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CUSTOMER ACCEPTANCE OF ROBOT SERVICE QUALITY AT KLUANG RAIL COFFEE

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Abstract:

The integration of robotics into the Malaysian food and beverage (F&B) sector has emerged as a promising innovation, particularly in enhancing operational efficiency and service quality. However, limited research explores customer acceptance of robotic services in this context. This study investigates customer perceptions of robotic service quality at Kluang Rail Coffee, Johor specifically assessing the impact of tangibility, reliability, responsiveness, assurance, and empathy on customer satisfaction. A quantitative approach was employed, collecting structured survey data from 267 respondents representing a broad demographic spectrum. The study found that tangibility, encompassing the robots' appealing design and user-friendly features, was highly rated. Reliability, measured by task consistency and minimal malfunctions, also gained positive responses. Responsiveness, demonstrated by the robots' promptness and adaptability, significantly influenced customer acceptance. Assurance, reflecting trust and confidence in robot service, emerged as a critical factor, while empathy, though limited by technological constraints, highlighted potential areas for future enhancement. Statistical analysis, including Spearman's rank correlation, revealed a strong positive relationship between perceived service quality and customer acceptance. These insights offer practical implications for restaurant operators and policymakers seeking to optimize robotic services in Malaysian F&B settings. The study concludes that strategic improvements in service quality dimensions can drive greater acceptance, enhancing customer satisfaction and operational efficiency. Future research should explore AI-driven personalization to improve empathy in robotic interactions.

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Keywords:

Customer Acceptance, Robot Service, ServQual, and Technology Adoption.

Introduction

The study on customer acceptance of robotic service quality at Kluang Rail Coffee. It highlights the growing adoption of robotics in the food and beverage (F&B) industry, driven by labour shortages, the need for efficiency, and advancements in artificial intelligence. The capabilities of robotic service have progressively surpassed those of human care providers in some domains, such as memory, computational capacity, physical strength, and the management of unpleasant or hazardous activities (Lee, 2021). Nevertheless, such robotic service possesses a limited amount of artificial intelligence to provide a diverse range of services. Artificial intelligence may be categorised into four types: mechanical, analytical, intuitive, and empathic (Chiang & Trimi, 2020). Contemporary robotic service, while their applications have markedly expanded throughout the ongoing pandemic, are efficient and mostly used for the first two tiers of intelligence, since they remain deficient in the two higher orders of intelligence (M. H. Huang & Rust, 2018). While robotics has been widely implemented in developed countries, Malaysia is still in the early stages of adopting this technology. This study aims to explore how service quality dimensions, which are tangibility, reliability, responsiveness, assurance and empathy that influence customer perceptions and acceptance of robotic services (Belanche et al., 2021). The problem statement identifies a gap in research on customer attitudes toward robotic services in Malaysian restaurants, emphasising the need to understand factors that drive or hinder acceptance.

The significance of the study extends to customers, restaurant managers, institutions, and TVET students, providing insights for improving robotic service quality and implementation strategies. The research scope focuses on customers at Kluang Rail Coffee in Johor, using a quantitative approach to collect data. Despite some limitations, such as geographical constraints and the reliance on self-reported data, the study aims to contribute to the broader understanding of technology adoption in the Malaysian F&B sector (Hwang et al., 2020). The conceptual framework is based on service quality dimensions, guiding the research toward evaluating how robotic services impact customer satisfaction and acceptance.

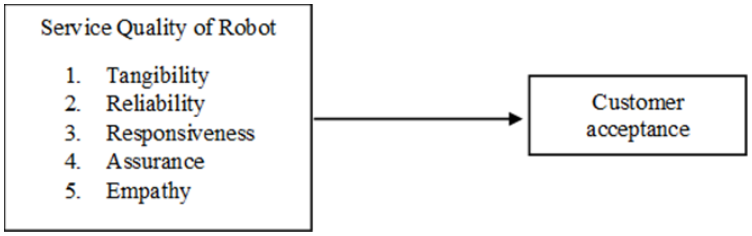

Figure 1: The conceptual framework of customer acceptance of robot service quality at Kluang Rail Coffee

Source: (Donnelly et al., 1995)

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Literature Review

The integration of robotic services in the food and beverage (F&B) industry, particularly in Malaysia, and how service quality dimensions influence customer acceptance.

