

## ***Development of Healthy Food E-Commerce Website Using React-Tailwind with Integrated Calorie Calculator Feature***

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### ***Abstract***

This study presents the design and development of the Healthy Kitchen website prototype, a responsive healthy food e-commerce platform integrating an interactive calorie calculator to support nutrition-aware decision-making. The research adopts a Design and Development Research (DDR) methodology combined with an agile development approach, enabling iterative refinement throughout the design, implementation, and evaluation phases. The prototype was developed using React.js and Tailwind CSS, incorporating core features such as a product showcase, nutritional calculator, testimonial carousel, and a simplified WhatsApp-based ordering mechanism. Usability evaluation involved fifteen participants aged 25–45, employing the System Usability Scale (SUS), task completion rate, and user satisfaction survey. The results demonstrate a SUS score of 85.2, a 96% task completion rate, and an average satisfaction score of 4.6 out of 5, indicating excellent usability and positive user acceptance. These findings suggest that integrating nutritional transparency features within a single-restaurant e-commerce platform can enhance user engagement and perceived usefulness. This study contributes to applied e-commerce and human-computer interaction research by demonstrating how modern frontend technologies and usability-centered design can support health-oriented digital commerce without relying on complex multi-vendor infrastructures. Future work will focus on backend integration, personalized nutrition recommendations, and mobile application development.

**Keywords:** *Healthy Food E-Commerce, React.js, Tailwind CSS, Nutritional Calculator, User Experience, Web Development*

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### **Introduction**

The global health and wellness industry has experienced substantial growth in recent years, driven by increasing consumer awareness of healthy lifestyles and dietary choices. The healthy food market is projected to reach USD 1.1 trillion by 2027, with a compound annual growth rate (CAGR) of 6.3% between 2022 and 2027 (Global Wellness Institute, 2023). This trend is closely aligned with the rapid digitalization of food retail, where e-commerce platforms have become a primary channel for food discovery, ordering, and consumption.

Within the food e-commerce landscape, existing platforms predominantly emphasize transaction efficiency, menu variety, and delivery speed. While these factors are important, prior studies indicate that such platforms often provide limited support for nutrition-aware decision-making, particularly for health-conscious consumers (Felix & Rembulan, 2023; Astuti, 2023). Nutritional information, when available, is frequently presented in a fragmented or non-interactive

manner, reducing its practical value during the ordering process. This limitation is especially evident in small-scale or single-restaurant e-commerce systems, which typically lack the technical resources to implement advanced nutritional features (Radhiya, 2022).

Single-restaurant e-commerce websites represent a distinct segment within digital commerce. Unlike multi-vendor marketplaces, single-restaurant platforms rely on focused branding, limited menus, and direct customer engagement to create value (Christianto et al., 2023). In the context of healthy food services, this model offers a strategic opportunity to emphasize informational depth rather than product breadth, allowing restaurants to communicate nutritional value, ingredient transparency, and health benefits more effectively. However, empirical studies examining how such platforms can integrate nutritional tools while maintaining high usability remain limited.

Recent advances in frontend web technologies, particularly React.js and utility-first CSS frameworks such as Tailwind CSS, provide new opportunities to address these challenges. React's component-based architecture supports modular development and interactive user interfaces, while Tailwind CSS enables rapid styling consistency and responsive design (Bernatska, 2023; Aruna, 2024). Despite their widespread adoption, existing research largely focuses on technical performance or development efficiency, with insufficient attention to how these technologies support health-oriented user experience goals in food e-commerce applications.

Based on this context, a research gap can be identified in the limited exploration of integrated nutritional transparency features, such as calorie calculators, within single-restaurant e-commerce platforms that are systematically evaluated from a usability perspective. Most prior works either emphasize system functionality without empirical user evaluation or focus on large-scale platforms where nutritional features are detached from real ordering workflows.

