

An Overview of the Application of Restaurant Management Systems in the Foodservice

Journal of Tourism, Hospitality & Culinary Arts (JTHCA)
2023, Vol. 15 (2) pp 191-204
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UiTM Press
Submit date: 25th October 2023
Accept date: 15th December 2023
Publish date: 30th December 2023

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Proposed citation:

Rosnan, A.N., Che Ahmat, N.H., & Norfezah, M.N. (2023). An Overview of the Application of Restaurant Management Systems in the Foodservice Industry. *Journal of Tourism, Hospitality & Culinary Arts*, 15(2), 191-204.

Abstract

A restaurant management system is a software designed to manage and optimize restaurant operations. This paper provides an overview of empirical studies on the application of restaurant management systems in the foodservice industry. Based on 31 studies published on the application of restaurant management systems from various countries, the researchers reviewed their findings regarding the impacts of restaurant management system adoption in the foodservice industry. From the secondary data, the researchers found that most of the previous studies focused on information technology, gastronomy and food science, and business management. Findings from the previous studies also reported that the restaurant management system benefits the foodservice operation by offering convenience in accessing virtual menus and online ordering through the delivery system. Moreover, the restaurant management system consists of inventory management that could ease the entire operation. Previous studies also revealed that the restaurant management system helps oversee restaurant daily operations by tracking sales and recording data. The technology transformation has become unavoidable and vital to be competitive around the world, hence, the foodservice industry needs to rapidly adapt with innovative technology to improve the productivity and efficiency of an operation. This paper will encourage future researchers to determine and investigate the perceived value of a technology innovation such as the restaurant management system towards its continuous usage intention from restaurant operators' perspective.

Keywords:

Foodservice, Restaurant, Technology, Restaurant Management System (RMS)

1 Introduction

Technology advancement is rapidly evolving throughout the years, and the foodservice industry sector has shown a rising trend as it becomes a convenient tool that could benefit the restaurant industry in many ways. Some benefits include less time spent taking customer orders, enhanced seat turnover, faster service time, decreased labour cost and enhanced food production. Technology can also help enhance productivity and provide higher profitability towards the organisation, increasing competitiveness and adaptation to crisis conditions (Asrihapsari & Setiawan, 2020). As the innovation of technology has increasingly emerged, technology such as point-of-sale system, mobile apps ordering, contactless payment, online delivery system, tableside ordering technology, digitalisation and e-commerce has become a tool that give a significant impact towards businesses (Gazdecki, 2020).

Many foodservice establishments have been exposed to a technology innovation called Restaurant Management System (RMS). RMS is a software that is specially designed to be used within the restaurant industry. These RMS are aimed to assist the management of the business and help in carrying out many critical managerial tasks (Panneerselvam et al., 2022). According to Panneerselvam et al. (2022), RMS is defined as a tool that is able to manage and optimize operations in between different types of food service establishment. It is a tool that is more advanced than the point-of-sale system with some other functions including tracking the restaurant sales and orders, viewing an accurate real-time financial statement, accessing data using multiple devices, managing staff scheduling, managing customer relationships, online ordering, inventory management and delivery system and many more.

This paper aims to provide an overview of the RMS features and the implications of using RMS by reviewing past empirical research published on RMS in the foodservice industry. This paper is crucial as it highlights the advantages of the RMS towards the growth and sustainability of the foodservice industry in exploring the advancement of technology that are rapidly growing day by day. This paper also will help the researchers identify and present the research gaps that exist in the limited number of studies focusing on the application of RMS in the foodservice industry.

2 Literature Review

2.1 The Application of Restaurant Management System in the Foodservice Industry

The use of RMS within the foodservice industry may assist to enhance overall performance of the company (Mohd Fuzi, 2021). It provides all the convenience tools that are specifically for restaurant business operations such as tracking all sales data including orders, expenses, profit, and payments accurately, analysing business performance through analytic graph, gives information such as top sales menu items and seat turnover rate which make it convenience for the restaurant operators to organise and review their business performance (Romano, 2023).

RMS could also help restaurants to alleviate the business operation and at the same time help in cutting down the manual process by utilizing the online ordering feature where consumers can use their smartphones and tablets to obtain the menu virtually and make order and payment online. The use of the QR code menu provided by the organisation is one of the ways to hasten the online ordering process in which it is designed to enhance the customer dining experience. By scanning the QR code provided, browsing the menu complete with the picture, self-checkout and several options for payment including cashless payment which could improve the speed and accuracy of the order taking. This form of features helps in reducing customer waiting lines and could avoid the possibility of a mistake-filled process when entering the orders manually (Baker, 2023). Also, a study by Mwanyolo (2021) has summarized that the food industry was greatly relying on technology such as RMS where online the ordering system plays an important role in restaurant operation.

