Check for updates

Teaching Case

JITTC

Journal of Information Technology Teaching Cases
2025, Vol. 15(1) 2–7
© Association for Information Technology Trust 2023



Article reuse guidelines:
sagepub.com/journals-permissions
DOI: 10.1177/20438692311815599
journals.sagepub.com/home/jittc



A sustainable solution for the hospitality industry: The QR code menus

Selcen Ozturkcan[1,2] and Olgun Kitapci[3]

Abstract

This case presents a study of how QR code menus have emerged as a popular and sustainable solution for the hospitality industry in the wake of the COVID-19 pandemic. The case explores the environmental benefits of QR code menus in the restaurant industry by drawing on existing literature and examining how QR code menus can reduce paper waste, lower carbon footprint, and promote sustainable practices. The case also discusses how QR code menus contribute to several United Nations Sustainable Development Goals (SDGs), such as SDG 12 (Responsible Consumption and Production), SDG 13 (Climate Action), and SDG 17 (Partnerships for the Goals). The case concludes that QR code menus offer various benefits for restaurants and customers, such as reducing waste, enhancing customer experience, supporting local and organic food producers, and promoting responsible consumption and production. The case also suggests that QR code menus are not only a digital transformation tool but also a step towards creating a more eco-friendly and resilient restaurant industry.

Keywords

QR code menus, sustainability, hospitality industry, restaurant menus, digital transformation, contactless technology, UN SDGs

Introduction

With the onset of the COVID-19 pandemic, the hospitality industry faced new challenges in maintaining health and safety standards while continuing to provide quality service to its customers. One area of concern was the use of printed menus, which were seen as potential sources of contamination. As a result, QR code menus emerged as a popular and sustainable solution that reduces waste while enhancing the customer experience. This approach not only improves hygiene and reduces paper waste but also offers other benefits, such as easy updating, vivid imagery, and improved information quality. By adopting QR code menus, the hospitality industry can contribute to a more sustainable future by reducing its carbon footprint and promoting eco-friendly practices.

According to the National Restaurant Association, half of all full-service restaurant operators in the United States have added QR code menus (NYT, 2021). QR menu access became popular to help minimize contact during the pandemic. Iskender et al. (2022) explained restaurant patrons' behavioral intentions toward QR code menu utilization in restaurant servicescapes under pandemic constraints. Their proposed model, including the overlooked construct of trialability and contextual construct of hygiene, performed better in explaining behavioral intentions over and beyond existing technology acceptance models. While paper menus have returned to many locations post-pandemic, QR technology continues to have applications. Most restaurant operators believe QR codes will become more common or remain the same in the future (NRA, 2022).

Several sustainability benefits involved with QR menus are discussed in this manuscript to point the reader to their promising stay following their accelerated entry with the pandemic. Firstly, traditional print menus require a substantial amount of paper, which can contribute to environmental issues like deforestation and pollution. By implementing menus with QR codes, restaurants can significantly reduce their paper usage, thereby contributing to a more sustainable environment. Secondly, printing menus

[1]Linnaeus University, Växjö, Sweden
[2]Sabanci University, Istanbul, Turkey
[3]Akdeniz University, Antalya, Turkey

Corresponding author:
Selcen Ozturkcan, Linnaeus University, Department of Marketing and Tourism Studies, Växjö 352 52, Sweden: Sabanci University, Istanbul, Turkey.
Email: selcen.ozturkcan@lnu.se

can be expensive, especially for restaurants that update their menus frequently. Menus with QR codes are economical because they can be easily updated and distributed without incurring printing expenses. Thirdly, QR code menus can increase restaurant efficiency by decreasing the amount of time required to print, distribute, and update menus. Customers can access the menu on their smartphones using QR codes, reducing the need for waitstaff to distribute and collect menus. Fourthly, QR code menus provide restaurants with greater flexibility, as they can easily change their menus and add new items without printing new menus. This adaptability enables restaurants to respond swiftly to fluctuating customer demands and preferences. Also, it allows restaurants to promote perishable food to save from unwanted food waste. Fifth, QR code menus can enhance the customer experience by providing more detailed information about dishes, such as images, nutritional data, and allergen information. This can help customers make more informed decisions and enhance their overall dining experience satisfaction. Last but not least, further integrated technology can promote contactless transactions, allowing customers to order food and directly pay from their mobile wallet (NRA, 2021).