To address this gap, this study aims to design and develop a healthy food e-commerce website prototype that integrates an interactive calorie calculator using modern frontend technologies. Employing a Design and Development Research (DDR) methodology, this research evaluates the prototype through usability testing to assess user experience quality, task effectiveness, and satisfaction. The contributions of this study lie in (1) demonstrating the practical integration of nutritional transparency features within a single-restaurant e-commerce model, (2) empirically assessing usability outcomes of such integration, and (3) providing design insights for health-oriented digital commerce systems that prioritize informational depth and user-centered interaction.

## **Literature Review**

### **E-Commerce in the Food Industry**

E-commerce has become a key driver of digital transformation in the food industry, enabling consumers to access food products conveniently while reshaping purchasing behavior. Prior studies emphasize that online food platforms improve accessibility and operational efficiency, particularly for small and medium enterprises (Barska, 2020). In Indonesia, the rapid growth of online food services reflects increasing consumer reliance on digital channels for meal selection and ordering (Felix & Rembulan, 2023).

However, existing food e-commerce systems largely prioritize transaction efficiency, menu variety, and delivery logistics, often overlooking the role of nutritional information in supporting health-conscious decisions. Astuti (2023) highlights that many small-scale food businesses provide limited or inconsistent nutritional details, creating information asymmetry for consumers. This limitation suggests that current food e-commerce models are not fully aligned with the growing demand for transparency and healthy consumption, particularly in specialized healthy food services.

## **React.js in Modern Web Development and E-Commerce**

React.js has been widely adopted as a frontend framework for modern web applications due to its component-based architecture and performance efficiency. Research by Bernatska (2023) demonstrates that React improves maintainability and scalability in complex systems, making it suitable for e-commerce platforms that require dynamic user interaction. Comparative studies further indicate that React-based applications outperform traditional web implementations in terms of responsiveness and runtime efficiency (Dubey et al., 2024).

Within food e-commerce contexts, React's state management capabilities support interactive features such as product selection, dynamic content updates, and user feedback mechanisms (Yao et al., 2023). While these studies confirm React's technical advantages, they primarily focus on development efficiency and performance metrics, providing limited discussion on how React-based architectures contribute to health-oriented user experience design. This gap indicates a need to explore React's role beyond technical implementation, particularly in supporting usability and informational clarity.

## **CSS Frameworks and Tailwind CSS in Rapid Development**

Utility-first CSS frameworks have transformed frontend development by enabling rapid styling and design consistency. Tailwind CSS, in particular, has been shown to accelerate development while maintaining visual uniformity across interfaces (Aruna, 2024). Sahu (2024) notes that constrained utility classes reduce design inconsistencies, which is critical for maintaining usability in customer-facing applications.

From a performance perspective, mobile-first design principles embedded in Tailwind CSS align with contemporary web usage trends, where mobile access dominates food e-commerce traffic. Vinutha (2025) reports that applications using modern utility-based CSS frameworks achieve better performance scores and responsive behavior. Despite these findings, prior research has rarely examined how Tailwind CSS supports user comprehension and interaction clarity in health-focused food applications, leaving an opportunity for further investigation.

## **Calorie Calculator Integration in Web Applications**

The integration of nutritional information into digital food systems presents both technical and usability challenges. API-based nutritional databases such as Open Food Facts provide scalable solutions for retrieving calorie and macronutrient data (Kwon et al., 2023). Nevertheless, the completeness and accuracy of nutritional datasets vary across food categories and regions, particularly for non-packaged or customized meals (Whalen, 2022; Ha et al., 2024).

From a user experience perspective, Selvaraju (2025) emphasizes that simplified and contextualized presentation of nutritional data—rather than raw numerical values—significantly increases user engagement and decision confidence. These findings suggest that calorie calculators should be tightly integrated into the interaction flow and designed with usability principles in mind. However, existing studies tend to evaluate nutritional tools as standalone applications, rather than as embedded features within e-commerce ordering systems.

## **User Experience Design for Food Applications**

User experience design plays a critical role in determining the effectiveness of food e-commerce platforms. Sungboonlue et al. (2022) identify clear information hierarchy, visual consistency, and reduced cognitive load as essential design principles for food-related applications. These principles are particularly relevant for healthy food platforms, where users must process additional information related to nutrition and ingredients.