Moreover, RMS could boost the performance of the business where this feature helps to keep track of the menu item, recipe and give details about the profitability of an item. The tool is able to monitor and control the stock levels and ensure sufficient number of supplies on hand (Baker, 2023). This feature also generates reports to help in calculating the food costs and pricing and generally provide an accurate picture of the profitability (Baker, 2023). It also has the ability to track the inventory and could assess which menu choices are the most popular among customers (forecasting the restaurant demand), which could help in increasing the business profits and helps in preventing food waste. Foodservice establishments need to adapt with the fast-paced environment in order to provide a better service to the customer where RMS provides a helpful tool that could enhance the efficiency of the restaurant operation business. Next, the method of this paper will be discussed in the following section.

3 Methodology

3.1 Research Design

Using secondary data, the researchers collected and analysed published studies from the previous researchers. This paper examines past research articles that are related to RMS in general view and these selected articles should contain the appropriate methods, data collection, findings, and implications. In other words, this paper only analysed research articles, while excluding book chapters, short surveys, and product reviews. The researchers only sampled empirical research that was published between 2017 and 2023, where the development of technology especially RMS could be clearly seen, and people have started to engage more with the technology. Using online database, the researchers use keywords such as restaurant management system and foodservice industry to refine the articles search. The researchers also use Google Scholar, Academia, and ResearchGate platform to extend the findings of previous research articles related with RMS.

After refining the research into selected years (from 2017 to 2023), the result came out with 691 articles. Then, the researchers refined the search into research articles based only which exclude book chapters, short surveys and product reviews which shows 332 of research articles. After that, the researchers decided to only select research articles published in indexed journals (ScienceDirect) such as Journal of Hospitality Management, Journal of Information Technology and Management, Journal of Economics and Business Management, which are related with the topic focusing on technology adoption. This process resulted in 92 research articles. From the 92 of research articles, the researchers only used 31 research articles in the analysis as these articles focused on the RMS application. In each article, the researchers extracted important information such as their methods and findings. For the analysis, the articles from the past research were reviewed and grouped based on the related categories including country, topic area, research method, sample, and main findings (see Table 1, Table 2, and Table 3).

4 Findings

4.1 Results

Based on the data presented in Table 1, 31 articles were found related to the RMS application in the foodservice industry from various countries. For the topic area, the articles chosen were refined and categorized based on the focused subject area and publication title in ScienceDirect which are related with the use of RMS (the use of information technology system) that are specifically within the foodservice industry (hospitality management subject area). Moreover, the past studies that were reviewed were basically about the entire restaurant business operation process in implementing technology systems (business management) and none of the topic areas were redundant to each other. Based on the tables presented, most of the articles focused on hospitality management (45%, n=14) where the researchers developed a tool or system, specifically a restaurant management system that helps the efficiency of the restaurateurs. It includes designing the digital menu, delivery system and online ordering. Other topic area that has been reviewed are information technology (36%, n=11), business management (16%, n=5) gastronomy and food science (3%, n=1) According to Table 1, 49 percent (n=15) out of 31 published articles were using quantitative method where the researcher used online survey in collecting their data. Next, 26 percent (n=8) of the articles found were using prototype model research where the previous researchers built and experimented a new RMS. Another 16 percent (n=5) of the articles utilized qualitative methods, where past researchers interviewed their respondents. Secondary research covered 10 percent (n=3) of the articles where past researchers gathered data through existing reports, dataset, and literature review. In terms of countries, the majority of the past research is from the United States (29%, n=9), followed by Malaysia (13%, n=4) and India (10%, n=3). Sri Lanka, China, Germany, and Turkey with seven percent (n=2) respectively. Meanwhile, countries such as Australia, South Korea, Bangladesh, Thailand, Nigeria, Sweden, and Jordan contribute

three percent from the total research articles found. Based on findings reported by the previous studies, the researchers will discuss the main findings and present the RMS opportunities in the foodservice industry.

4.1.1 Upgrading to a Systematic Management

RMS includes features such as tracking sales and order of the daily restaurant operation where the system tracks and controls the business operation in real time manner. It also provides users with organizing the overall business performance of the business where it brings convenience towards the organisation (Alt, 2021; Mohd Fuzi, 2021; Muhittin 2018; Mwanyolo, 2021). RMS is a system that is mainly developed to ease the restaurant operation and allows restaurants to manage the operation efficiently.

Table 1: Summary on RMS application focusing on systematic management.

