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SWOT Analysis of Customer Perceptions Towards AI Robot Services in Bangkok Restaurants

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Abstract. The study's objectives are to (1) understand customer perceptions of AI Robot services in Bangkok's restaurants, (2) perform a SWOT analysis on the use of AI Robots in the restaurant service context, and (3) draw insights and recommendations for restaurant operators and policymakers on the adoption and implementation of AI Robot services. According to the service quality and technology acceptance model (TAM), consumers' happiness with AI Robot services depends on their views of quality, simplicity, and usefulness. Qualitative semi-structured interviews were conducted with a convenience sample of Bangkok restaurant 8 customers who employed AI Robot services, 4 service staffs, and 3 restaurant's supervisors, totaling 15 persons. After thematic analysis, a SWOT analysis made sense of the data. The study discovered a variety of client reactions to AI robot services. It has been shown that some customers prefer the ease and novelty, but others miss the human interaction of conventional waiters. SWOT analysis revealed possibilities like efficiency and distinctiveness, weaknesses like technology faults, and threats like dehumanization of the service experience. Restaurant owners and policymakers learn about the effects of AI robots in the service industry. It emphasizes the importance of humanizing the hospitality business as technology advances. This study adds to the literature by examining customers' perceptions regarding AI Robot services at restaurants in a major Asian metropolis using a SWOT analysis.

Keywords: AI Robot Services, Customer Perceptions, SWOT Analysis, Service Quality

1. Introduction

In a time marked by swift progression in technology, artificial intelligence (AI) emerges as a prominent catalyst propelling a myriad of transformative breakthroughs throughout diverse industries. The restaurant industry, with its intrinsic nature of continuous evolution, has been no exception to this trend. Bangkok, Thailand, stands as a testimony to this, showcasing a novel integration where AI robots have taken on the mantle of delivering food in eateries. This innovative approach has garnered the attention of scholars, industry professionals, and customers, leading to broader discussions about its potential societal and industrial implications.

Yet, beneath the technological marvel and industry buzz, lie pertinent questions: How do customers perceive the service quality of these AI robots in Bangkok's bustling restaurant scene? What do they identify as the strengths, weaknesses, opportunities, and threats of such a technological leap in dining experiences? And importantly, based on these perceptions, what guidance can be given to both restaurant operators and policymakers for the effective adoption and implementation of AI Robot services?

Although AI's integration into daily operations promises unprecedented efficiency and novel customer service experiences, especially in restaurants, there remains a lacuna in consumer-centric research on this phenomenon. While the allure of robot-staffed restaurants continues to captivate both the young and old in Bangkok, the overarching customer sentiment towards such innovations remains largely uncharted. Furthermore, alongside the potential advantages of robotics and AI in enhancing service delivery, concerns about job displacements linger in the shadows.

This research embarks on a journey to bridge this knowledge gap. By leveraging a SWOT framework, it seeks to comprehensively assess the implications of AI robot services from the most critical stakeholder's vantage point: the customer. This undertaking endeavors to illuminate customer perceptions while simultaneously paving the way for industry stakeholders to make informed decisions, guaranteeing a seamless fusion of technological innovation and human-centered service.

2. Literature Review

2.1. The Rise of AI in Service Industry

Artificial intelligence is increasingly part of our daily lives, many businesses worldwide, including restaurants, are increasingly automating their operations to enhance efficiency and customer service (Ivanov & Webster, 2017). Ventura and Aldinhas Ferreira (2017) agree that RAISA (robots, AI, and service automation) is no longer the stuff of science fiction but a reality. Revolution in many service industries is possible because to service robots that are outfitted with sensors, cameras, voice recognition, and artificial intelligence. They can boost output and efficiency by taking up duties previously handled by frontline workers (Wirtz et al., 2018). The trend has already begun in Bangkok, where certain eateries are experimenting with the use of AI robots to improve their service. Robot-staffed restaurants can attract youngsters and provide adults an exciting eating experience. These innovations improve service quality and attract and keep customers by offering new and engaging ways to interact (Cifci & Alrawadieh, 2023). AI-enabled robots also enhance hotel guests' experiences. These robots improve visitor pleasure in hospitality (Gupta et al., 2022). Customer reaction to AI robot services is, however, yet unknown. Despite the benefits of robotics and AI in service, there remain concerns about job losses. Several research have examined how these technologies may affect employment loss, gain, and role alteration (Cifci & Alrawadieh, 2023). In many businesses, AI technology like service robots is becoming essential. Research on human-machine interaction and employee development and competency is crucial (Sen et al., 2022). The purpose of this research is to analyze the prospective effects of AI robot services on customers by analyzing their merits, flaws, possibilities, and dangers via a SWOT framework. Taking this method will help you gain a comprehensive comprehension of the potential benefits and drawbacks of using AI robot services in the

restaurant sector.

