the respondents' perceptions on recommended strategies to address the challenges in optimizing digital systems and operational plans in fast food establishments. The findings revealed a composite weighted mean of 3.49, which falls under the Highly Recommended (HR) verbal interpretation. This reflects strong agreement among respondents that the suggested solutions are highly relevant, practical, and necessary for improving digitalization processes.

The highest-rated recommendation was the use of manual order-taking, mobile app ordering, and alternative payment methods as backup options when digital systems fail 3.54, followed closely by the need for regular maintenance, durable hardware, and staff training to maintain digital technology in excellent condition 3.59. These emphasize the importance of preparedness and human support in ensuring continuity and system stability.

Other highly rated recommendations include improving hardware and proactive monitoring to prevent crashes 3.53, scheduling software updates during off-peak hours 3.51, and maintaining reliable self-service systems through regular upkeep 3.52. The high ratings for these items confirm the need for technical reliability and minimizing operational disruptions.

Security-related concerns were also well addressed, with strong encryption, multi-factor authentication, and privacy policies receiving a high score 3.49, showing that customers prioritize digital safety and trust when using online systems.

CC BY SA

Overall, all items received "*Highly Recommended*" ratings, indicating strong consensus that enhancing usability, system reliability, customer support, and security should be key elements in the operational plans of digitalized fast-food establishments.

As stated by **Aquino and Dela Cruz (2021)**, they suggest that fast-food chains can optimize their digital systems by effectively using tools such as digital menus and e-table numbers to improve order accuracy and reduce waiting times. To address challenges in digital operations, they recommend integrating data analytics to understand customer preferences and enhance personalization. Additionally, incorporating feedback features can help businesses continuously improve system performance and user experience. These strategies ensure that digital systems remain efficient, reliable, and aligned with customer needs, ultimately strengthening operational plans for machine-based services.

The results of the reliability analysis reveal that the research instrument used in the study is highly dependable, valid, and statistically sound, proving that it is capable of producing consistent results across all variables. The Thematic component achieved an outstanding Cronbach's Alpha of 0.9741, which signifies excellent internal consistency. This exceptionally high value indicates that the items under this section are strongly interrelated and consistently measure the same construct. It implies that the statements are well-developed and effectively capture how technology shapes customer experience and service delivery in modern fast-food establishments.

Meanwhile, the Challenges component yielded a Cronbach's Alpha of 0.8918, and the Solutions component recorded a 0.8997, both of which fall under the range of good reliability. These results suggest that the questions designed to assess the issues encountered and the strategies proposed to address them, are well-constructed and capable of accurately reflecting the views of the respondents. Together, these findings emphasize that the instrument successfully measures the intended variables and gathers meaningful, coherent data that can be interpreted with confidence.

CONCLUSION

It shows that demographic fall within the Generation Z, Generation Y, and Generation X age brackets, hence making the opinions concerning how digitalization works for fast-food restaurants well balanced. Younger generations prefer speedy, agile digital means such as mobile applications and online payment methods, while older generations prefer systems that are easy to operate and accessible. That is, the system should be designed for use by people of all ages, especially those who are not well acquainted with technology. Most were females; thus, system designs and marketing should be inclusive and sensitive to gender. Regarding occupation, the mix of students, employees, and self-employed points to the need for digitally enabled platforms that are flexible and accessible enough to serve varied customers.

It shows that mode of payment indicated a very high level of satisfaction related to available payment options in fast-food chains. It would appear that clear price visibility, speed of transactions, and the possibility of online and cashless payments are highly appreciated. Satisfaction is the least when it comes to using cards, so it would mean smoothness in the card-based systems has to be achieved. The outcome proved that digital payment systems in Caloocan are effective but still need improvement to be hassle-free for all customers.

CC BY SA

It shows that technical capacity of customers reported satisfaction regarding the technical systems in place, such as self-service kiosks and online applications of the digitalized fast-food chains. The menus were clear on the kiosks, but delays in processing orders placed online or through apps, especially at busy hours, were noted. This means that fast-food establishments should continue upgrading their systems to make them more responsive and faster to meet customer expectations.