Evolution and Trends in Robot Services

The evolution of robot services in restaurants has progressed significantly, moving from basic automated machines performing repetitive tasks to AI-driven service robots capable of interacting with customers (Cha, 2020). Initially, robots were introduced to enhance efficiency and reduce reliance on human labor.

Over time, technological advancements have enabled them to perform more complex tasks, such as taking orders, serving food, and engaging in customer interactions (Zhu & Chang, 2020). The increasing adoption of AI and machine learning has allowed robots to personalize experiences, offering tailored recommendations and improving service efficiency. While robotic services are gaining traction globally, their implementation in Malaysia remains relatively new, making it essential to study their acceptance among local consumers(Javaid et al., 2021).

Advantages of Robot Services in Restaurants

One of the key advantages of using robots in restaurants is their ability to improve operational efficiency. Robots can perform tasks faster and more accurately than human employees, reducing waiting times and enhancing service speed (Mandil et al., 2023). Additionally, the long-term cost savings associated with robotic services, such as reduced labor costs and minimal human errors, make them attractive to restaurant operators (Liu et al., 2024).

Robots also offer consistency in food preparation and service quality, ensuring that customers have the same experience every time they visit (Othman & Yang, 2023). Another major benefit is workplace safety, as robots can take over high-risk tasks, such as handling hot dishes or working with heavy kitchen equipment. These factors contribute to an overall improvement in restaurant performance and customer satisfaction.

Challenges in Implementing Robot Services

Despite these advantages, implementing robot services in restaurants comes with challenges. One of the biggest obstacles is the high initial investment required for acquiring and maintaining robotic systems. The cost of purchasing, programming, and regularly updating robots can be a significant financial burden, particularly for small businesses (Shajahan, 2022).

Additionally, technological limitations still exist, as robots may struggle to handle complex human interactions, respond to customer complaints, or adapt to unexpected situations (Ye et al., 2021). Another challenge is customer acceptance, as not all consumers are comfortable with robotic services, especially those who value human interaction in hospitality settings. Some customers may perceive robotic services as impersonal, reducing their overall satisfaction with the dining experience (Huang et al., 2021). Restaurants must address these concerns by ensuring a balance between automation and human engagement.

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Factors Influencing Customer Acceptance

Several factors influence customer acceptance of robotic services. One of the primary factors is perceived usefulness, where customers are more likely to accept robots if they believe they enhance service efficiency and convenience. Ease of use also plays a role, as robots with intuitive and user-friendly interfaces tend to be better received (Zhou et al., 2023).

Trust and familiarity with technology further impact acceptance, as customers who regularly interact with digital solutions are more likely to view robotic services positively (Shah et al., 2023). Cultural expectations are also significant, especially in Malaysia, where personal hospitality is highly valued. Customers who expect warm, personal interactions may be hesitant to accept robots, whereas younger, tech-savvy individuals may be more open to the idea.

Impact of Service Quality on Customer Satisfaction

The impact of service quality on customer satisfaction is crucial in understanding robotic service adoption. This study applies to the ServQual model, which evaluates service quality based on five key dimensions.

Tangibility refers to the physical appearance of robots, including their design and how well they integrate into the restaurant setting. Customers tend to accept robots that are aesthetically appealing and easy to interact with. Reliability measures how consistently robots perform tasks without errors or malfunctions. A reliable robotic service ensures that customers receive efficient and accurate service, leading to higher satisfaction. Responsiveness reflects how quickly and effectively robots respond to customer needs. If robots can promptly take orders, answer inquiries, and adapt to service demands, they are more likely to be accepted. Assurance relates to customer trust and confidence in robotic services. Customers need to feel secure in the robots' ability to perform tasks correctly and safely. Lastly, empathy examines the ability of robots to simulate human-like interactions. While robots currently lack genuine emotional intelligence, AI advancements may help improve personalised experiences in the future (Hou et al., 2021; Hu et al., 2019; Mina et al., 2020).