The surge of RAISA (robots, AI, and service automation) has heralded a new era in the service industry, significantly revolutionizing operations, with special emphasis in the restaurant and hospitality sectors (Ivanov & Webster, 2017; Ventura & Aldinhas Ferreira, 2017). Research seems to focus predominantly on the positive impact and efficiency benefits AI brings. There's limited exploration into the negative implications and potential setbacks of AI in the service sector. The concern about job losses and role alterations due to AI is mentioned but not profoundly explored (Cifci & Alrawadieh, 2023). Research carried out in a specific geographical area, such as Bangkok, may not possess universal applicability.

2.2.The AI Service Robots in Restaurant

Recent research on restaurant service robots has examined how different features affect customers' impressions, preferences, and intentions. One study by Cha (2020) aimed to empirically test a theoretical model of customers' intention to use robot-serviced restaurants in Korea. The study incorporated the factors of coolness, motivated consumer innovativeness (MCI), and the theory of planned behavior. The results showed that sensory elements of robot services improved customer attitudes towards the use of robots in restaurants, highlighting the importance of considering these elements in restaurant marketing strategies (Cha, 2020). Another study investigated the robotic restaurant experience through a multiple case study approach. The findings revealed six main themes that contribute to the robotic restaurant experience: attraction for kids, robotic system, memorable experience, ambience-related attributes, food-related attributes, and deficiencies (Seyitoğlu & Ivanov, 2022). This study provided valuable insights into the components that shape the overall experience of customers in robotic restaurants. The facilitation and collaboration of value by serving robots in restaurants was the subject of a mixed-methods study by Zhang et al. (2022). The study involved qualitative interviews with customers who had dined at a service robot restaurant, followed by a quantitative study with restaurant patrons. The findings indicated that guest perceptions of robot attributes, such as role significance, competence, social presence, warmth, autonomy, and adaptability, influenced service robot value facilitation (Zhang et al., 2022). Recent research has given insight on the value cooperation process, consumer intention to utilize, and other facets of service robots in restaurants. They provide valuable insights for restaurant operators and companies developing service robots, offering practical implications for marketing strategies, robot design, and the deployment of robots in frontline roles (Cha, 2020; Zhang et al., 2022).

AI service robots, particularly in restaurants, have been researched from the perspective of customer impressions, preferences, and intentions. Factors such as coolness, the sensory aspect of services, and memorable experiences have been highlighted (Cha, 2020; Seyitoğlu & Ivanov, 2022). Most studies approach the subject from a technology acceptance or customer satisfaction perspective. There seems to be a dearth of research on the probable societal implications, cultural determinants, and enduring consequences of said alteration. There's an implicit assumption that incorporating robots invariably leads to a unique or enhanced experience, but nuances like cultural differences, demographic considerations, or different restaurant formats might play a role in acceptability.

2.3. Customer Experiences with Service Robots

Service robots are typically well-received by clients, according to several studies. Service robots can aid emotionally and practically, according to research (Huang et al., 2021). Service robots help the tourism industry adapt to new trends like the pandemic by reducing human contact and enhancing security (Meidute-Kavaliauskiene et al., 2021). Convenience, personalization, service quality, trust, and perceived sacrifice improve AI-enabled consumer experiences (Ameen et al., 2021). Robot embodiment and human-oriented perceptions have affected hospitality and tourism robot use. Visitors have been seen trying to build a "relationship" with robots (Tung & Au, 2018).

Self-efficacy, motivation, social influence, supportive surroundings, and emotions affect service industry perceived value. Trust boosts these preconditions (Wang et al., 2021). Mariani and Borghi (2021) found that consumers' perceptions and judgments of service robots affected their satisfaction, suggesting that mechanical AI-related information in online reviews affected e-WOM. Hlee et al. (2023) examined client interactions using AI-powered service robots. AI service robots' emotional and functional effects were studied. Results showed that such discussions shape customers' perspectives and experiences. According to studies cited by Belanche et al. (2019), customers are more likely to be satisfied with and loyal to an organization if they view its employees as trustworthy and human. The perceived competence and kindness of a service provider also has a beneficial effect on customer evaluations and loyalty intentions. PRINTEPS was created as a framework for integrating intelligent applications (Morita et al., 2020). Key criteria in boosting customer satisfaction in robotic services were also mentioned by Morita et al. (2020). Customers have mixed feelings about service robots (Akdim et al., 2023), and believable robots are often rejected in high-pressure sales environments. According to a study by Chi et al. (2021), a trust scale for AI social robots in service delivery was developed and verified, and the elements that affect consumers' trust in robot interaction were found. A distinct perspective on AI's effect on the customer service they receive was presented (Cukier, 2021). Few empirical research has examined the potential of AI robots replacing human servers from the client's perspective. Despite its importance to the widespread deployment of AI robot services, customer perception of robot servers as viable alternatives has not been well studied.

