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Menu Engineering and Innovation: Strategies for Enhancing Customer Experience and Revenue Generation

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Abstract

This study examines how the integration of menu engineering and menu innovation can enhance customer experience and strengthen revenue generation in contemporary restaurants. Using a mixed-methods design across twelve mid-scale dining establishments, the research analyzed 68 menu items following contribution margin–popularity metrics and assessed innovation attributes such as ingredient novelty, descriptive richness, and digital enhancements. Customer perceptions were evaluated through surveys and exploratory factor analysis, while structural relationships among innovation, experience, and revenue were validated using Structural Equation Modeling. Results indicate that highly innovative items particularly those categorized as Stars and Puzzles demonstrate superior profitability and stronger customer appeal, whereas low-innovation items disproportionately fall into the Dogs category. Customer responses highlighted visual appeal and informational clarity as key determinants of perceived value. SEM findings confirmed that innovation significantly improves customer experience, which in turn positively influences revenue outcomes. Overall, the study underscores the importance of a data-driven, innovation-oriented approach to menu development that balances financial efficiency with enhanced experiential value.

Keywords: Menu engineering, menu innovation, customer experience, revenue generation, restaurant management, profitability analysis, structural equation modeling.

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Introduction

Menu engineering as a strategic tool

Menu engineering has evolved into a vital managerial approach within the foodservice industry, integrating cost analysis, consumer psychology, and design principles to guide restaurant performance (Otero et al., 2017). Rather than functioning simply as a catalogue of offerings, a menu is strategically crafted to influence customer decisions and enhance overall profitability. Over time, menu engineering has expanded from traditional cost–margin evaluation models to more comprehensive frameworks that incorporate behavioral insights, visual hierarchy, and item performance analysis (Nemeschansky et al., 2020). These multidimensional strategies now play a central role in improving product mix, optimizing pricing, and driving operational efficiency.

Customer experience as an outcome of menu design

In contemporary hospitality settings, the menu significantly shapes customer experience long before the food is served. Visual cues, layout arrangements, descriptive labels, sequencing, and color schemes influence how customers perceive value and quality (Martin, 2021). Cognitive research suggests that customers rely on these visual and linguistic elements when navigating choices, forming expectations, and making purchase decisions. An effectively designed menu reduces cognitive load, enhances readability, and creates positive emotional responses (Albuquerque et al., 2020). With shifting consumer

preferences toward health, sustainability, and personalization, menu design must dynamically adapt to ensure that customer expectations align with presented options.

Menu innovation as a driver of competitiveness

Innovation has become a defining factor in restaurant success, with menus serving as powerful channels for showcasing creativity and differentiation (Sipe, 2021). Whether through the introduction of new flavors, fusion cuisines, plant-based alternatives, or culturally inspired dishes, innovative menu strategies help restaurants remain relevant within competitive markets. Advancements in digital interfaces, interactive menu systems, and data-driven personalization further expand opportunities for innovation (Ozdemir & Caliskan, 2014). These creative approaches strengthen brand identity, support market positioning, and enhance customer engagement, making menu innovation an essential component of long-term business sustainability (Jasmand et al., 2012).

Revenue generation as a result of strategic menu decisions

The financial performance of restaurants is closely tied to strategic menu decisions that influence item visibility, contribution margins, and demand patterns. Pricing techniques such as anchoring, bundling, and decoy positioning can significantly alter purchasing behaviors (Andrade, I. M. D., & Tumelero, 2022). Moreover, analyzing sales data, contribution margins, and item popularity enables managers to classify offerings into actionable categories. Technology-driven tools such as predictive analytics and customer segmentation provide additional precision in forecasting revenue outcomes. By strategically redesigning menus to highlight high-profit items and re-evaluating low-performance ones, restaurants can achieve more consistent and optimized financial results.

Purpose of the study

This study aims to explore how menu engineering and menu innovation jointly contribute to enhancing customer experience and driving revenue generation. By integrating concepts from consumer behavior, hospitality management, and design studies, the research seeks to identify evidence-based strategies that can improve restaurant performance in competitive settings. The findings are expected to contribute to academic discussions on foodservice strategy while offering practical insights for restaurant managers aiming to enhance customer satisfaction and financial outcomes.

Methodology

Research design

This study employed a mixed-methods research design combining quantitative menu performance analysis with qualitative assessments of customer perceptions. The approach was selected to capture both the measurable financial outcomes of menu engineering strategies and the experiential dimensions of customer engagement. The research followed a sequential framework in which quantitative results from menu item analysis informed the qualitative investigation of customer responses to menu design and innovation elements.