The following sections introduce the first sustainability efforts in the restaurant industry, the QR code as an information technology tool, its implementation in restaurant menus, and an overview of the newly discovered side-promoted sustainability benefits of this not-so-novel information technology tool to conclude with pointing to the relevant United Nations Sustainable Development Goals.

Sustainability in the restaurant industry

Restaurants that prioritize environmental sustainability have received increasing attention in academic literature and are commonly known as "ecological" or "green" restaurants (Iamkovaia et al., 2019). Although there is no consensus on a single definition of sustainable restaurants, they are generally recognized for operating in an environmentally conscious manner that balances economic viability with ecological responsibility.

The restaurant industry's significant and continuous growth has led to growing environmental concerns. The industry faces various challenges, such as excessive energy and water consumption, substantial amounts of non-recyclable waste, and wasted food (Jang et al., 2017). Therefore, there is a greater focus on adopting environmentally and economically sustainable practices in restaurants.

Restaurants are adopting various practices such as reducing energy and water consumption, minimizing food waste, using renewable energy sources, and sourcing ingredients locally to address these challenges. However, the attitudes and behaviors of restaurant managers and staff play a crucial role in the success of these practices. In particular, the values and leadership of top management are crucial in advancing environmental commitment and sustainable practices (Dey et al., 2022).

Moreover, stakeholders such as customers, suppliers, and regulatory bodies also play a critical role in promoting and supporting environmentally sustainable practices in restaurants. Engaging stakeholders in decision-making processes and soliciting their feedback can help restaurants align their sustainability practices with stakeholder expectations and needs, leading to greater environmental sustainability and improved restaurant performance.

Research examining the effects of top management values and leadership on environmental sustainability in the restaurant industry, as well as the effects of stakeholder engagement on sustainability and the impact of sustainable practices on restaurant performance, found that top management values and leadership play a significant role in advancing environmental commitment, stakeholder engagement has a significant impact on sustainability, and sustainable practices positively impact restaurant performance (Jang et al., 2017). Consumers have also been found to be supportive of sustainability efforts, with awareness of sustainable practices and concern for the environment significantly influencing their intention to support environmentally friendly restaurants (Hu et al., 2010).

To promote sustainability in food service provision, it is essential to create more responsible consumer options. One way to achieve this is by (re)designing restaurant menus to inform customers about the environmental impacts of their food selections and encourage them to choose more eco-friendly options (Filimonau and Krivcova, 2017). Customer attitudes have also been shaped by the impact of food selection on personal health, subjective well-being, and the environment, leading to an increased emphasis among consumers on the nutritional value, calorie content, and environmental impact of the restaurant food they consume (Price et al., 2016).

In conclusion, environmentally and economically sustainable practices are becoming increasingly important for restaurants to address environmental concerns and improve their performance. Sustainable restaurants can take various measures to minimize their environmental footprint, and the attitudes and behaviors of top management and stakeholders are critical for successful implementation. This highlights the importance of continued research in this area to identify effective strategies for promoting environmental sustainability in the restaurant industry.

Restaurant menus

A restaurant is a service business that provides food and beverage items to customers for consumption on the premise or for takeaway. The service aspect of a restaurant

includes various activities such as greeting customers, taking orders, serving food and drinks, and processing payments. The customer's dining experience in a restaurant is influenced by various factors such as the quality of food, the speed and efficiency of service, the ambiance and atmosphere of the restaurant, and the overall level of customer service. Customer satisfaction and loyalty are critical factors that can significantly affect a restaurant's success in the highly competitive food service industry.

Service businesses like restaurants have unique characteristics that set them apart from other types of businesses, such as intangibility, perishability, heterogeneity, and inseparability of production and consumption. These characteristics present both opportunities and challenges for restaurant managers, who must constantly strive to create a positive customer experience and build strong relationships with their customers.