The initial reception of service robots by customers is generally positive. Factors influencing perceptions include trust, perceived competence, and kindness (Belanche et al., 2019; Mariani & Borghi, 2021). While trust scales and frameworks have been developed for understanding customer relationships with service robots (Chi et al., 2021), the depth of these relationships and the ethical implications of such emotional ties aren't adequately addressed. Some contradictions exist. While robots are generally well-received, Akdim et al. (2023) indicate mixed feelings, especially in high-pressure sales scenarios. The causes of such discrepancies have not been thoroughly investigated.

2.4. AI and Robotics in the Food Industry

AI and robotics in food industry have far-reaching effects. Voice-activated restaurant technology improves service quality and customer happiness the most (Cheong et al., 2021). Artificial intelligence robots can boost agricultural productivity, cut operating costs, and replace labor-intensive human work, but they also bring ethical issues that have yet to be thoroughly investigated (Ryan et al., 2021). AI-based food sector automation can improve operations, productivity, and supply chain management (Kumar et al., 2021). Restaurants are still exploring the full possibilities of AI and robotics (Blöcher & Alt, 2021). AI and big data analytics optimize food company efficiency, for instance, advertising, production, distribution, and supply chain administration (Sharma et al., 2021). AI and robotics impact the economy (Darapureddy et al., 2021). AI improves food supply chain visibility, auditability, quality, quantity, and waste (Dora et al., 2022). Torero (2021) claimed that robotics and AI in farming are necessary for future food security. More farmers are using artificial intelligence robots to efficiently increase food production for an increasing global population (Ryan et al., 2021). Food companies employ AI for modeling, prediction, and control (Mavani et al., 2022). The utilization of artificial intelligence and automation in the culinary industry is producing profound and extensive repercussions (Khan et al., 2018). Robots boosted production, accuracy, and food safety, according to Iqbal et al. (2017). AI improves food production productivity and quality (Agbai, 2020). Robots imbued with the marvelous power of Artificial Intelligence are poised to revolutionize the farming industry by magnifying productivity and mitigating wasteful practices, as posited by Ryan et al. in their seminal work (2021). Autonomous robots may affect farmers' independence and decision-making (Ryan et al., 2021).

AI and robotics bring about productivity, efficiency, and improvements in quality in the food

industry. Supply chain management and the hospitality industry represent merely two of the numerous sectors that shall be impacted, as posited by Cheong et al. (2021) and Sharma et al. (2021). While the benefits of AI and robotics are highlighted, ethical concerns, particularly surrounding labor replacement, aren't extensively discussed (Ryan et al., 2021). The long-term effects of extensive AI application in the food business on the economy and society are mostly uncharted. Most research lauds the positives of AI and robotics in farming, but concerns like potential risks, farmers' autonomy, and environmental consequences are only superficially touched upon by some like Ryan et al. (2021).

The advent of RAISA (robots, AI, and service automation) has significantly transformed the service sector, particularly evident in the restaurant and hospitality domains. The literature predominantly underscores the potential benefits and efficiencies brought about by AI and robotics, such as improved customer experiences and operational enhancements. The multifaceted implications of this transformative shift, however, cannot be overlooked. In the restaurant context, AI service robots have been studied primarily from the angle of their influence on customer perceptions and intent. While there's a consensus that features like sensory appeal and memorable experiences positively sway customer attitudes, there are notable research gaps. The long-term societal implications, potential cultural variances, and the overarching impact on different restaurant types are areas that remain under-investigated. By and large, the experiences of customers with service robots have been favorable. The existing literature highlights the role of trust, perceived competence, and kindness in shaping these experiences. Nevertheless, some discrepancies arise. Despite the general optimism surrounding AI service robots, certain scenarios, especially high-pressure sales situations, elicit mixed feelings among customers. The intricacies underlying such inconsistencies have not been thoroughly probed. In the broader realm of the food industry, AI and robotics promise augmented productivity, better quality, and streamlined operations. They've shown potential in enhancing everything from supply chain dynamics to actual on-ground restaurant functionalities. When it comes to the ethical challenges raised by modern technologies, particularly with respect to the displacement of human labor, however, the literature is noticeably lacking. Furthermore, long-term ramifications, socio-economic consequences, and the environmental cost of embedding AI and robotics extensively in the food sector are aspects that call for deeper scrutiny.

In summary, the current literature is the lack of studies employing SWOT analysis in the context of AI robot services in the restaurant industry. Conducting a SWOT analysis that meticulously scrutinizes the capabilities, limitations, possibilities, and hazards of AI-powered robot services through the lens of patrons can furnish an exhaustive and equitable appraisal of this extraordinary occurrence. Such an assessment can greatly aid eateries in their strategic deliberations about the adoption of such cutting-edge technology. while the existing body of literature paints a promising picture of the integration of AI and robotics in the service and food industries, there's a clear need for more holistic, nuanced, and critical investigations into the multifarious implications of this transformative trend.