Social proof mechanisms, such as testimonials and reviews, further influence consumer trust and purchase intention. Sutrisno et al. (2025) demonstrate that authentic testimonials can significantly

increase engagement and conversion rates, especially for health-oriented products where perceived risk is higher. Despite this evidence, many small-scale e-commerce platforms underutilize testimonial features or present them in a non-interactive manner.

### **Simplified Ordering Systems and Conversational Interfaces**

Recent studies highlight the importance of simplifying ordering processes to reduce friction and abandonment rates in e-commerce systems. Ausat et al. (2021) report that streamlined checkout mechanisms and alternative ordering channels can substantially improve user conversion. In particular, conversational commerce through messaging platforms such as WhatsApp has gained prominence in emerging markets.

Abas et al. (2025) find that WhatsApp-based ordering enables personalized communication and lowers technical barriers for small businesses, although scalability remains a concern. While these approaches are effective for single-restaurant operations, limited research has examined how conversational ordering can be integrated with nutrition-focused interfaces to support informed food choices.

### **Literature Review Summary and Research Positioning**

Based on the reviewed studies, three key gaps can be identified. First, existing food e-commerce research emphasizes efficiency and scalability while providing limited attention to nutritional transparency as a core design feature. Second, modern frontend technologies such as React.js and Tailwind CSS are widely discussed from a technical standpoint but rarely evaluated in terms of their contribution to health-oriented user experience. Third, nutritional tools are often treated as standalone applications rather than integrated components within e-commerce workflows.

This study positions itself at the intersection of these gaps by developing and evaluating a single-restaurant healthy food e-commerce prototype that integrates a calorie calculator within the ordering experience. By combining modern frontend technologies with usability-centered evaluation, the research extends prior work and provides empirical insights into the design of nutrition-aware digital commerce systems.

## **Research Methodology**

This study employed a Design and Development Research (DDR) methodology, which is well suited for research that aims to design, develop, and evaluate digital artifacts while contributing both practical solutions and theoretical insights. According to Jaya et al. (2021), DDR enables systematic investigation through iterative design and evaluation cycles, making it appropriate for developing technology-based systems such as e-commerce platforms. In this research, DDR was applied to ensure that the developed prototype not only functioned technically but also addressed usability and user experience requirements in healthy food e-commerce contexts.

The research process consisted of two main phases: (1) design and development of the healthy food e-commerce prototype and (2) evaluation of the developed artifact. To support iterative refinement, an agile development approach was integrated into the DDR framework. Agile principles facilitated continuous improvement through short development cycles, allowing feedback from early testing stages to inform subsequent refinements (Alsaqqa et al., 2020). This combination ensured alignment between research objectives, system functionality, and user-centered design principles.

### **System Design and Development**

The prototype was developed using a modern frontend technology stack. React.js (version 18.2.0) was utilized to implement a component-based architecture, enabling modular development, state management, and reusable interface elements (Shevchenko et al., 2021). Tailwind CSS (version

3.3.0) was applied to support rapid styling, responsive layouts, and visual consistency across different devices (El-Kaliouby, 2021). State management was handled using React's Context API and useReducer, providing a lightweight solution suitable for single-restaurant e-commerce applications (Khan et al., 2022).

Nutritional information was integrated through the Open Food Facts API, which provides calorie and macronutrient data for a wide range of food items. Although the database has limitations for non-packaged or customized meals (Whalen, 2022), it was considered adequate for prototyping and usability evaluation. The system architecture followed atomic design principles, organizing interface components into atoms, molecules, and organisms to enhance maintainability and interface consistency (Elrom, 2021).

Development activities were conducted over four iterative sprints, each lasting one week. The first sprint focused on project setup and layout design; the second implemented the product catalog, basic ordering flow, and WhatsApp integration; the third integrated the calorie calculator and nutritional data retrieval; and the fourth emphasized performance optimization, testimonial integration, and mobile responsiveness. This incremental approach ensured functional stability and progressive enhancement throughout development.