Menus are an important tool for restaurants, particularly when it comes to attracting customers' attention to the most lucrative food services. The design and content of menus also contribute to the restaurant's atmosphere, which is one of the essential components of the service environment that affects customers' sensory and emotional experiences (Baker et al., 1994). Previous research (Hansen et al., 2005) has shown that restaurant menus impact customers' overall dining experience. Menus have multi-layered associations with the restaurant's atmosphere, as they complement the ambient (such as sound, light, and temperature), social (such as employee-employee, employee-guest, and guest-guest relations), and design (such as architectural decor, symbols, spatial order, and aesthetics) factors (Heide & GrØnhaug, 2006). Therefore, menus play a critical role in creating a positive dining experience and enhancing customers' overall satisfaction and loyalty.

QR codes

Denso Wave, a Japanese corporation, pioneered the development of QR (Quick Response) codes in 1994. Initially, the company designed QR codes for tracking vehicles and parts throughout the manufacturing process. However, the technology gained significant traction in Japan, where it was applied in diverse fields such as inventory management, advertising, and museums to provide visitors with additional exhibit information. QR codes consist of a two-dimensional barcode that encodes information in the form of a square pattern of black and white dots arranged in a specific manner. A mobile device equipped with a QR code reader application can instantly read the encoded information and use it for various purposes, such as displaying contact information, accessing websites, and facilitating payments. The proliferation of mobile devices in recent years has significantly increased the application of QR codes across various sectors, including commerce, retail, logistics, tourism, and restaurants, among others (Jong-Hyuok et al., 2012; Okazaki et al., 2011; Ozkaya et al., 2015; Rotsios et al., 2022; Sang Ryu and Murdock, 2013).

QR codes have become a ubiquitous tool for businesses and are employed in various applications such as payments, loyalty programs, event registration, product tracking, and contactless menus, among others. For example, QR codes can be used to facilitate payments by scanning the code with a smartphone. Similarly, QR codes are employed in loyalty programs to track purchases and offer rewards to customers. QR codes can also be used for event registration and ticketing, allowing attendees to quickly and easily check-in. Businesses can also use QR codes to track products throughout the supply chain, enabling prompt identification of any issues that may arise. In the hospitality industry, QR codes have been increasingly used in restaurants to provide contactless menus, especially since the COVID-19 pandemic.

QR codes have emerged as a versatile tool for businesses, providing a quick and efficient means of providing information, streamlining processes, and reducing paper waste in many cases.

QR code menus

The COVID-19 pandemic has compelled restaurants to adopt digital solutions swiftly to address perceived risks associated with the virus (Brewer and Sebby, 2021). One of the major concerns has been the menus, which are frequently touched surfaces that could potentially contribute to contamination. Consequently, restaurants across the globe have leveraged QR codes on their menus as a digital transformation tool to lower the risk of contamination. These QR codes were placed either on tables or takeaway ordering facilities, providing customers with the ability to scan them using their smartphones and access the menus without touching them physically.

In addition to reducing the risk of contamination, the adoption of digital menus has also resolved a long-standing concern related to the visual experience of printed menus. Prior research has demonstrated that photographs on menus can have a positive impact on customers' purchasing intentions (Gómez-Carmona et al., 2021; Reynolds et al., 2005). The hospitality industry has experienced a surge in the use of digital menus, which offer the benefits of vivid imagery and the ability to be updated easily (Beldona et al., 2014). According to these authors, the preference of consumers for e-tablet menus is associated with enhanced information quality, menu availability, and customer satisfaction with their orders.

QR codes have emerged as an effective replacement for traditional restaurant menus during the COVID-19 pandemic, with experts predicting their continued use and advocating for their adoption as a sustainable solution

(Lucas, 2021). The use of QR codes has not only aided in curbing the spread of germs but has also been identified as an eco-friendly solution that can benefit both restaurants and the environment. The digital format of QR code menus eliminates the requirement for single-use paper menus, which are frequently discarded after one use and contribute to the growing global waste problem. Additionally, QR codes enable restaurants to update menus in real-time, reducing the need for reprinted paper menus and minimizing food waste by ensuring only available items are displayed. Furthermore, QR codes can be used to inform customers about the restaurant's sustainability efforts, such as sourcing local and organic ingredients or reducing energy consumption. As consumers become increasingly environmentally conscious, providing this information can attract more customers and build a loyal customer base. The transition to QR code menus is not only a sustainable solution to reducing waste and enhancing customer experience but also a step towards creating a more eco-friendly and resilient restaurant industry.