3. Research Methodology

Qualitative research techniques hold significant importance in comprehending intricate phenomena and delving into subjective encounters. Within the qualitative inquiry realm, continuous discourse has taken place regarding the tactics and benchmarks aimed at guaranteeing the utmost accuracy and dependability in research (Morse, 2015). The investigation shall employ a qualitative methodology to procure multifaceted, intricate, and situational perspectives pertaining to the research inquiries. The principal research blueprint shall consist of an investigative case study, which will facilitate a profound scrutiny of a particular occurrence within its authentic milieu (Hollweck, 2015). In this instance, the occurrence in question pertains to the utilization of AI robots in Bangkok's eateries and the corresponding perceptions of their clientele.

3.1. Data Collection

This specific investigation engaged a selection of happenstance for the execution of semi-formal, interpersonal dialogues. Braun and Clarke's (2006) research defines convenience sampling as selecting available and accessible people. Semi-structured interviews shall amass the quintessential information for the researchers, thereby providing a comprehensive and exhaustive understanding of the subject matter. 8 customers who have utilized AI robots service, 4 service workers, and 3 supervisors, total 15 participants will be recruited from Bangkok restaurants for the study (Table 1). Convenience sampling will choose participants based on availability and interest. The interview schedule will complement the research aims and include free-form questions for in-depth responses.

The participant selection was segmented into three categories:

(1) Customers who have utilized AI robots service (8 participants):
Criteria: Individuals who have recently visited and availed services from restaurants in Bangkok that employ AI robots. Preferably, these customers should have experienced both traditional human service and AI robot service to draw a comparative understanding.

(2) Service workers (4 participants):
Criteria: Staff members from restaurants who have firsthand experience working alongside AI robot servers. These could include waitstaff, hosts/hostesses, or any other relevant frontline service staff. Their inclusion provides an inside perspective on the practical aspects and implications of AI robot service in restaurants.

(3) Supervisors (3 participants):
Criteria: Management personnel or supervisors from the selected restaurants. They can offer insights from a managerial perspective, covering the benefits, challenges, and long-term vision concerning AI robots in their establishments.

The main emphasis in the selection process was ensuring the participants were directly linked to the context of the study. Convenience sampling eliminates random selection, but it may introduce biases. The responses might not represent the wider population's opinion but offer valuable, context-rich insights.

Sample Interview Questions:

For Customers:

"Can you describe your initial reaction or feelings when you first encountered an AI robot server in a restaurant? How did it compare to your experiences with human servers?"

For Service Workers:

"How has the introduction of AI robots impacted your day-to-day responsibilities and interactions with customers? Are there specific challenges or benefits you've noticed?"

For Supervisors:

"From a managerial perspective, what motivated the decision to incorporate AI robot servers? How do you envision the future of AI robot servers in the context of your restaurant's operations and customer service?"

Table 1. Participants with Their Information

Code No. of Interviewees	Gender	Occupation
L1	Male	Restaurant's Supervisor
L2	Male	Head Waiter
L3	Female	Head Waitress
L4	Female	Waitress
L5	Female	Waitress
L6	Female	Waitress
L7	Male	Waiter
L8	Female	Customer
L9	Female	Customer

L10	Male	Customer
L11	Female	Customer
L12	Female	Customer
L13	Male	Customer
L14	Female	Customer
L15	Female	Customer

3.2 Data Analysis

Thematic analysis, an intriguing and stimulating method, was implemented to scrutinize the data ascertained from the interviews. This methodology entails recognizing patterns and themes within the data and classifying them into meaningful divisions. Such a method enables a thorough and comprehensive exploration of the participants' outlooks and experiences (Braun & Clarke, 2006). The analysis shall commence with a thorough understanding of the data, followed by preliminary coding. Subsequently, the codes will be combined into possible themes. These themes will then be meticulously evaluated and refined to ensure that they accurately depict the data. A SWOT (short for "Strengths, Weaknesses, Opportunities, Threats") assessment will be compiled using the data gathered in the theme analysis. This will necessitate identifying and categorizing key points from the data into the SWOT framework to provide a comprehensive understanding of customer perspectives and the potential ramifications of AI robot services in Bangkok's restaurant industry.

Based on the data from the semi-structured interview, a conceptual research framework was proposed for this study. (Figure 1.)