### **Evaluation Design and Participants**

The evaluation phase focused on assessing both technical performance and user experience. Technical testing included functional validation of interface components, API integration, and cross-browser compatibility. Performance indicators such as load time and responsiveness were evaluated using tools aligned with Core Web Vitals recommendations (Ali, 2024).

User-centered evaluation involved fifteen participants aged between 25 and 45, representing the target user segment of health-conscious consumers. The sample size was selected based on usability research suggesting that 10–20 participants are sufficient to identify the majority of usability issues and assess overall system effectiveness (Hyzy et al., 2022). Given the exploratory and prototype-oriented nature of DDR, this sample size was deemed appropriate to capture meaningful usability insights without excessive redundancy.

### **Data Collection and Analysis**

Usability data were collected using three instruments: the System Usability Scale (SUS), task completion rate, and a user satisfaction survey. Participants were asked to complete a set of predefined tasks, including browsing products, using the calorie calculator, viewing testimonials, submitting a contact form, and accessing the ordering section.

Quantitative data were analyzed descriptively by calculating mean SUS scores, completion rates, and average satisfaction ratings. The SUS results were interpreted using standardized usability benchmarks to determine the system's usability level. Qualitative feedback from participants was reviewed to identify recurring usability themes related to clarity of nutritional information, visual design, and interaction flow. This mixed evaluation approach provided a comprehensive understanding of both system effectiveness and user perception.

### **Ethical Considerations and Research Limitations**

Ethical principles were observed throughout the study. All participants provided informed consent, participation was voluntary, and user data were anonymized to protect privacy. Several limitations were acknowledged, including the limited sample size, reliance on frontend-only implementation, and potential variability in nutritional data accuracy from the Open Food Facts API. Despite these constraints, the applied DDR framework enabled a rigorous evaluation of the prototype's usability and practical feasibility.

## Implementation And Result

This section presents the implementation outcomes and evaluation results of the Healthy Kitchen website prototype. The focus is placed on how the developed system supports usability, nutritional awareness, and interaction effectiveness rather than on detailed technical code explanations.

### Frontend Implementation and Design Features

The Healthy Kitchen prototype was implemented as a responsive web application using React.js and Tailwind CSS. The overall interface design follows a user-centered layout structure, ensuring clarity, consistency, and ease of navigation across desktop and mobile devices. The application consists of several core functional sections, including a hero section, product showcase, promotional banner, nutrition calculator, testimonial carousel, contact form, and footer.



Figure 1. Hero Section

The hero section, shown in Figure 1, serves as the primary entry point of the application. It presents a clear value proposition through a prominent headline and supporting tagline, accompanied by call-to-action buttons that guide users toward menu exploration and ordering activities. This design supports effective information scent and visual hierarchy, which are critical in e-commerce interfaces (Chen et al., 2020).