Author (year)	Country	Topic Area	Method	Sample	Main Findings
Panneerselvam et al. (2022)	India	Information Technology	Prototype Model	Not available	RMS minimises the probability of human error and provides the simplicity and ease of access to e-Menu.
Ishan et al. (2022)	Bangladesh	Business Management	Quantitative	385 managers	RMS contributes highly to the management of restaurant and facilitate business operation.
Kocaman (2021)	Turkey	Gastronomy & Food Science	Quantitative	285 managers	RMS help increases restaurant sales. RMS has high operational contribution towards restaurant and facilities.
Mwanyolo (2021)	Turkey	Hospitality Management	Quantitative	385 managers	RMS helps restaurants to monitor orders and assign orders to the users.

Mohd Fuzi (2021)	Malaysia	Information Technology	Qualitative (Interview)	1 restaurant owner	RMS design is simple, easy to understand and use even for those who have limited knowledge in digital transformation.
Liyenage et al. (2019)	Sri Lanka	Information Technology	Prototype Model	Not available	RMS develops mainly to make the users' day-to-day life easier.
Ahn & Seo (2018)	United States	Hospitality Management	Quantitative	568 customers	The functionality and customisation of self-service technology stimulated positive responses and enhanced consumer perceived value of the technology.
Cheng (2018)	United States	Information Technology	Prototype Model	Not available	RMS system of a restaurant is more flexible, easier to be learned and use by employees. Also inventory management system helped keep track the ingredients storage.
Tran et al. (2017)	Australia	Business Management	Secondary Research (Explanatory)	Not available	RMS helps maximise sales through satisfying customer needs and wants.

4.1.2 Enhancing Customer Dining Experience

In this digital era, customers are more prone to a contactless dining experience (Michael, 2021). The digitalization of the restaurant industry has helped restaurant operators to overcome their difficulties in operating a restaurant business. Through many of previous research studies, the main problems are that restaurants rely on paper-based menu and order taking methods making the process time consuming and outdated especially in today's application (Khandwani et al., 2023; Mohd Nasir, 2022; Piyatissa, 2020). Hence, past research aimed to change the traditional way of ordering food using RMS. Replacing manual methods to a systematic management tool for daily restaurant operations could help to improve overall efficiency of restaurant operation (Panneerselvam et al., 2022). Majority of the previous studies stated that RMS has helped restaurants improving their ordering process through online ordering management (Khandwani et al., 2023; Liyenage et al., 2019; Mohd Nasir, 2022; Mwanyolo, 2021; Pannerselvam et al., 2022; Piyatissa, 2020; Saeed et al., 2017; Singhal & Konguvel, 2022). Tools such as digital menu cards and contactless order through digital tablets and touchscreen technology have helped the employees to minimize the probability of human error as well as assist customers in placing their order effortlessly.

Table 2: Summary on RMS application focusing on customer dining experience.

Author (year)	Country	Topic Area	Method	Sample	Main Findings
Alt (2021)	German	Business Management	Secondary Research (Explanatory)	Not available	The analysis of existing digital services has shown that digital transformation has reached the restaurant industry that supports many functions in a restaurant.
Brewer & Sebby (2021)	United States	Hospitality Management	Quantitative	463 customers	Online food ordering platform has offered customers the convenience of the service processes.
Leung & Wen (2020)	United States	Hospitality Management	Quantitative	153 customers	From customers' point of view, restaurant operators should continue to optimize online ordering methods as it generates the highest satisfaction level and

					improves customer experience.
Sultana & Islam (2020)	Sweden	Business Management	Qualitative (Interview)	5 managers	RMS helps businesses survive and more new customers experience online food orders than before.
Suarez et al. (2019)	United States	Hospitality Management	Quantitative	415 customers	Quick-service and midscale restaurants needs to consider investing in tablet-based menu as customers demonstrate higher adoption intention to use the technology.
Kim et al. (2018)	United states	Hospitality Management	Qualitative (Interview)	47 customers	Restaurant integrated with technology related to service innovation had create an advantage for customers through service delivery processes.
Saeed et al. (2017)	United States	Information Technology	Prototype Model	Not available	RMS enhances customer dining experience with digitized menus and employees can view a real time analytic of the restaurant.

4.1.3 Improving Business Performance and Efficiency

Past research stated that RMS consist of inventory management control tool that could boost business performance where the feature helps to keep track the menu item, recipe and give details about the profitability of an item (Ishan et al., 2022; Kocaman, 2021; Mohd Nasir, 2022; Tran et al., 2017). RMS is able to monitor and control the stock levels and ensure sufficient number of supplies needed. RMS also helps restaurants to keep the right amount of food and ingredients, ensuring they have enough stock to serve all customers and also avoid spoilage and loss. Overall, RMS has contributed highly to ease the management and facilities of a restaurant business operation.

Table 3: Summary on RMS application focusing on the efficiency of the business performance.