It shows that processing time was satisfied with the overall time it took to have things processed. They said that especially, the use of e-table numbers allowed for better order management. This did not prevent slow service during peak hours, though. That means that while digitalization improves efficiency, businesses will need to plan better in rush-hour periods to maintain speed in service delivery.

It shows that accessibility features were well-appreciated, especially readable kiosk texts and clear menus. However, there were other customers, such as wheelchair users or persons of short stature, who had difficulties in accessing some of the kiosks. Because of this, digital systems in fast-food restaurants should be designed in such a way that they are inclusive so that everyone has equal rights to have an easy experience.

It shows that assistance availability reported being satisfied by the assistance provided by staff while undertaking digital transactions. Many of the respondents, however, indicated that at times when they needed such services, the staff were not available. This calls for management to ensure availability of a sufficient number of trained staff to assist customers who may find the systems hard to use.

It shows that challenges and solutions were the most common problems detected included unclear kiosk instructions and systems maintenance. To solve these, the respondents highly recommended regular maintenance, durable equipment, and continuous staff training. They further suggested backup systems like manual ordering and mobile app options when the digital tools fail. Besides, security was an aspect that needed further development, as safety in using online payment systems was considered a core element of customer values. In such a way, successful digitalization needs technical reliability along with human support.

RECOMMENDATIONS

1. Enhance Digital System Performance. Fast-food establishments should improve the responsiveness and reliability of kiosks and online ordering platforms to ensure efficient service, particularly during peak operating hours.

2. Strengthen Digital Payment Security and Efficiency. Additional security measures and improved card payment processing are recommended to enhance customer trust and prevent transaction delays.

3. Improve Accessibility of Digital Interfaces. Self-service kiosks and digital platforms should be designed to be more user-friendly by incorporating adjustable screen height, readable text, and multi-language or audio-guided features to accommodate diverse users.

4. Increase Availability of Staff Assistance. Personnel should be adequately trained and readily available to assist customers in operating digital systems, ensuring smoother interactions and reducing user difficulty.

5. Maintain Backup Operational Methods. Manual ordering procedures and alternative payment options should remain available to ensure continuous service flow in the event of system downtime.

CC BY SA

6. Conduct Regular Maintenance and System Upgrades. Routine technical inspections, timely maintenance, and scheduling of system updates during non-peak periods are recommended to prevent system failures and minimize service interruptions.

REFERENCES

Alonso, R., Martinez, P., & Kim, J. (2023). *Fast-Food Restaurant Consumer Preferences in Using Self-Service Kiosks: An Empirical Assessment of the 4As Marketing Mix.* Research Gate. https://www.researchgate.net/publication/370823421_Fast-Food_Restaurant_Consumer_Preferences_in_Using_Self-Service_Kiosks_An_Empirical_Assessment_of_the_4As_Marketing_Mix

Aquino, A., & Dela Cruz, M. (2021). *eCarte: An interactive restaurant menu with feedback collection*. Mindanao Journal of Science and Technology. https://mjst.ustp.edu.ph/index.php/mjst/article/view/385

Choi, J., Kim, S., & Lee, H. (2024). *Robots in the kitchen: The automation of food preparation in restaurants and the compounding effects of perceived love and disgust on consumer evaluations*. ScienceDirect. https://www.sciencedirect.com/science/article/pii/S0195666324005270

Dela Peña, G. B., & Aquino, J. M. (2023). *An analysis of customer perception on self-ordering kiosk of fast-food restaurants in San Pablo City, Laguna*. ResearchGate. https://www.researchgate.net/publication/384392357_AN_ANALYSIS_OF_CUSTOMER_PERCEPTION_ON_SELF-ORDERING_KIOSK_OF_FASTFOOD_RESTAURANTS_IN_SAN_PABLO_CITY_LAGUNA

Ishak et al., (2021). *The Implementation of Self-Ordering Kiosks (SOKs): Investigating the Challenges in Fast Food Restaurants*. https://www.researchgate.net/publication/355921267_The_Implementation_of_Self-Ordering_Kiosks_SOKs_Investigating_the_Challenges_in_Fast_Food_Restaurants

Lee et al. (2024) *Designing self-ordering kiosk for older adults: Familiarity design focusing on representation, manipulation, and organization*. ScienceDirect. https://www.sciencedirect.com/science/article/abs/pii/S0747563224001043

Maftuh, B., Nurdin, E. S., & Mansur, H. (2025). *Quantitative Descriptive Analysis of the Potential for Implementing Open and Distance Learning in Senior and Vocational High Schools.* JTP-Jurnal Teknologi Pendidikan, 27(3), 1054-1072.