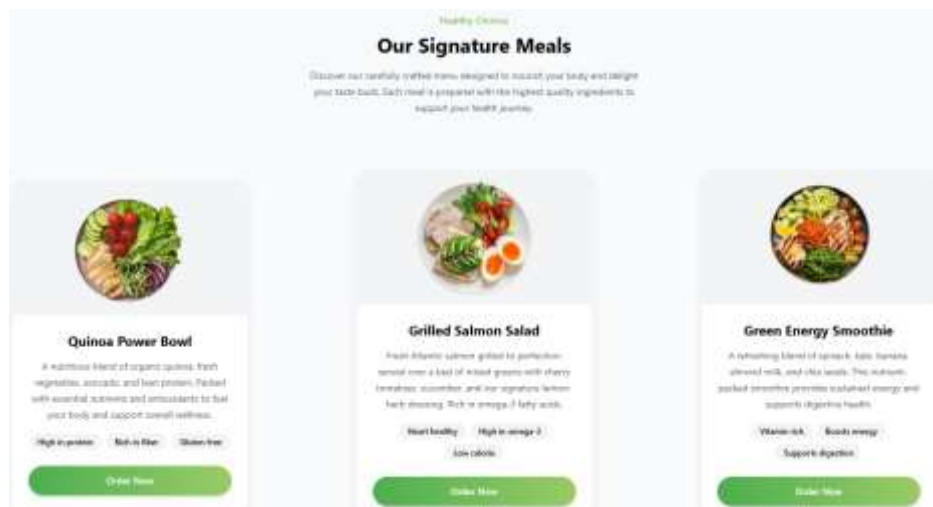


Figure 2. Product Section

The product showcase section, illustrated in Figure 2, displays curated healthy meal options with concise descriptions emphasizing nutritional benefits. Consistent card layouts, spacing, and visual emphasis were applied to minimize cognitive load and improve scanability, aligning with interaction consistency principles proposed by Haryanti (2022). Rather than offering extensive menu variety, the design emphasizes informational depth to support informed food choices.



Figure 3. Promotional Banner

A promotional banner, presented in Figure 3, highlights core service values such as freshness, quality assurance, and delivery efficiency. This section functions as a trust-building element, reinforcing the platform's positioning as a health-oriented food service.

A nutrition calculator interface. At the top is a red apple icon and the title 'Nutrition Calculator'. Below are two input fields: 'Food Name' with a placeholder 'e.g., Apple, Chicken Breast, Rice...' and 'Portion Size' with a dropdown menu currently showing '100g'. A large green button labeled 'Calculate Nutrition' is positioned below the inputs. At the bottom, a yellow box contains a lightbulb icon and the text: 'Tips: Search for common foods like "banana", "chicken breast", "brown rice" for best results. Database may not contain all local foods.'

Figure 4. Nutrition Calculator

One of the core functional contributions of the system is the integration of a nutrition calculator, shown in Figure 4. This feature allows users to input food items and portion sizes to obtain calorie and macronutrient information retrieved from the Open Food Facts API. The interface design emphasizes clarity and minimal interaction steps, following usability guidelines for nutritional tools (Mendiratta, 2023).

By embedding the nutritional calculator directly within the browsing experience, the system enables users to evaluate dietary information without leaving the ordering context. This approach addresses limitations identified in previous studies where nutritional tools were implemented as standalone applications rather than integrated e-commerce features.



Figure 5. Testimonial Section

The prototype incorporates a testimonial carousel, depicted in Figure 5, which dynamically presents user feedback, star ratings, and verification indicators. This feature serves as a social proof mechanism that enhances perceived credibility and user trust. Prior research indicates that authentic testimonials significantly influence purchase confidence in food e-commerce environments (Sutrisno et al., 2025).