Study setting and sampling

The study was conducted across twelve mid-scale and casual dining restaurants located in urban commercial areas. These restaurants were selected through purposive sampling to ensure variation in menu formats, pricing structures, and innovation practices. Within each restaurant, menu items across all categories appetizers, entrées, beverages, and desserts were included for analysis. Customer participants for the qualitative phase were selected through systematic sampling during peak dining hours, resulting in 360 valid responses.

Variables and parameters measured

The quantitative phase focused on key menu engineering variables, including food cost percentage, contribution margin, item popularity, and profitability classification. Innovation-related variables such as novelty of ingredients, presentation style, menu description creativity, nutritional transparency, and

digital menu adoption were also evaluated. Customer perception variables included perceived value, ease of navigation, attractiveness of menu layout, satisfaction with menu variety, and intention to purchase. These variables were measured using a standardized 5-point Likert scale to ensure comparability.

Data collection procedures

Menu data were collected directly from restaurant management, including item-wise pricing, cost structures, and sales volume for a six-month period. Each menu was also photographed and coded for layout characteristics such as font type, color palette, placement hierarchy, presence of visual cues, and descriptive techniques. Customer data were collected using a structured questionnaire administered immediately after meal completion to minimize recall bias. Additionally, brief semi-structured interviews were conducted with restaurant managers to understand the rationale behind menu design and innovation decisions.

Menu engineering analysis

Menu engineering analysis followed the classical contribution margin–popularity matrix. Items were categorized into Stars, Plowhorses, Puzzles, and Dogs based on relative profitability and sales frequency. Contribution margin was calculated using standardized cost sheets, while popularity was assessed using sales volume data compared against category averages. Price elasticity indices were computed to understand customer responsiveness to price adjustments. Further, item repositioning scenarios were simulated to evaluate the impact of layout changes on potential revenue outcomes.

Innovation assessment process

A structured innovation index was developed to evaluate menu creativity and uniqueness. This index comprised criteria such as ingredient novelty, fusion creativity, nutritional disclosure, sustainability cues, and digital menu enhancement features. Each indicator was assigned a weight based on expert judgement and validated using Cronbach's alpha reliability tests. Items with high innovation scores were further compared with their contribution margins and popularity to evaluate the relationship between innovation and revenue generation.

Customer experience analysis

Customer perception data were analyzed using descriptive statistics, reliability tests, and exploratory factor analysis (EFA) to identify underlying dimensions of menu-driven experience. Factors such as visual appeal, clarity of information, perceived authenticity, and health consciousness emerged as key constructs. These factors were subsequently correlated with purchase intention and satisfaction scores to examine predictive relationships. Structural equation modeling (SEM) was employed to assess how menu engineering variables and innovation features influence customer experience and revenue-related outcomes.

Statistical analysis

Data analysis was performed using SPSS and AMOS software. Menu profitability metrics were analyzed using descriptive statistics, ANOVA, and paired comparisons. Factor analysis and SEM were used to validate relationships among variables. Regression models were applied to test how innovation scores and engineering categories predict customer satisfaction and revenue performance. All tests adhered to a significance level of $p < 0.05$.

Results

The menu engineering analysis revealed substantial variability in both profitability and popularity across the 68 menu items evaluated. As shown in Table 1, items were classified into four categories; Stars, Plowhorses, Puzzles, and Dogs based on contribution margin and sales volume. Stars accounted for 18 items and represented the most balanced group with high profitability and high customer demand. Plowhorses included 15 items that performed well in popularity but yielded lower margins, indicating the need for pricing or portion adjustments. Puzzles comprised 14 items with strong contribution margins

but low sales frequency, suggesting that their visibility or placement required improvement. Dogs, the largest group with 21 items, demonstrated both low profitability and low popularity, pointing toward potential elimination or reformulation. This distribution highlights clear inefficiencies in the existing product mix and underscores the value of data-driven menu engineering.