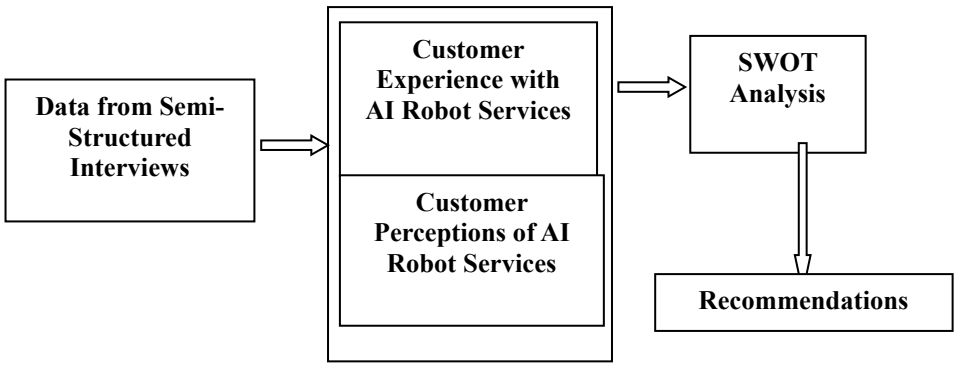

Fig.1: The Conceptual Research Framework
Source: Prepared by Author

To ensure the utmost reliability, the investigation will embrace the methodologies of credibility, transferability, dependability, and confirmability as recommended by Lincoln and Guba (1985). These methodologies encompass member validation, presenting a comprehensive overview of the information, detailed analysis records, and introspection. Every participant will furnish an informed agreement before contributing to the study, and their confidentiality and privacy will be upheld during the entire research undertaking. Prior to commencing the study, the pertinent ethical review board will be contacted for ethical approval.

Interviews across two site visits spanning two months (mid-April to late-June, 2023) provided empirical data for the current study. The interviews were carried out at a famous buffet-style chain restaurant established in 2019, the headquarter was located in Bangkok, the capital city of Thailand, which has gained immense popularity in recent years owing to its hotpot buffet offerings that attract a long queue of patrons. The restaurant has the potential to leapfrog from traditional operational limits through tech innovation. In just 3 years now. It has 42 branches spread throughout Bangkok, especially on the outskirts, about 30,000 customers a day visit its restaurants. The restaurant booked strong growth in operating results over the past two years despite the pandemic. The enterprise experienced a notable

surge in its earnings, as the transactions rose from 1.2 billion Thai baht (which corresponds to 43 million US dollars) during the year 2020 to an exceptional 1.5 billion in the year 2021. Net profit was 147 million baht (about 4 million US dollars). Recently, with most producers to increase prices, restaurant chains are spike in manufacturing costs as a result of the Russia-Ukraine war and galloping inflation. Buffet is the restaurant category that received the greatest impact from high costs, while the a la carte category has received the least impact, according to restaurant owners of Bangkok. On the one hand, in an effort to lure more customers, most of the restaurant extended the chain's service hours. On the other hand, many of restaurants created new menus and enhanced the customer experience by using service robots.

In April of the year 2023, an inaugural visit was conducted wherein a convocation transpired with the supervisors and managers. Furthermore, a supervisor imparted a comprehensive two-hour tour of the restaurant to the researcher. The tour involved a briefing on general information, restaurant facilities, company culture, and AI service robot. Furthermore, informal interviews were spontaneously conducted with the restaurant manager, supervisor, and various service staff members during the meeting held in the restaurant's meeting room.

On the contrary, the subsequent visit was executed towards the end of June, wherein semi-structured interviews were administered over a span of three days, commencing from June 26th till the 29th, leading to the formulation of 15 pivotal interview transcripts. Detailed Description of Interview Protocol and Data Analysis Process:

(1) Pre-Interview Preparations: Before the formal interview process, an outline was constructed detailing the primary questions and potential follow-ups. This served as a blueprint for the discussions and ensured consistency across different interview sessions. It was crucial for this study to focus on unbiased, open-ended questions that allowed participants to express their views candidly.

(2) Interview Protocol:

- Setting: The interviews were conducted in the restaurant's service area, a neutral and comfortable environment for all participants.

- Duration: Each interview lasted approximately 45-60 minutes.

- Recording: To guarantee accuracy throughout transcription and analysis, interviews were audio recorded with participants' permission.

- Questions: The interview began with general questions about the participant's role, experience with AI service robots, and their perceptions. As the conversation evolved, more in-depth, focused questions were posed, probing areas of particular interest or unexpected revelations.

(3) Data Analysis Process:

- Transcription: Immediately following each interview, audio recordings were transcribed verbatim. This resulted in a rich dataset, capturing not only the content but also the emotion and emphasis of the participants.

- Open Coding: The transcriptions underwent a first pass of open coding. During this phase, initial codes or tags were assigned to distinct ideas or comments. These codes were short descriptors that captured the essence of the statement.