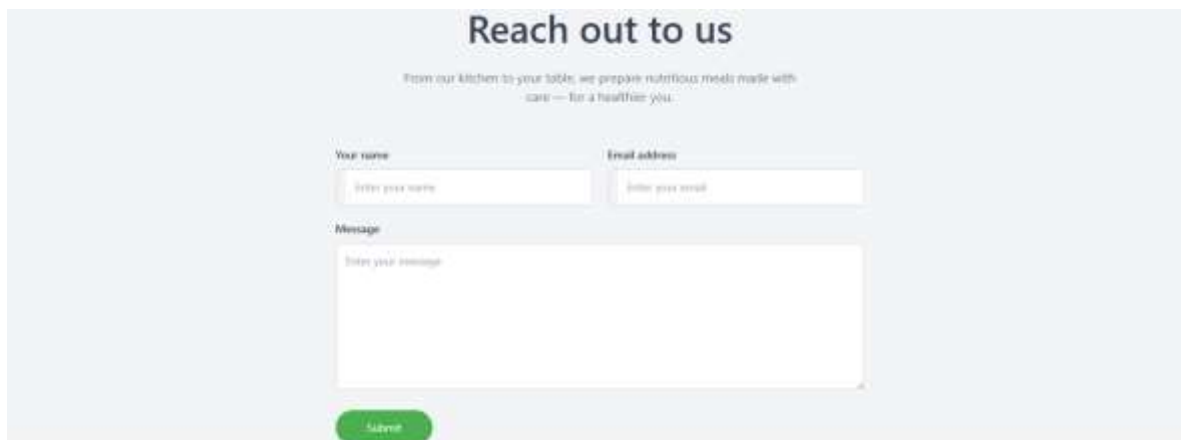


Figure 6. Contact Section



Figure 7. Footer Section

User communication is further supported through a contact section, shown in Figure 6, which includes a simple input form for inquiries and feedback. The layout applies clear visual hierarchy and spacing to ensure accessibility and ease of use. Additionally, the footer section, presented in Figure 7, provides consistent brand information, navigation links, and contact details, strengthening site credibility and navigability.

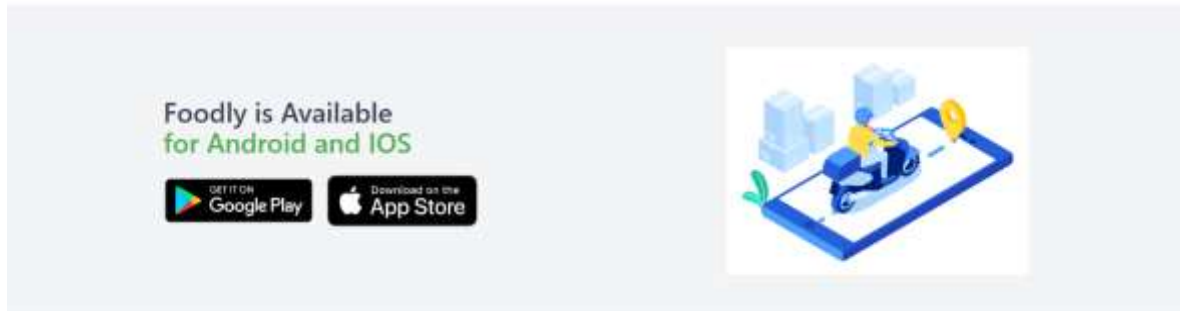


Figure 8. Mobile Application Promotion Section

A mobile application promotion section, illustrated in Figure 8, is included as a placeholder for future development. This section reflects the platform's scalability and mobile-first orientation, indicating planned expansion beyond the current web-based prototype.

### **Technical Implementation and Optimization**

Several optimization strategies were implemented to enhance performance and responsiveness, including component-level code splitting, image compression, and React memoization to reduce unnecessary re-rendering. These optimizations contributed to stable performance and smooth interaction across devices, supporting the system's overall usability goals.

### **Usability Evaluation**

Usability evaluation was conducted through task-based testing involving fifteen participants. Participants were asked to complete five representative tasks: browsing product information, using the nutrition calculator, viewing testimonials, submitting a contact form, and navigating to the ordering section.

The evaluation results indicate a task completion rate of 96%, demonstrating that users were able to accomplish intended actions with minimal difficulty. The System Usability Scale (SUS) yielded a mean score of 85.2, which falls within the "excellent" usability category according to established benchmarks (Hyzy et al., 2022). Furthermore, the user satisfaction survey produced an average score of 4.6 out of 5, reflecting positive perceptions of interface clarity, visual appeal, and interaction flow.

### **Discussion**

The findings of this study demonstrate that the Healthy Kitchen prototype successfully achieves its primary objectives in terms of usability, interaction clarity, and nutritional transparency. The high System Usability Scale (SUS) score of 85.2 indicates excellent usability, suggesting that users were able to navigate and interact with the system efficiently and with minimal cognitive effort. According to Hyzy et al. (2022), SUS scores above 80 reflect systems that are not only usable but also highly satisfying, reinforcing the effectiveness of the applied user-centered design approach.