Author (year)	Country	Topic Area	Method	Sample	Main Findings
Baba et al. (2023)	Malaysia	Hospitality Management	Quantitative	430 customers	Self-ordering technology helped reduce the number of mistakes and labour cost.
Yoon (2023)	South Korea	Hospitality Management	Secondary Research (Dataset from Korea Rural Economics Institute)	Not available	Self-service technology reduced the labour cost and raised skilled workers rather than replacing unskilled labour.
Christ-Brendemuhl (2022)	German	Hospitality Management	Qualitative (Interview)	26 managers	Technology optimised the operation process and makes employees more productive.
Mohd Nasir (2022)	Malaysia	Information Technology	Prototype Model	Not available	Designed an RMS system to give convenience for customers to review the menu and place order. Ease management to restore database inventory and information from users.
Piyatissa (2020)	Sri Lanka	Information Technology	Qualitative (Interview)	15 employees	RMS allows restaurants to manage online menus and navigate customers' orders faster and easier.
Muhittin (2018)	United States	Business Management	Quantitative	500 managers	Companies spending for mobile technologies are continuing to increase where these technologies only incur nine percent of total spending.
Malkawi (2017)	Jordan	Information Technology	Quantitative	66 managers	The impact of IT positively and directly influences the process of improving the quality of service at a restaurant.

4.1.4 *Increasing Market Competitiveness*

The competition in the business world has become more intense day by day. Restaurant industry is one of the institutions concerned in keeping pace with the developments and systems in information technology where fast changes and intense competition among industries occur (Alt, 2021). Innovation in the food and beverage industry has turned many restaurants to adopt technology not only for survival, but also thriving in the business industry. Advancement of technology has created online ordering, self-ordering kiosks, touch less payments, delivery and now AI technology. Having said that, the foodservice industry could no longer afford to ignore that technology has helped the businesses to remain relevant and stay competitive throughout the industry. It is undeniable that technology such as RMS are further leveraging the power of technology in the foodservice industry. Throughout this paper, the researchers analysed previous studies to identify what and how RMS could bring a positive impact towards the foodservice industry. This paper will contribute to expanding the literature review on RMS. It will also help future researchers to identify the potential effects of the RMS features on the foodservice industry in enhancing customer dining experience.

5 Conclusion, Limitations and Future Research Recommendations

Given the importance of RMS for the foodservice industry, it is important for restaurant operators to take proactive action to utilize RMS for their own benefits. Within the fast-paced foodservice industry, utilizing RMS in a business operation could be a life changer for all business owners where it could help to alleviate the business to the next level. Many foodservice industries are competing with one another to give an exceptional customer dining experience (Alt, 2021). The technology transformation has become unavoidable and vital to be competitive around the world, both small and large organisations are rapidly adapting innovative technologies to improve productivity and efficiency (Alt, 2021).

This paper adds value by providing an overview of RMS features, reviewing past studies on RMS, and presenting many RMS opportunities for restaurant operators to continuously use RMS. Based on the previous studies, RMS brings benefits and convenience towards restaurant establishment where this tool helps in improving the efficiency of the business, reduce wait times, enhance dining experience and significantly impact customer satisfaction which leads to greater success of a business operation (Gazdecki, 2023). Indeed, technology is transforming the foodservice industry which brings great impact towards the restaurant industry. There are also endless opportunities for restaurants to use technology for a seamless integration and improve their customer experience (Panneerselvam et al., 2022). The technological advancements have proved to be beneficial for the customers as well as for the restaurant operators.

This paper shed some light for future discussion related to the RMS and foodservice industry as well as technology used in the businesses. Nonetheless, the limitation of the current paper is that this paper only provides the general understanding on RMS towards foodservice establishments and its benefits. Therefore, future studies could use this paper as reference to elaborate more and give in-depth explanation about RMS as well as the factors, dimensions, and theories that could be used to explore more regarding advancement technology of RMS, thus filling in the gap that may exist in order to achieve better understanding.

Moreover, for restaurants to stay competitive in the industry, it is crucial for them to keep up with the latest trend and innovative offering. However, there is another input in which they need to take into consideration which is the cost in investing in technology. High operational risk in adopting technology such as RMS has limited the firm in accessing their finance thus diminishing the growth of the business (Verreynne et al., 2019). Some of the restaurateurs may have doubt in implementing technology as it involves financial (Burhan et al., 2021). Therefore, business operators need to consider the return of investment when investing with technology where this RMS provides an automated data system, online ordering management and inventory management where it simplifies and eases employees' tasks which can reduce the number of staff thus resulting in reducing labour cost. Hence, future studies could investigate the cost-benefit paradigm in investing technology RMS where positive and negative factors should be evaluated to further extend the findings.

6 About the author

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