Sustainability benefits of QR code menus

QR menus have several sustainability benefits, ranging from easily updating menus to target different audiences and promoting dishes that are about to expire to eliminate food waste to preventing unnecessary paper waste associated with traditional print menus, particularly in high-inflation economies.

QR code menus are a digital alternative to printed menus that can save paper and help the environment (Wiener-Bronner, 2022). Furthermore, printing menus necessitates the use of ink and energy, both of which have environmental consequences. Printed menus must be frequently updated to reflect price changes, availability, or promotions, resulting in increased paper consumption and disposal. QR code menus can be easily updated online and produce no waste. QR code menus can help restaurants save money and resources by eliminating the need for printing, updating, and disposing of paper menus. Customers can access the menu and order their food in a convenient and eco-friendly manner by scanning a QR code with their smartphones.

QR code menus can also help restaurants reduce food waste by promoting food items that are about to expire. Food waste contributes significantly to greenhouse gas emissions, land use, and water consumption. Restaurants can use QR code menus to offer discounts or specials on food items that need to be sold quickly, encouraging customers to buy them and preventing them from going to waste.

Additionally, menus with QR codes can encourage customers to make more environmentally friendly food selections. More details about the ingredients, origin, and environmental effects of each dish can be found in QR code menus, along with suggestions for vegetarian or vegan options. This can encourage consumers to choose more environmentally friendly options and become more conscious of the effects their food choices have on the environment.

QR code menus can also help managers produce food more responsibly. Managers can use QR code menus to get real-time data on customer preferences, demand, and feedback, which can help them optimize their inventory, supply chain, and menu design. This can assist managers in reducing food waste, lowering costs, and increasing customer satisfaction. Managers can also use QR code menus to show off their sustainability efforts and certifications to customers and stakeholders.

QR code menus can also help local and organic food producers by allowing restaurants to show their customers their sourcing practices and certifications. Customers can learn more about where their food comes from, how it is grown or raised, and what environmental or social benefits it has by scanning a QR code. This can assist customers in making informed decisions while also supporting restaurants that use local and organic food sources. This can also help to reduce food miles, CO2 emissions, and pesticide use.

United nations sustainable development goals

UN SDG is an acronym that stands for United Nations Sustainable Development Goals (UN, 2023). They are a collection of 17 global goals established by the United Nations in 2015 to guide and coordinate global efforts toward sustainable development (UN, 2023). The SDGs address a wide range of interconnected issues, including poverty, inequality, climate change, environmental degradation, and social injustice.

The goals cover a wide range of issues, including the abolition of poverty and hunger, the provision of quality education and healthcare, the achievement of gender equality, the promotion of clean energy and sustainable cities, the promotion of responsible consumption and production, and the protection of marine and terrestrial ecosystems. To track progress, each goal has specific targets and indicators.

The Sustainable Development Goals (SDGs) seek to mobilize governments, businesses, civil society organizations, and individuals to collaborate in order to create a more sustainable and equitable world by 2030. They provide a comprehensive framework for addressing global issues and promoting social, economic, and environmental well-being for all people, with no one left behind. The SDGs are viewed as a blueprint for a brighter future, guiding policymaking,

resource allocation, and international cooperation at both the national and global levels.

QR code menus offer not only digital but also a sustainable solution for the hospitality industry. The discussed benefits of QR code menus, in this case, remain relevant to the following SDGs:

SDG 12: Responsible Consumption and Production: QR code menus can aid in the promotion of responsible consumption and production by reducing paper and food waste, supporting local and organic food producers, and providing consumers with more information about the environmental and social impact of their food choices.

SDG 13: Climate Action: QR code menus can aid in climate change mitigation by reducing greenhouse gas emissions, energy consumption, and water consumption associated with paper production, printing, and disposal. They can also help reduce food miles and the carbon footprint of restaurants by allowing them to source food locally and organically.