Summary of Comprehensive Literature Study

Study Aspect	Key Findings	Author(s)
Evolution and Trends	Robotic services have evolved significantly from simple task automation to advanced AI-driven interactions, becoming more personalised and efficient.	Cha (2020); Zhu & Chang (2020)
Advantages	Robots enhance efficiency, reduce service time, maintain consistency, improve safety, and offer long-term cost savings by minimising human error.	Mandil et al., (2023)
Challenges	High initial costs, technological limitations in handling complex human interactions, and potential customer resistance due to perceived impersonality.	Ye et al., (2021).
Customer Acceptance Factors	Perceived usefulness, ease of use, trust, familiarity with technology, and cultural expectations significantly influence customer acceptance of robotic services.	Zhou et al., (2023).

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Impact on Satisfaction	Tangibility, reliability, responsiveness, assurance, and empathy directly influence customer satisfaction. Higher scores in these dimensions correlate with greater acceptance.	Hou et al., (2021); Hu et al., (2019); Mina et al., (2020).
Empirical Results	Tangibility and reliability rated highest by customers, while empathy rated lower due to technological constraints. Responsiveness and assurance significantly impact acceptance positively.	Hou et al., (2021); Hu et al., (2019); Mina et al., (2020).

Methodology

This study employed a quantitative research design using a structured survey method to collect data from customers at Kluang Rail Coffee, Johor Click or tap here to enter text.. A total of 267 respondents participated, selected through a random sampling technique to ensure diverse representation. Based on Figure 1.0, the survey questionnaire was designed to assess five key dimensions of robotic service quality: tangibility, reliability, responsiveness, assurance, and empathy. The questionnaire was adapted from Chiu (2020), which had been modified from the original instrument of the psychological well-being scale constructed in the study of Ryff (2012). Each dimension was measured using a Likert scale, allowing participants to rate their perceptions of robotic service performance. Reliability tests were conducted to ensure the consistency of the survey instrument, and validity checks were performed to confirm the appropriateness of the measured constructs. Ethical considerations were maintained by ensuring participant anonymity and informed consent. Then, the real data collection was done through the distribution of a Google Form to the customers.

Next, the data collected were analysed using SPSS software, employing descriptive statistics, correlation analysis, and Spearman's rank correlation to determine relationships between service quality dimensions and customer acceptance (Abhari et al., 2019). The structured methodology provided a systematic approach to evaluating customer acceptance of robotic service quality and identifying factors influencing satisfaction in the Malaysian F&B sector.

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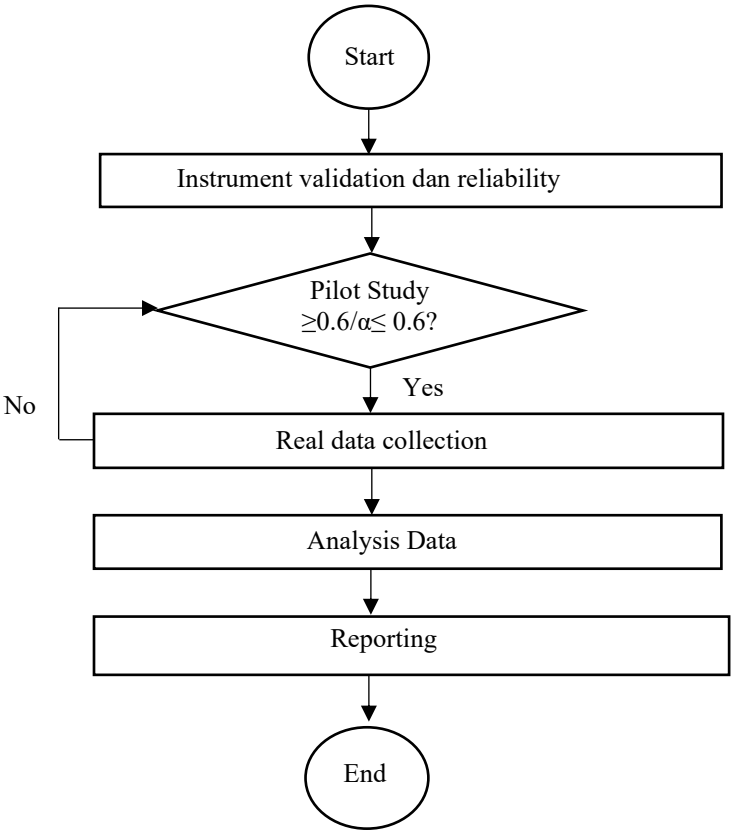