- Axial Coding: Following the initial coding, axial coding was performed. Here, the preliminary codes were grouped into larger categories based on their interrelationships. This process started highlighting emergent themes and patterns in the data.

- Theme Identification: Once axial coding was complete, broader themes began to emerge. These themes were the primary insights drawn from the interviews and were continually refined as more data was analyzed.

- Verification: A second researcher was brought in to examine the transcriptions and the coding that

was done to confirm the reliability and validity of the found themes. Any discrepancies between the two researchers were discussed, debated, and resolved to reach a consensus.

(4) Theme Validation: After identifying potential themes, they were presented back to a subset of participants. This member-checking process ensured that the themes authentically represented their views and experiences. Feedback from participants was then incorporated, fine-tuning the themes.

The interviews were directed by the research inquiries of the investigation.

RQ1: How do customers perceive the service quality of AI Robots in Bangkok's restaurants?

RQ2: What are the strengths, weaknesses, opportunities, and threats (SWOT) of employing AI Robots in restaurant services from the customers' perspective?

RQ3: What practical recommendations can be drawn for restaurant operators and policymakers on the adoption and implementation of AI Robot services based on customers' perceptions and SWOT analysis?

4. Results and Discussion

RQ1: How do customers perceive the service quality of AI Robots in Bangkok's restaurants?

To answer this question, there are two perspectives that should be considered: customer experience with AI robot services, and customer perceptions of AI robot services.

Customer experience with AI robot services

-Draw to Novelty

All the customers who were interviewed unanimously agreed that their visit to this restaurant was exclusively for the purpose of experiencing the service of the delivery robot, which they found to be incredibly innovative. As an example, “I hail from the northeastern region of Thailand, however, to my dismay, there exists no chain store of this restaurant in my hometown. I undertook a significant journey to Bangkok just to be able to enjoy the robot delivery service at this restaurant. The robots seamlessly traverse the restaurant, skillfully avoiding obstacles along the way. Their intelligence is truly remarkable. This experience is exceptional and unforgettable. I want to return to this restaurant soon with my family and friends to enjoy this unique experience.” (L8, L9, L12, L14, L15) The restaurant supervisors and waiters interviewed believe that delivery robots can serve as a highlight for restaurants to attract customers. For example, “since the introduction of food delivery robots, restaurants have attracted many customers, especially on weekends when many large families come to the restaurant for meals. Young people are very interested in food delivery robots.” (L1, L3, L6, L7)

-Efficiency in Service

Most customers greatly appreciate the efficiency of food delivery robots. For example, "Not long after we finished ordering, the delivery robot prepared our food very efficiently and quickly. The robot automatically stopped before delivering the food to our dining table and prompted us to pick up the food with voice prompts. After picking up the food, the robot will leave on its own, which is really convenient." (L9, L10, L12, L13) All the servers we talked to agreed that the delivery robot would make their jobs easier. For example, “We have a big number of regulars who frequent our restaurant. The utilization of delivery robots could yield substantial advantages, particularly during peak hours when the request for sustenance is at its pinnacle. Robots can be of great assistance.” (L4, L5, L6, L7)

It shows that some participants were thrilled by the novelty and efficiency of the robots, highlighting that the robots were fast, accurate, and provided a unique dining experience. These findings align with previous literature suggesting the appeal of novelty in technology-based services (Ameen et al., 2021; Gupta et al., 2022).

Customer perceptions of AI robot services

-Technological Innovation

Most of the surveyed customers stated that intelligent food delivery robots are a symbol of technological innovation. For example, "Intelligent food delivery robots can enable customers to experience the achievements of technological innovation, providing fast and accurate services. We hope that food delivery robots can become more intelligent in the future." (L8, L9, L11, L15) The questioned restaurant supervisors were unified in their belief that technology advancement was essential to the food industry. For example, "The rapid development of our restaurant is inseparable from technological innovation. The introduction of intelligent delivery robots has brought a large number of customers, and we believe that the future development of the restaurant industry also requires technological innovation." (L1, L2, L3)

-Lack of Interaction

Some of the interviewed customers mentioned the lack of interaction between them and the delivery robot. For example, "We feel that there is absolutely no interaction with the food delivery robot. Robots deliver food to us according to predetermined programs, completely unaware of our gender, age, mood, and state, and unable to provide customized services to us. I feel that the food delivery robot is just a cold machine." (L9, L11, L13, L14) All of the serving staff members who were questioned agreed that intelligent robots cannot provide the same level of customer service as human beings. For instance, "While there are many benefits to using delivery robots, they are limited in their ability to interact with customers." Due to their high failure rate and constant need for charging, we must frequently devote time to their maintenance." (L4, L5, L6, L7)

It reveals that the perceptions towards AI robot services were generally positive, but nuanced. Participants appreciated the technological innovation, efficiency, and the unique experience they provide. Some customers, however, expressed concerns about the impersonal interaction and loss of human touch in service delivery, which supports previous studies that emphasize the importance of human interaction in service industries (Hlee et al., 2023; Mariani & Borghi, 2021).