Mallillin, L. L. (2025). *Teaching Strategy Theory for Effective Classroom Setting.* JOURNAL OF DIGITAL LEARNING AND DISTANCE EDUCATION, 4(7), 1765-1785.

Mallillin, L. L. D., Caday, A. T., & Canda, E. G. (2024). *Integration of Leadership in an Organizational Context: A Perspective Tool for Management System.* International Journal of Advanced Multidisciplinary Research and Studies, 4(3).

Mallillin, L. L. D., Caday, M. A. T., & Canda, E. G. (2024). *Management Style and Productivity of Employee Toward Organizational Outcome.* European Journal of Alternative Education Studies, 9(2).

Mallillin, L. L., & DOLBA, S. Q. (2026). *Digital Intelligence (DQ): Demands and Challenges in the Educational System.* JOURNAL OF DIGITAL LEARNING AND DISTANCE EDUCATION, 4(8), 1845-1854.

Mallillin, L. L. D., Mallillin, J. B., Ampongan, Y. D., Lipayon, I. C., Mejica, M. M., & Burabo, J. Z. (2023). *Instructional design for effective classroom Pedagogy of teaching*. Eureka: Journal of Educational Research, 1(2), 41-52.

Mallillin, L. L. D., Mendoza, L. C., Mallillin, J. B., Felix, R. C., & Lipayon, I. C. (2020). *Implementation and readiness of online learning pedagogy: a transition to COVID 19 pandemic.* European Journal of Open Education and E-learning Studies, 5(2).

Ming, Z. (2025). *Formation of customer-oriented marketing approaches in the activities of the enterprise (based on the materials of the Khmelnytskyi Directorate of JSC «Ukrposhta»)*. Інституційний репозитарій Хмельницького національного університету (Institutional Repository of Khmelnytskyi National University). https://elar.khmnu.edu.ua/items/34d607be-3426-450e-8563-33a4901e4771

Noelah Mae Dimayuga B. (2024, November). *Kiosk Revolution: The Transformation of Fast Food in the Philippines*. ResearchGate. https://www.researchgate.net/publication/386343440_Kiosk_Revolution_The_Transformation_of_Fast_Food_in_the_Philippines

Patriarca, R., Lovaglio, L., & Simone, F. (2025). *Functional resonance analysis via a genetic algorithm to ensure cost-effective maintenance planning*. International Journal of Production Economics, 281, 109516.

Reynolds, J. (2025). *Sustainable Practices in the Restaurant Industry: Review 2020-2025*. ResearchGate. https://www.researchgate.net/publication/396109387_Sustainable_Practices_in_the_Restaurant_Industry_Review_2020-2025

Saputra, M. P. A., & Wahid, A. J. (2025). *Education revolution: Leveraging technology to improve learning quality by 2025.* International Journal of Ethno-Sciences and Education Research, 5(1), 30-36.

Shahril, Z., Zulkafly, H. A., Ismail, N. S., & Sharif, N. U. N. M. (2021). *Customer Satisfaction Towards Self-Service Kiosks for Quick Service Restaurants (QSRs) in Klang Valley*. International Journal of Academic Research in Business and Social Sciences, 11(13), 54–72.

Shalihati, F., Sumarwan, U., Hartoyo, H., & Yuliati, L. N. (2025). *Mapping customer relationship management research in higher education: trends and future directions.* Administrative Sciences, 15(2), 68.

Tillman, B. L. (2025). *A Quantitative Descriptive Study of Authentic Leadership Practices and Attracting the Millennial Generation.* Liberty University Scholars Crossing. https://digitalcommons.liberty.edu/doctoral/6589/

United Nations (n.d.) *Build resilient infrastructure, promote inclusive and sustainable industrialization and foster innovation*. https://sdgs.un.org/goals/goal9#targets_and_indicators

Wang, A. (2022). *Pros & Cons of Fast Food Kiosks in 2022.* INFI. https://www.infi.us/post/fast-food-kiosk

CC BY SA