Figure 1: Flow Chart of Data Collection process

Results and Discussion

The demographic analysis reveals a balanced representation of respondents in terms of gender, with females constituting 49.1 percent (n=131) and males making up 50.9 percent (n=136). This nearly equal distribution ensures that the findings adequately reflect perspectives from both genders. Regarding age distribution, respondents were categorized into four groups, with those aged 25 to 34 and 45 to 54 each representing 25.5 percent (n=68), while those aged 18 to 24 accounted for 24.3 percent (n=65) and those aged 35 to 44 made up 24.7 percent (n=66). This indicates a diverse age representation within the sample. Figure 2 shows the demographic data involved in this study.

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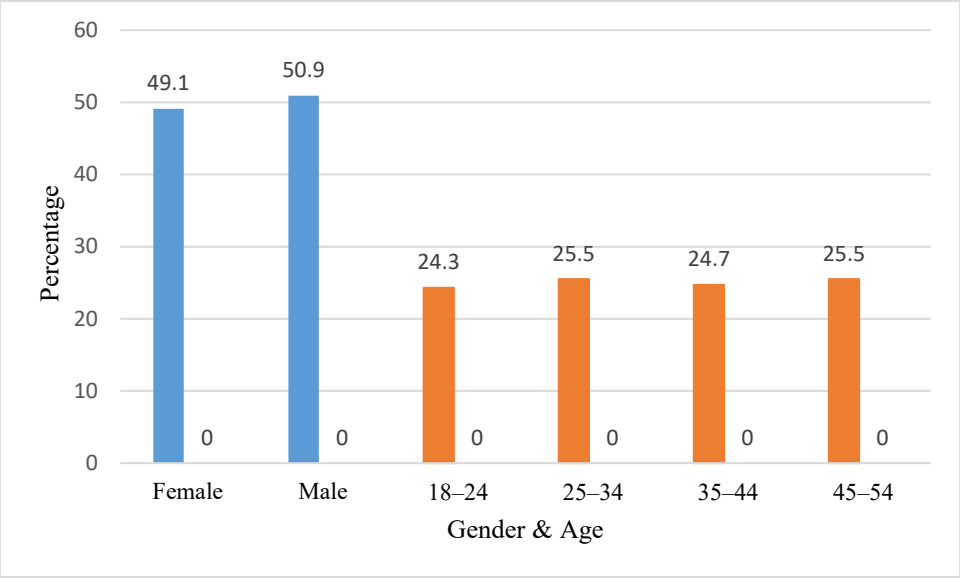

Figure 2: Demographic Data

The study's findings indicate that customers generally have a positive perception of robotic service quality at Kluang Rail Coffee (Nasir et al., 2023). Tangibility received the highest ratings, as respondents appreciated the robots' design and ease of use, making them an attractive addition to the restaurant experience. Reliability was also rated positively, with customers noting that the robots performed their tasks consistently with minimal malfunctions. Responsiveness played a significant role in customer acceptance, with robots being perceived as efficient in delivering orders and responding to customer requests. Assurance was another key factor influencing customer trust in robotic services, as users felt confident in the robots' accuracy and functionality. However, empathy, while still relevant, was rated lower due to the technological limitations of robotic interactions, suggesting room for improvement in making the experience more personalized. Spearman's correlation analysis confirmed strong positive relationships between all five service quality dimensions and customer acceptance, reinforcing the importance of optimizing these factors to enhance user satisfaction and encourage widespread adoption of robotic services.

Table 1: Correlation Analysis

Variables	Tangibility	Reliability	Responsiveness	Assurance	Empathy	Customer Acceptance
Tangibility	1	.855**	.848**	.791**	.869**	.906**
Reliability		1	.788**	.817**	.814**	.894**
Responsiveness			1	.692**	.837**	.905**
Assurance				1	.704**	.779**
Empathy					1	.869**
Customers Acceptance						1

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Conclusions

The study highlights that robotic service quality significantly influences customer acceptance at Kluang Rail Coffee. Enhancing tangibility, reliability, responsiveness, assurance, and empathy can further drive customer satisfaction and operational efficiency. Tangibility emerged as a crucial factor, with respondents highlighting the modern and appealing design of the robots. This aspect is vital as it creates a positive first impression, which is essential in the dining experience. Customers rated the robots highly on attributes such as their physical appearance and technological features. This aligns with existing literature, such as the study by Xiao and Zhao (2022), which suggests that well-designed service robots enhance customer satisfaction and overall experience.