RQ2: What are the strengths, weaknesses, opportunities, and threats (SWOT) of employing AI Robots in restaurant services from the customers' perspective?

Based on research findings from research question 1, a SWOT analysis was proposed as follows:

Strengths

Novelty: The novelty of AI robot services greatly contributes to the customer experience. Visitors are attracted to the uniqueness of the concept, and the novelty factor also enhances the overall dining experience. This attraction can serve as a competitive advantage for the restaurant.

Efficiency: AI robot services significantly boost operational efficiency. Reduced wait times and happier customers are the results of robots' ability to execute orders swiftly and precisely. The restaurant staff also agreed that robots can assist during peak hours, thus ensuring smooth operations.

Technological Innovation: The adoption of AI robots reflects the restaurant's commitment to technological innovation. Customers appreciate this forward-thinking approach, and it helps in fostering a modern and progressive image of the restaurant.

Weaknesses

Lack of Interaction: Despite the benefits of AI robots, they lack the ability to interact with customers in a personalized way. Some customers expressed their desire for more personalized service which robots are currently incapable of delivering. This lack of human touch could potentially lead to lower customer satisfaction.

Maintenance and Operational Challenges: AI robots require regular maintenance and charging, which can be time-consuming for the staff. There's also the possibility of technical glitches which can

disrupt the restaurant's operations.

Opportunities

Market Differentiation: The use of AI robots offers a unique selling point for the restaurant, differentiating it from competitors and potentially attracting more customers.

Technological Advancements: Ongoing advancements in AI technology present the opportunity for further enhancing robot capabilities. As technology evolves, the robots may be able to offer more personalized interactions in the future.

Trend Towards Automation: With the growing trend of automation in various industries, embracing this technology positions the restaurant as a front-runner and a trendsetter.

Threats

Human Job Replacement: The use of AI robots could lead to job losses, potentially causing unrest among current or potential employees and creating a negative perception among some customer segments who value human-led services.

Customer Resistance: While some customers appreciate the novelty of AI robot services, others may resist this change, especially those who value traditional, human-led services.

Reliance on Technology: Heavy reliance on AI robots for service delivery could pose challenges in case of technological failures, leading to operational disruption and customer dissatisfaction.

The findings from this SWOT analysis mirror several observations found in previous literature:

Novelty and Efficiency: Ameen et al. (2021) alongside Gupta et al. (2022) discovered that the utilization of AI-powered robotic services not only enhances operational efficiency but also fosters innovation, consequently leading to a significant boost in customer relations. These studies found that novel technological interventions in the service sector often initially attract customers due to the unique experiences they provide.

Lack of Interaction: The identified weakness of a lack of personalized interaction with AI robots is consistent with observations by Cha (2020) and Seyitoğlu and Ivanov (2022). They noted that while technology can offer several functional advantages, the emotional and personalized aspect of human-to-human interaction is challenging to replicate.

Job Replacement Concerns: The threat of human job replacement by automation has been a recurring theme in many studies, notably by Ryan et al. (2021) and Cifci and Alrawadieh (2023). These concerns highlight the potential socio-economic impacts of widespread automation and the associated ethical considerations.

Practical Implications for Restaurant Owners:

Hybrid Model of Service: Given the identified strengths and weaknesses, restaurant owners could consider a hybrid service model. This would involve AI robots handling operational and repetitive tasks while human staff focuses on roles that require personalized interactions, problem-solving, and other tasks robots currently can't perform efficiently. Such a model can enhance efficiency without compromising the personalized touch that many customers value.

Training and Development: Investing in staff training to ensure they can work alongside robots effectively can be beneficial. For instance, staff could be trained on how to troubleshoot common technical glitches, ensuring minimum disruption to service. Moreover, training staff to focus on enhancing the human touch and customer interaction can offset the impersonal nature of robot services.

Stakeholder Engagement: Restaurant operators might openly discuss automation with personnel and stakeholders to solve job displacement concerns. Providing reassurances, laying out clear plans for staff retention, and perhaps even involving staff in the decision-making process regarding AI integration can mitigate potential unrest and negative perceptions.

RQ3: What practical recommendations can be drawn for restaurant operators and policymakers on the adoption and implementation of AI Robot services based on customers' perceptions and SWOT analysis?

Based on the research findings, discussions, and SWOT analysis, the following practical recommendations can be drawn for restaurant operators and policymakers on the adoption and implementation of AI Robot services:

(1) Balanced Integration of Human and Robot Services: While customers appreciate the novelty and efficiency of AI robots, they also miss the personal touch and interaction that comes with human service. Hence, restaurants could strive for a balanced integration of human and robot services. Robots can handle the routine and repetitive tasks, leaving more complex, creative, and interactive tasks to human staff.