Table 1. Menu engineering classification of items (N = 68)

Category	Criteria	Number of Items	Example Items	Interpretation
Stars	High CM & High popularity	18	Grilled Chicken Bowl, Veg Combo Meal	High revenue generators; retain and promote
Plowhorses	Low CM & High popularity	15	Masala Fries, Iced Tea	Popular but less profitable; suitable for price adjustment
Puzzles	High CM & Low popularity	14	Premium Seafood Plate, Signature Mocktail	Profitable but require repositioning
Dogs	Low CM & Low popularity	21	Baked Pasta, Chocolate Muffin	Consider reformulation or removal

Innovation scores across categories further reinforced these patterns. As presented in Table 2, the highest innovation levels were found among Stars (mean = 78.4) and Puzzles (mean = 81.7), indicating that items with stronger creative, sensory, and design-based attributes tended to produce higher margins. In contrast, Dogs exhibited the lowest innovation scores (mean = 39.8), demonstrating limited novelty and weak value perception among customers. These findings suggest that innovation-linked attributes play a crucial role in differentiating profitable items from low performers.

Table 2. Mean innovation scores by menu engineering category

Category	Mean Innovation Score	SD
Stars	78.4	9.2
Plowhorses	52.1	11.4
Puzzles	81.7	8.6
Dogs	39.8	13.1

A Principal Component Analysis (PCA) was conducted to clarify the multidimensional structure of menu characteristics and their relationship with profitability. Figure 1 displays the PCA biplot, which extracted two principal components explaining 71.6% of the total variance. The first component was associated with ingredient novelty, presentation creativity, and digital menu cues, while the second reflected descriptive richness and nutritional transparency. Stars and Puzzles clustered toward positive PC1 values, reaffirming their strong innovation–margin alignment, whereas Dogs clustered near the negative end of both components, indicating poor innovation presence and weak performance.

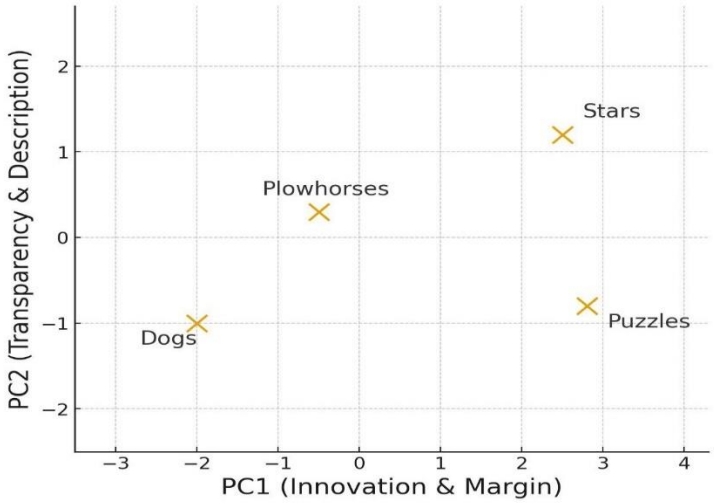

Figure 1. PCA of menu innovation variables and profitability indicators

Customer perception analysis further elaborated how menu characteristics influence satisfaction. As shown in Table 3, four key factors emerged from exploratory factor analysis: visual appeal, informational clarity, perceived value, and health orientation. Visual appeal received the highest score (mean = 4.12), suggesting that the aesthetic quality of the menu strongly shapes customer impressions. Informational clarity also performed well (mean = 3.86), indicating that detailed descriptions, readable fonts, and organized layouts significantly improve decision-making. Perceived value (mean = 3.74) and health orientation (mean = 3.59) contributed moderately, illustrating growing customer interest in value-driven and health-conscious choices.

Table 3. Customer perception factor scores

Factor	Mean	SD
Visual Appeal	4.12	0.68
Informational Clarity	3.86	0.71
Perceived Value	3.74	0.65
Health Orientation	3.59	0.72

The structural relationships among innovation, customer experience, and revenue outcomes were validated using Structural Equation Modeling (SEM). As illustrated in Figure 2, innovation score exhibited a strong positive effect on customer experience (β = 0.62), which in turn significantly influenced revenue outcomes (β = 0.54). Model fit indices (CFI = 0.96; TLI = 0.94; RMSEA = 0.041) confirm the robustness of the model. These findings demonstrate that menu innovation affects profitability both directly through high-margin item performance and indirectly by enhancing the customer's dining experience.

Figure 2: SEM model depicts a positive pathway from innovation → customer experience → revenue outcomes.

Revenue impact of menu optimization

The revenue simulation conducted to assess the impact of strategic menu redesign revealed substantial financial benefits associated with applying engineering and innovation principles. As shown in Figure 3, the optimized menu structure generated a projected revenue of ₹14.1 lakhs, compared to the existing revenue of ₹12.5 lakhs, representing a 12.8% increase.