The relationship between perceived service quality of robots and customer acceptance of robot services at Kluang Rail Coffee confirmed a positive and significant relationship between these variables, indicating that higher perceived service quality leads to greater customer acceptance. This finding is crucial as it suggests that improvements in the dimensions of service quality can directly enhance the overall acceptance of robotic services among customers. Specifically, the study highlighted that dimensions such as reliability and assurance played key roles in fostering customer trust. Respondents expressed a strong belief that reliable robotic services contribute significantly to their satisfaction and willingness to accept these technologies. Assurance, on the other hand, encompasses the customers' feelings of safety and trust when interacting with robotic systems. High levels of assurance lead to increased confidence in the technology, which fosters greater acceptance among customers (Oubrich et al., 2021). If customers feel secure in their interactions with robots, they are more likely to embrace these technologies as part of their dining experience. The positive ratings for these dimensions underscore their importance in shaping customer perceptions and acceptance. These findings offer strategic insights for restaurant operators and policymakers to refine robotic service implementations in the Malaysian F&B industry. Future research should explore AI-driven personalization to enhance empathy in robotic interactions. In terms of demographic scope can also be diverse across different regions in Malaysia.

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References

Abhari, S., Jalali, A., Jaafar, M., & Yean, L. C. (2019). *Customers' Acceptance Level Of Smart Restaurant Services In Penang*. 490–501. https://doi.org/10.15405/epms.2019.12.48

Belanche, D., Casaló, L. V., & Flavián, C. (2021). Frontline robots in tourism and hospitality: service enhancement or cost reduction? *Electronic Markets*, *31*(3), 477–492. https://doi.org/10.1007/s12525-020-00432-5

Cha, S. S. (2020). Customers' intention to use robot-serviced restaurants in Korea: relationship of coolness and MCI factors. *International Journal of Contemporary Hospitality Management*, *32*(9), 2947–2968. https://doi.org/10.1108/IJCHM-01-2020-0046

Chiang, A. H., & Trimi, S. (2020). Impacts of service robots on service quality. *Service Business*, *14*(3), 439–459. https://doi.org/10.1007/s11628-020-00423-8

Journal of Tourism, Hospitality and Environment Management
JTHEM
EISSN: 0128-178X
Volume 10 Issue 41 (September 2025) PP. 144-153
DOI 10/35631/JTHEM.1041010
Chiu, L. Y. (2020). Adaptation of Ryff's Psychological Well-Being Scale for Use Among Malaysian University Students [Unpublished manuscript]. Faculty of Human Development, Universiti Pendidikan Sultan Idris.

Donnelly, M., Wisniewski, M., Dalrymple, J. F., & Curry, A. C. (1995). Measuring service quality in local government: the SERVQUAL approach. *International Journal of Public Sector Management*, *8*(7), 15–20. https://doi.org/10.1108/09513559510103157

Hou, Y., Zhang, K., & Li, G. (2021). Service robots or human staff: How social crowding shapes tourist preferences. *Tourism Management*, *83*, 104242. https://doi.org/10.1016/j.tourman.2020.104242

Hu, Z., Pan, J., Fan, T., Yang, R., & Manocha, D. (2019). Safe Navigation With Human Instructions in Complex Scenes. *IEEE Robotics and Automation Letters*, *4*(2), 753–760. https://doi.org/10.1109/LRA.2019.2893432

Huang, D., Chen, Q., Huang, J., Kong, S., & Li, Z. (2021). Customer-robot interactions: Understanding customer experience with service robots. *International Journal of Hospitality Management*, *99*, 103078. https://doi.org/10.1016/J.IJHM.2021.103078

Huang, M. H., & Rust, R. T. (2018). Artificial Intelligence in Service. *Journal of Service Research*, *21*(2), 155–172. https://doi.org/10.1177/1094670517752459

Hwang, J., Lee, K. W., Kim, D., & Kim, I. (2020). Robotic restaurant marketing strategies in the era of the fourth industrial revolution: Focusing on perceived innovativeness. *Sustainability (Switzerland)*, *12*(21), 1–18. https://doi.org/10.3390/su12219165