The 96% task completion rate further confirms that the system's interface design effectively supports user goals. Participants were able to browse products, access nutritional information, and navigate ordering-related features without significant obstacles. This finding aligns with the work of Sungboonlue et al. (2022), who emphasized the importance of clear information hierarchy and

interaction consistency in food-related applications. The results suggest that emphasizing informational depth over menu variety can enhance usability in single-restaurant e-commerce contexts.

One of the most significant contributions of the prototype lies in the integration of the calorie calculator directly within the e-commerce browsing experience. User feedback highlighted the clarity and perceived usefulness of the nutritional information, supporting prior research by Selvaraju (2025), which found that simplified and contextualized nutritional data increases user engagement and confidence in food selection. Unlike standalone nutrition applications, the embedded approach adopted in this study enables users to make informed dietary decisions without disrupting the ordering flow, thereby improving perceived system usefulness.

From a technological perspective, the use of React.js and Tailwind CSS proved effective in maintaining interface consistency and responsiveness across devices. Consistent with Bernatska (2023), the component-based architecture of React facilitated predictable interaction patterns, which likely contributed to reduced user confusion and improved task efficiency. Tailwind CSS further supported visual coherence and mobile responsiveness, aligning with findings by Aruna (2024) that utility-first frameworks enhance development efficiency while preserving usability standards.

The inclusion of testimonial features and simplified WhatsApp-based ordering also contributed to positive user perceptions. Social proof mechanisms, as demonstrated by Sutrisno et al. (2025), play a critical role in building trust, particularly in health-oriented food services where perceived risk may be higher. The conversational ordering approach complements this trust-building process by offering a familiar and low-friction communication channel, as noted by Abas et al. (2025).

Despite these positive outcomes, several limitations should be acknowledged. First, the usability evaluation involved a relatively small and homogeneous participant group, which may limit the generalizability of the findings. Second, the prototype focuses primarily on frontend implementation, without full backend integration for real-time order processing and user account management. Third, nutritional data accuracy depends on the availability and completeness of the Open Food Facts database, which may vary across food types and regions. These limitations suggest that the findings should be interpreted as exploratory rather than definitive.

Overall, the discussion highlights that integrating nutritional transparency features within a single-restaurant e-commerce platform can meaningfully enhance user experience and engagement when supported by modern frontend technologies and usability-centered design principles. The results reinforce the growing perspective that in specialized digital commerce systems, clarity, trust, and informational depth can outweigh the advantages of scale and variety offered by large multi-vendor platforms.

## **Conclusion**

This study has presented the design and development of the Healthy Kitchen website prototype, a healthy food e-commerce platform that integrates an interactive calorie calculator to support nutrition-aware decision-making. By adopting a Design and Development Research (DDR) methodology combined with an agile development approach, the research demonstrates how iterative design and user-centered evaluation can be effectively applied in the development of health-oriented digital commerce systems.

The implementation results and usability evaluation indicate that the proposed system achieves a high level of effectiveness and user acceptance. A System Usability Scale (SUS) score of 85.2, a 96% task completion rate, and an average user satisfaction score of 4.6 out of 5 confirm that the platform provides a clear, efficient, and engaging user experience. These findings suggest that integrating nutritional transparency features directly within the e-commerce interface can enhance

both usability and perceived usefulness, particularly in single-restaurant or small-scale food service contexts.

From an academic perspective, this study contributes to the intersection of e-commerce, human-computer interaction, and digital health by demonstrating that modern frontend technologies such as React.js and Tailwind CSS can support the development of usable and informative health-focused applications without complex multi-vendor infrastructures. The embedded calorie calculator represents a practical design contribution that bridges nutritional information systems and commercial platforms.

Despite these contributions, the study has limitations related to sample size, frontend-oriented implementation, and reliance on external nutritional data sources. Future research should explore full backend integration, personalized dietary recommendations, and mobile application development to further enhance system functionality and scalability.

In conclusion, the Healthy Kitchen prototype illustrates that usability-centered design and nutritional transparency can coexist effectively within modern food e-commerce platforms, offering valuable insights for both researchers and practitioners in digital commerce and health technology.

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