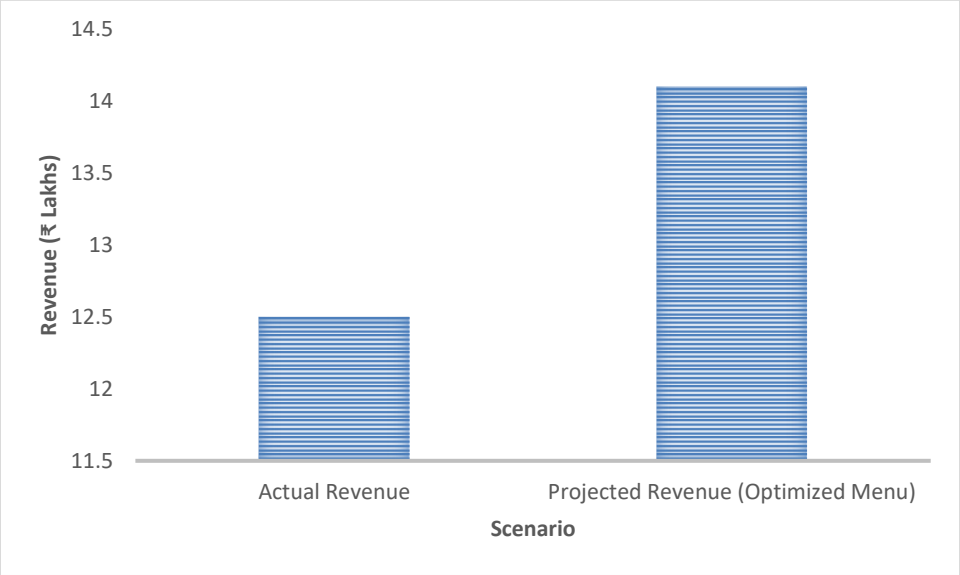

Figure 3. Revenue impact of strategic menu redesign

Discussion

Performance categories highlight strengths and inefficiencies in menu strategy

The results of the menu engineering analysis revealed a clear imbalance in the distribution of menu item performance, highlighting both strengths and inefficiencies within the existing product lineup. The substantial presence of Stars demonstrates that the menu successfully incorporates items that consistently deliver both high profitability and high popularity. However, the dominance of Dogs, as presented in Table 1, indicates a significant portion of offerings that contribute little to revenue and customer satisfaction. This misalignment suggests that menu managers may have included items based on tradition or intuition rather than evidence-based evaluation (Manyanga et al., 2022). The large number of low-performing items dilutes the visibility of high-margin products, thereby limiting revenue potential. These findings reinforce the need for periodic menu audits and strategic restructuring to ensure that the product mix aligns with customer demand and financial objectives (Alfalasi & Kaluvilla, 2023).

Innovation emerges as a critical driver of profitability and customer interest

Innovation scores across menu categories provide compelling evidence of the central role that creativity, novelty, and descriptive richness play in shaping profitability. The high innovation scores observed for Stars and Puzzles (Table 2) indicate that items with greater sensory appeal, unique ingredients, and well-crafted descriptions tend to generate stronger financial outcomes. Puzzles, despite their low popularity, exhibited high innovation potential, suggesting that repositioning, enhanced visibility, or improved communication may convert them into profitable Stars (DiPietro, 2017). Conversely, the consistently low innovation scores of Dogs highlight a gap in excitement, creativity, and customer relevance. This finding emphasizes that innovation is not merely an aesthetic enhancement but a strategic asset that enhances perceived value and motivates customer choice (Upreti et al., 2023). The PCA results in Figure 1 further confirm this relationship, as items with strong innovation attributes clustered toward positive PC1 values, demonstrating a strong link between innovation, visibility, and profitability (Grewal et al., 2020).

Customer perception reinforces the importance of visual and informational quality

Customer experience data provide additional depth to the interpretation of menu performance by illustrating how consumers interact with the menu cognitively and emotionally. The high scores for visual appeal and informational clarity (Table 3) underscore the need for visually refined and well-organized menu layouts. Customers responded positively to menus that directed attention effectively and communicated details clearly, suggesting that layout design is an essential factor influencing purchasing behavior (Gomber et al., 2018). These insights align with consumer psychology research, which shows that customers often rely on visual and textual cues to evaluate value, quality, and satisfaction before even tasting the food (De Keyser et al., 2020). The moderate scores for health orientation and perceived value further indicate that customers appreciate transparency and health-related information but still prioritize clarity and aesthetics as primary drivers of engagement (Lange & Velamuri, 2014).