(2) Continuous Investment in Technology: Restaurants should consider continuous investment in AI technology to enhance the efficiency and capability of robot servers. Regular maintenance and upgrades would ensure the smooth operation of robots and reduce potential disruption due to technical failures.

(3) Training and Skill Development for Staff: As robots take over some tasks, the roles and skill requirements of human staff may change. Owners and managers of eating establishments owe it to their employees to equip them with the training they need to adjust to the changing workplace and acquire skills that complement artificial intelligence.

(4) Customer Education: Restaurant operators could educate customers about the benefits and limitations of AI robot services to set appropriate expectations. This could be done through in-restaurant communication or marketing campaigns.

(5) Feedback Mechanism: Implementing a feedback mechanism can help restaurants understand customer experiences and perceptions towards AI robot services in a timely manner, and make necessary adjustments.

(6) Policy Guidelines: Guidelines and restrictions for the use of AI in the food business should be established by policymakers. This includes addressing potential job displacement issues and setting standards for safety, privacy, and ethics.

(7) Sustainable Practices: Policies should be put in place to encourage sustainable practices like re-skilling or up-skilling of workers who may be displaced as a result of automation of formerly human-only tasks. Policymakers and restaurant operators should jointly address these challenges and explore solutions, such as alternative job roles, training programs, or social protection measures.

(8) Promoting Technological Innovation: Organizations that employ AI technology ought to be duly commended, while fostering research and development in AI should be actively promoted. In addition, a solid foundation must be established to allow for the extensive and pervasive use of AI in many other areas.

By adopting these recommendations, restaurant operators and policymakers can effectively manage the implementation of AI Robot services, capitalize on their strengths, address their weaknesses, and prepare for the opportunities and threats identified in the SWOT analysis.

5. Conclusion

This qualitative study explores Bangkok restaurant patrons' opinions on AI Robot Services, examining its pros and cons in the hospitality business and its potential and downsides. The study's findings affect the hospitality industry and provide new research opportunities. The novelty and efficacy of AI Robot Services make consumers responsive, according to studies. Some customers value hotels' human touch and courteous treatment. These findings support the literature's focus on technology's efficiency vs

people's interpersonal abilities while offering services. SWOT analysis shows that restaurants may attract customers with efficiency and innovation, but technological issues, impersonal service, and job loss threats should not be ignored. Customers' technology knowledge, age, and AI familiarity greatly impact their thoughts and experiences. This shows the need of assessing the target market before using such technologies. Conclusions it's crucial to balance automation with human contact in the restaurant industry's future. Every restaurant has its own issues, clients, and prospects. A larger and more representative sample may illuminate our findings' wider significance for future research. To track customers' AI views, this research should be repeated. Due to the lack of qualitative research on restaurant customers' perceptions of AI Robot Services, this study's findings may benefit industry stakeholders and researchers. In a technologically driven world, AI in the hospitality business is inevitable, but it must be used to improve guest experience.

5.1 Limitations of the Study

Geographic Concentration: This study focused on Bangkok restaurant patrons. While this provides in-depth insights into this particular demographic, it might not be representative of broader customer perceptions in other regions or cultures.

Sample Size: With a finite number of individuals involved in the research, there is a possibility that varying viewpoints and encounters may have gone unaccounted for. This constraint possesses the potential to impact the applicability of the conclusions.

Bias in Convenience Sampling: The employment of convenience sampling, though expeditious, may potentially result in a biased sample as it is predicated upon the availability and inclination of participants, rather than being a genuinely random representation of the populace.

Evolution of Technology: AI technology and its applications are rapidly evolving. The findings of this study represent a snapshot in time and might become outdated as AI capabilities and consumer attitudes evolve.

5.2 Future Research Directions

Broader Demographics: Future studies could diversify the sample by considering a broader demographic, including different age groups, cultural backgrounds, and regions, to get a more holistic understanding.

Longitudinal Studies: Analyzing the viewpoint of clientele over a prolonged period can offer exquisite enlightenment regarding the progression of outlooks towards artificial intelligence (AI) since its gradual assimilation into everyday existence and individuals' familiarity with this technological innovation.

Economic Impact Analysis: Further research could delve into the economic implications of AI Robot Services, focusing on return on investment, job displacement vs. creation, and the potential for new business models in the hospitality sector.

Ethical Considerations: Given the apprehensions regarding the loss of employment opportunities and the unfeeling nature of AI interactions, one could also direct future research towards investigating the ethical aspects of AI in the hospitality industry. This could involve delving into the most optimal approaches for the incorporation of AI that upholds the dignity of both staff and clients.

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