Javaid, M., Haleem, A., Singh, R. P., & Suman, R. (2021). Substantial capabilities of robotics in enhancing industry 4.0 implementation. *Cognitive Robotics*, *1*, 58–75. https://doi.org/10.1016/J.COGR.2021.06.001

Lee, I. (2021). Service robots: A systematic literature review. In *Electronics (Switzerland)* (Vol. 10, Issue 21). MDPI. https://doi.org/10.3390/electronics10212658

Liu, Y., Cao, Y., Lu, M., Shan, Y., & Xu, J. (2024). Automating efficiency: The impact of industrial robots on labor investment in China. *Economic Modelling*, *140*, 106849. https://doi.org/10.1016/J.ECONMOD.2024.106849

Mandil, W., Rajendran, V., Nazari, K., & Ghalamzan-Esfahani, A. (2023). Tactile-Sensing Technologies: Trends, Challenges and Outlook in Agri-Food Manipulation. *Sensors*, *23*(17), 7362. https://doi.org/10.3390/s23177362

Mina, T., Kannan, S. S., Jo, W., & Min, B.-C. (2020). Adaptive Workload Allocation for Multi-Human Multi-Robot Teams for Independent and Homogeneous Tasks. *IEEE Access*, *8*, 152697–152712. https://doi.org/10.1109/ACCESS.2020.3017659

Nasir, S. M., Shafii, H., & Yassin, A. M. (2023). Determining environmental ethics, personal norm, knowledge, and waste separation behaviour among households. *IOP Conference Series: Earth and Environmental Science*, *1205*(1), 012002. https://doi.org/10.1088/1755-1315/1205/1/012002

Othman, U., & Yang, E. (2023). Human–Robot Collaborations in Smart Manufacturing Environments: Review and Outlook. *Sensors*, *23*(12), 5663. https://doi.org/10.3390/s23125663

Ryff, C. D. (2014). Psychological well-being revisited: Advances in the science and practice of eudaimonia. *Psychotherapy and Psychosomatics, 83*(1), 10–28. https://doi.org/10.1159/000353263

Shafiq, M., Naeem, M. A., Munawar, Z., & Fatima, I. (2017). Service Quality Assessment of Hospitals in Asian Context: An Empirical Evidence From Pakistan. *INQUIRY: The Journal of Health Care Organization, Provision, and Financing*, *54*, 004695801771466. https://doi.org/10.1177/0046958017714664

Journal of Tourism, Hospitality and Environment Management
JTHEM
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Volume 10 Issue 41 (September 2025) PP. 144-153
DOI 10/35631/JTHEM.1041010
Shah, T. R., Kautish, P., & Mehmood, K. (2023). Influence of robots service quality on customers' acceptance in restaurants. *Asia Pacific Journal of Marketing and Logistics*, *35*(12), 3117–3137. https://doi.org/10.1108/APJML-09-2022-0780

Shajahan, M. A. (2022). Bioprocess Automation with Robotics: Streamlining Microbiology for Biotech Industry. *Asia Pacific Journal of Energy and Environment*, *9*(2), 61–70. https://doi.org/10.18034/apjee.v9i2.748

Ye, L., Tang, A. B., Shenoy, R., Mederos, M. A., Mak, S. S., Booth, M. S., Wilson, M., Gunnar, W., Girgis, M. D., Maggard-Gibbons, M., Begashaw, M., Childers, C. P., & Shekelle, P. S. (2021). Clinical and Cost Outcomes of Robot-Assisted Inguinal Hernia Repair: A Systematic Review. *Journal of the American College of Surgeons*, *232*(5), 746-763e2. https://doi.org/10.1016/j.jamcollsurg.2020.12.066

Zhou, X., Zeng, H., Chen, C., Xiao, H., & Xiang, Z. (2023). An attention-enhanced multi-modal deep learning algorithm for robotic compound fault diagnosis. *Measurement Science and Technology*, *34*(1), 014007. https://doi.org/10.1088/1361-6501/ac93a5

Zhu, D. H., & Chang, Y. P. (2020). Robot with humanoid hands cooks food better? *International Journal of Contemporary Hospitality Management*, *32*(3), 1367–1383. https://doi.org/10.1108/IJCHM-10-2019-0904