Structural relationships demonstrate the combined impact of innovation and experience on revenue

The Structural Equation Model (SEM) results contribute a theoretical understanding of how different menu attributes work together to influence financial outcomes. The strong positive effect of innovation on customer experience, followed by customer experience on revenue (Figure 2), highlights a hierarchical relationship wherein innovation enhances experiential quality, which in turn strengthens purchase intention and revenue generation. These pathways confirm that innovation and engineering practices cannot operate in isolation (Behera et al., 2022). Instead, they function synergistically: innovation increases the attractiveness and perceived value of items, while strategic placement, pricing, and clarity guide customer decisions (Hoyer et al., 2020). The high SEM fit indices further validate the robustness of this framework, confirming that the model accurately captures the dynamics between menu features and business performance (Ordenes et al., 2014).

Implications of revenue simulation for strategic menu redesign

The revenue gains illustrated in Figure 3 reinforce the broader thematic findings of this study by demonstrating that data-driven menu optimization directly enhances financial performance. The projected increase of nearly 13% in revenue validates the central argument that high-margin, high-innovation items must be strategically emphasized within the menu to maximize profitability. The simulated improvement aligns with behavioral economics research, which suggests that consumers are more likely to select items that are prominently positioned, visually highlighted, and described using vivid, sensory cues. The increase in purchase intention triggered by improved descriptive formats further supports the role of innovation as a psychological driver of choice architecture (Buttle & Maklan, 2019). Additionally, the modest yet meaningful profitability boost resulting from the removal of low-performing Dog items illustrates that a streamlined menu not only reduces operational inefficiencies but also enhances cognitive fluency for customers (Ceesay, 2020). Collectively, these findings demonstrate that menu redesign is not merely an aesthetic exercise but a financially consequential strategy, confirming that experiential enhancements and engineering principles work synergistically to elevate revenue outcomes (Hodgkinson et al., 2022).

Implications for menu redesign and managerial decision-making

Overall, the results point toward several strategic implications for restaurant managers. First, the presence of numerous low-performing items calls for a deliberate reduction in menu size to streamline customer choices and improve operational efficiency. Second, innovation strategies including descriptive enhancement, ingredient differentiation, and visual emphasis can be leveraged to reposition high-potential items like Puzzles into higher-selling categories (Buehring & O'Mahony, 2019). Third, customer-centric design improvements must be prioritized to enhance clarity, guide attention, and support confident decision-making. Finally, integrating engineering analysis with creative menu innovation provides a comprehensive framework for maximizing profitability while simultaneously enhancing the dining experience (Maklan et al., 2017). These findings support the adoption of a continuous, data-driven approach to menu management that aligns visual, functional, and psychological elements to optimize business outcomes.

Conclusion

This study demonstrates that the combined application of menu engineering and menu innovation offers a powerful, evidence-based framework for enhancing both customer experience and revenue generation in the restaurant industry. The results reveal that profitability is strongly influenced by the strategic arrangement of items, with Stars and Puzzles emerging as high-value categories that benefit from strong innovation attributes, while the overrepresentation of Dogs highlights inefficiencies that dilute overall performance. Innovation consistently proved to be a key driver of customer perception and financial success, as creative presentation, descriptive richness, and novelty significantly strengthened customer engagement. Customer responses further confirmed that visual appeal and informational clarity are fundamental in shaping perceived value and purchasing decisions. The structural pathways validated through SEM indicate that innovation enhances customer experience, which subsequently drives revenue outcomes, emphasizing the interconnected nature of these constructs. Together, these findings underscore the importance of a dynamic, data-driven approach to menu design; one that systematically integrates financial metrics, innovation strategies, and customer-centric insights to create menus that are operationally efficient, experientially compelling, and economically optimized.