SDG 17: Partnerships for the Goals: QR code menus can facilitate collaboration and innovation among restaurants, food producers, technology providers, and customers, which can help foster partnerships for the goals. They can also help stakeholders see sustainability efforts and certifications and raise awareness about the SDGs.

Conclusion

Following the COVID-19 pandemic, QR code menus have emerged as a popular and sustainable solution for the hospitality industry. They provide numerous advantages to restaurants and customers, including reduced paper and food waste, improved customer experience and satisfaction, support for local and organic food producers, and promotion of responsible consumption and production. QR code menus also help to achieve several UN SDGs, including SDG 12, SDG 13, and SDG 17, by mitigating climate change, fostering partnerships, and raising awareness about sustainability issues. QR code menus are not only a digital transformation tool but also a step toward making the restaurant industry more environmentally friendly and resilient.

Discussion questions

- What are the primary motivators and barriers to implementing QR code menus in the hospitality industry?
- How can restaurants use QR code menus to improve sustainability performance and communicate their efforts to customers and stakeholders?
- What are the potential risks and challenges of QR code menus in terms of privacy, security, accessibility, and customer satisfaction?
- How can restaurants quantify and assess the impact of QR code menus on environmental, social, and economic outcomes?
- How can restaurants use QR code menus in conjunction with other digital technologies and platforms, such as social media, online reviews, and mobile payments, to create a more seamless and engaging customer experience?

Declaration of conflicting interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

Funding

The author(s) received no financial support for the research, authorship, and/or publication of this article.

ORCID iD

Selcen Ozturkcan https://orcid.org/0000-0003-2248-0802

References

Baker J, Grewal D and Parasuraman A (1994) The influence of store environment on quality inferences and store image. *Journal of the Academy of Marketing Science 22*: 328–339. DOI: 10.1177/0092070394224002.

Beldona S, Buchanan N and Miller LB (2014) Exploring the promise of e-tablet restaurant menus. *International Journal of Contemporary Hospitality Management 26*(3): 367–382. DOI: 10.1108/IJCHM-01-2013-0039.

Brewer P and Sebby AG (2021) The effect of online restaurant menus on consumers' purchase intentions during the COVID-19 pandemic. *International Journal of Hospitality Management 94*: 102777. DOI: 10.1016/j.ijhm.2020.102777.

Dey M, Bhattacharjee S, Mahmood M, et al. (2022) Ethical leadership for better sustainable performance: Role of employee values, behavior and ethical climate. *Journal of Cleaner Production 337*: 130527. DOI: 10.1016/j.jclepro.2022.130527.

Filimonau V and Krivcova M (2017) Restaurant menu design and more responsible consumer food choice: An exploratory study of managerial perceptions. *Journal of Cleaner Production 143*: 516–527. DOI: 10.1016/j.jclepro.2016.12.080.

Gómez-Carmona D, Muñoz-Leiva F, Paramio A, et al. (2021) What do you want to eat? Influence of menu description and design on consumer's mind: an fmri study. *Foods 10*(5): 919. https://www.mdpi.com/2304-8158/10/5/919.

Hansen KV, Jensen Ø and Gustafsson IB (2005) The meal experiences of á la carte restaurant customers. *Scandinavian Journal of Hospitality and Tourism 5*(2): 135–151. DOI: 10.1080/15022250510014417.

Heide M and GrØnhaug K (2006) Atmosphere: Conceptual issues and implications for hospitality management. *Scandinavian*

Journal of Hospitality and Tourism 6(4): 271–286. DOI: 10.1080/15022250600979515.

Hu H.-H, Parsa HG and Self J (2010) The dynamics of green restaurant patronage. *Cornell Hospitality Quarterly 51*(3): 344–362. DOI: 10.1177/1938965510370564.

Iamkovaia M, Arcila M, Cardoso Martins F, et al. (2019) Sustainable development of coastal food services. *Sustainability 11*(13): 3728. https://www.mdpi.com/2071-1050/11/13/3728.

Iskender A, Sirakaya-Turk E, Cardenas D, et al. (2022) Restaurant patrons' intentions toward QR code menus in the U.S. during COVID-19: Acceptance of technology adoption model (ATAM). *Journal of Foodservice Business Research*: 1–26. DOI: 10.1080/15378020.2022.2133518.

Jang YJ, Zheng T and Bosselman R (2017) Top managers' environmental values, leadership, and stakeholder engagement in promoting environmental sustainability in the restaurant industry. *International Journal of Hospitality Management*, *63*, 101–111. DOI: 10.1016/j.ijhm.2017.03.005.

Jong-Hyuok J, Somerstein R and Eun Seon K (2012) Should i scan or should i go?: Young consumers' motivations for scanning qr code advertising [Article]. *International Journal of Mobile Marketing*, *7*(3), 25–37. http://search.ebscohost.com.proxy.lnu.se/login.aspx?direct=true&db=bsu&AN=85961052&site=ehost-live.

Lucas A (2021, 21 August 2021) *QR codes have replaced restaurant menus. Industry experts say it isn't a fad*: CNBC. https://www.cnbc.com/2021/08/21/qr-codes-have-replaced-restaurant-menus-industry-experts-say-it-isnt-a-fad.html.

NRA (2021, 11 August 2021) *Trends with Traction*: National Restaurant Association. https://restaurant.org/education-and-resources/resource-library/trends-with-traction/.

NRA (2022, 22 February 2022) *High-tech Hospitality*: National Restaurant Association. https://restaurant.org/education-and-resources/resource-library/high-tech-hospitality/.

NYT (2021, 26 July 2021) *QR Codes Are Here to Stay. So Is the Tracking They Allow*: The New York Times. https://www.nytimes.com/2021/07/26/technology/qr-codes-tracking.html.

Okazaki S, Hirose M and Li H (2011) QR code mobile promotion: An initial inquiry. *Advances in Advertising Research 2*: pp. 405–420. DOI: 10.1007/978-3-8349-6854-8_26.

Ozkaya E, Ozkaya HE, Roxas J, et al. (2015) Factors affecting consumer usage of QR codes. *Journal of Direct, Data and Digital Marketing Practice 16*(3): 209–224. DOI: 10.1057/dddmp.2015.18.

Price S, Viglia G, Hartwell H, et al. (2016) What are we eating? Consumer information requirement within a workplace canteen. *Food Quality and Preference 53*: 39–46. DOI: 10.1016/j.foodqual.2016.05.014.

Reynolds D, Merritt EA and Pinckney S (2005) Understanding menu psychology. *International Journal of Hospitality and Tourism Administration*, *6*(1), 1–9. DOI: 10.1300/J149v06n01_01.

Rotsios K, Konstantoglou A, Folinas D, et al. (2022) Evaluating the Use of QR Codes on food products. *Sustainability 14*(8): 4437. https://www.mdpi.com/2071-1050/14/8/4437.

Sang Ryu J and Murdock K (2013) Consumer acceptance of mobile marketing communications using the QR code. *Journal of Direct, Data and Digital Marketing Practice 15*(2): 111–124. DOI: 10.1057/dddmp.2013.53.

UN (2023) *Sustainable Development Goals*. United Nations. Retrieved 17 May 2023 from https://sdgs.un.org/goals.

Wiener-Bronner D (2022, 20 August 2022) *Why QR-Code Menus Are Still Around*. CNN. Retrieved 17 May 2023 from. https://edition.cnn.com/2022/08/20/business-food/qr-code-menus/index.html.

Author biographies

Selcen Ozturkcan continues her academic career with a permanent faculty position at Linnaeus University (Sweden) and is affiliated with Sabanci Business School (Turkey). Her research on digital experiences, which appeared as journal articles, books, book chapters, and case studies, is accessible at http://www.selcenozturkcan.com.

Olgun Kitapci works as a professor of marketing at Akdeniz University, Turkey. He has published in various journals and conferences on topics such as strategic marketing, service innovation, consumer complaint behaviour, and service robots. His academic profile can be found at https://avesis.akdeniz.edu.tr/okitapci.