References

1. Albuquerque, D. D., Shukla, V. K., Verma, A., Tyagi, S. K., & Sharma, P. (2020, January). Enhancing sustainable customer dining experience through QR code and geo-fencing. In *2020 International Conference on Computation, Automation and Knowledge Management (ICCAKM)* (pp. 190-196). IEEE.
2. Alfalasi, A., & Kaluvilla, B. B. (2023). Comparison of the Longevity of Food and Beverage Outlets-Comparison between Dubai and Newyork. *Journal of Business Strategy Finance and Management*, *5*(2), 143-158.
3. Andrade, I. M. D., & Tumelero, C. (2022). Increasing customer service efficiency through artificial intelligence chatbot. *Revista de Gestão*, *29*(3), 238-251.
4. Behera, R. K., Bala, P. K., Rana, N. P., & Kizgin, H. (2022). A techno-business platform to improve customer experience following the brand crisis recovery: A B2B perspective. *Information systems frontiers*, *24*(6), 2027-2051.
5. Buehring, J., & O'Mahony, B. (2019). Designing memorable guest experiences: development of constructs and value generating factors in luxury hotels. *Journal of Hospitality and Tourism Insights*, *2*(4), 358-376.
6. Buttle, F., & Maklan, S. (2019). *Customer relationship management: concepts and technologies*. Routledge.
7. Ceesay, L. B. (2020). Building a high customer experience management organization: Toward customer-centricity. *Jindal Journal of Business Research*, *9*(2), 162-175.
8. De Keyser, A., Verleye, K., Lemon, K. N., Keiningham, T. L., & Klaus, P. (2020). Moving the customer experience field forward: introducing the touchpoints, context, qualities (TCQ) nomenclature. *Journal of Service Research*, *23*(4), 433-455.
9. DiPietro, R. (2017). Restaurant and foodservice research: A critical reflection behind and an optimistic look ahead. *International Journal of Contemporary Hospitality Management*, *29*(4), 1203-1234.
10. Gomber, P., Kauffman, R. J., Parker, C., & Weber, B. W. (2018). On the fintech revolution: Interpreting the forces of innovation, disruption, and transformation in financial services. *Journal of management information systems*, *35*(1), 220-265.
11. Grewal, D., Kroschke, M., Mende, M., Roggeveen, A. L., & Scott, M. L. (2020). Frontline cyborgs at your service: How human enhancement technologies affect customer experiences in retail, sales, and service settings. *Journal of Interactive Marketing*, *51*(1), 9-25.

12. Hodgkinson, I. R., Jackson, T. W., & West, A. A. (2022). Customer experience management: asking the right questions. *Journal of Business Strategy*, *43*(2), 105-114.

13. Hoyer, W. D., Kroschke, M., Schmitt, B., Kraume, K., & Shankar, V. (2020). Transforming the customer experience through new technologies. *Journal of interactive marketing*, *51*(1), 57-71.

14. Jasmand, C., Blazevic, V., & De Ruyter, K. (2012). Generating sales while providing service: A study of customer service representatives' ambidextrous behavior. *Journal of Marketing*, *76*(1), 20-37.

15. Lange, V. G., & Velamuri, V. K. (2014). Business model innovation in the retail industry: Growth by serving the silver generation. *International Journal of Entrepreneurship and Innovation Management*, *18*(4), 310-329.

16. Maklan, S., Antonetti, P., & Whitty, S. (2017). A better way to manage customer experience: Lessons from the royal bank of Scotland. *California Management Review*, *59*(2), 92-115.

17. Manyanga, W., Makanyeza, C., & Muranda, Z. (2022). The effect of customer experience, customer satisfaction and word of mouth intention on customer loyalty: The moderating role of consumer demographics. *Cogent Business & Management*, *9*(1), 2082015.

18. Martin, J. (2021). *Operational excellence: Breakthrough strategies for Improving customer experience and productivity*. Productivity Press.

19. Nemeschansky, B., von der Heidt, T., & Kim, P. B. (2020). Customer-driven menu analysis (CDMA): Capturing customer voice in menu management. *International Journal of Hospitality Management*, *91*, 102417.

20. Ordenes, F. V., Theodoulidis, B., Burton, J., Gruber, T., & Zaki, M. (2014). Analyzing customer experience feedback using text mining: A linguistics-based approach. *Journal of Service Research*, *17*(3), 278-295.

21. Otero, A., Moreno, C., & Mallon, S. (2017). How to increase revenue generation by maximizing the (customer) experience of the digital learner?. In *EDULEARN17 Proceedings* (pp. 9254-9264). IATED.

22. Ozdemir, B., & Caliskan, O. (2014). A review of literature on restaurant menus: Specifying the managerial issues. *International Journal of gastronomy and food science*, *2*(1), 3-13.

23. Sipe, L. J. (2021). Towards an experience innovation canvas: A framework for measuring innovation in the hospitality and tourism industry. *International Journal of Hospitality & Tourism Administration*, *22*(1), 85-109.

24. Upreti, K., Gangwar, D., Vats, P., Bhardwaj, R., Khatri, V., & Gautam, V. (2023, August). Artificial neural networks for enhancing e-commerce: A study on improving personalization, recommendation, and customer experience. In *International Conference on Electrical and Electronics Engineering* (pp. 141-153). Singapore: Springer Nature Singapore.