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Research Paper

Moving Forward with Augmented Reality Menu: Changes in Food Consumption Behaviour Patterns

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Abstract: In the future, hospitality firms are expected to create experiences that differ greatly from what is offered today due to the fast-changing consumer behaviour and attitude today. Thus, hospitality service providers need to stay competitive through proactive changes in this digital business world. The restaurant and hospitality industries have been moving forward to become even more personalised, connected, responsive and tailored to the individual experience. In the field of the hospitality industry, the integration of augmented reality (AR) is poised to create a new healthy dining experience. Further, this integration can enhance operational efficiency, service quality and customer experience. This study is based on an extensive literature review related to the transformation of the menu presentation and integration of AR as a healthy information platform to increase customer interest to visit a particular restaurant for new dining experiences. Specifically, this study aims to explore the potential of AR-integrated menu in creating a healthy dining experience with nutritional information and also a realistic/immersive dining space.

Keywords: Augmented Reality, healthy dining experience, restaurant menu information

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Introduction

In recent decades, there has been an increase in health problems among consumers due to poor eating habits and lack of physical activities (Chin & Mansori, 2019). Moreover, the rising death toll worldwide as a result of chronic diseases can be primarily attributed to changes in eating behaviour, lack of health awareness and rapid changes taking place in the food industry (World Health Organization, 2019).

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Nevertheless, the rise of new digital industrial technology is poised to revolutionise the service delivery of the hospitality industry globally. Today's consumers are very much keen on health benefits from their meal choices in restaurants due to the rise in diseases related to obesity, which is caused by changes in eating habits and sedentary modern lifestyles. We can also see eating out has significantly increased amongst the millennial and Gen Z consumer market segments.

Numerous studies in the past have confirmed that the present generation of consumers are more conscious of their own health, which explains, their focus and growing interest in healthy eating and nutrition (Feiner, 1999; Baillot & Rosenblum, 2001; Nam, DiSalvo, Do, and Mendenhall, 2010). Consequently, to fulfil these new consumer demands, the restaurant sector is undergoing a paradigm shift, focusing more towards the integration of more information and better services in order to attract these health-conscious consumers to their establishments. The emergence of augmented reality (AR) and ambient intelligence has unravelled many new pathways for the restaurant sector and motivated several research efforts to integrate technological advancements within restaurant establishments. For instance, augmented dining tables, menus, facilities and service delivery processes are aimed at entertaining dining guests, socialisation during dinner, and dissemination of health information to consumers (Margetis et al., 2013).

Health Concerns with regard to Changes in Food Consumption Behaviour Patterns

In recent decades, there is an increased concern for healthy eating habits among consumers, for both eating at home and outside (Din, Zahari, & Shariff, 2012). The state of public health is directly influenced by people's food preferences and eating habits (Jin & Lee, 2016). The restaurant industry plays a significant role in today's market to reduce the prevalence of obesity and diabetics by incorporating dietary information into the restaurant menu to create healthier food choices for its diners. In the restaurant business, the menu is the core product of food and beverage operations which captures the dominant position amongst competition (Ozdemir & Caliskan, 2014). In response to rising healthy food preferences among consumers, the traditional printed menu with individual food and beverage prices, product descriptions, portion size and visual presentations has been transformed into a digital menu in the form of iPad, kiosk, and mobile applications, complete with cooking videos and dietary information, with the help of rapidly evolving technology.

AR Technology in the Hospitality Industry

Hospitality service providers continue to transform and adapt in tandem with the ever-evolving technology to stay relevant and to thrive in this competitive industry. In Industrial Revolution 4.0, the integration of AR and beacons in hotels

and restaurants has become a new way to attract consumers (Kansakar, Munir, & Shabani, 2017). A dedicated AR headset or the customer's own smartphone can be used to experience digitalised in-room services, interactive menu with information on healthy diet, digital review wall pages and immersive platforms to explore in-house points of interest (Perey, 2015). This kind of immersive services can be embedded into in-house loyalty application for long-term customer engagement (Hospital Technology, 2015). Many hoteliers have already incorporated AR and beacons in their establishments due to the shift in consumer behavioural pattern, specifically amongst millennials. It was expected that millennials will make up the largest market segment with high disposable income and spending power, estimated at around \$4.1 trillion annually, by 2020 (Hospital Technology, 2015). A recent study confirmed that the disposable income of Gen Z in 2020 touched close to \$360 billion as they earned around \$263 billion from full-time or part-time employment as well as \$40 billion through viable side hustles (Gen Z Planet LLC, 2021).

Augmented Reality Application in Restaurants

AR is a specific technology that allows the user to enjoy an immersive experience of the real world with the help of embedded virtual images, videos and information. The potential of AR within the restaurant context has been extensively explored with regard to perceived values of restaurants such as getting restaurant recommendations (Balduini et al, 2012; Chatzopoulos & Hui, 2016), engaging with games at the table (Ilhan & Çeltek, 2016; Shabani, Munir, & Hassan, 2019), chef storytelling at the table (Le Petit Chef, 2019) and exploration of local cultures while waiting to be served. The AR-based menu also helps customers to choose dishes based on the dietary information provided to have a healthy dining experience (Koui, 2017).

Augmented Reality, Technology, Human-Food Interaction and User Experience

The common factors, apart from the sensory attributes that affect our perception towards food choices, are mainly the menu, nutrition labelling/information, brand loyalty and price, whereby there is need for more creative nutrition labelling to grab consumers' attention (Dixon, Kimes, & Vermes, 2009). The table-based menu acts as great tool for providing various dietary information in a highly impressive graphical format to consumers (Yepes, 2015). The AR technology can also be used in the dining space to improve human-food interactions (Bruijnes, Huisman, & Heylen, 2016). For instance, the AR technology can help modify eating behaviours and also promote healthier eating patterns. Today, AR is widely acknowledged as a vital customer-engaging platform for any hotel marketing campaign as it collates important marketing data such as guest reviews and recommendations as well as communicates promotions or offers through bar or restaurant menus. Additionally,

hotels can create an immersive experience for their customers by allowing them to check turn-down service time, obtain pop-up information in the menu, or browse the map around the property using the AR technology.

Conclusion

The rising obesity prevalence has become a serious epidemic globally, especially for Malaysia which has the fastest growing rate in the ASEAN region, with approximately half of its population overweight or obese. Even though obesity is a social phenomenon, the hospitality industry plays an important role in choosing the right transformation path to help support customers adopt healthy dining with the help of the AR platform. The transformation of the traditional menu into an AR-integrated menu can provide healthy information such as notes on allergy, nutritional information and other health-related information to pique the customer's interest to visit the particular restaurant for a new dining experience. The AR-integrated menu will change the way food and beverages are presented to draw the attention of customers, with sumptuous images, pop-ups of dietary information and cooking videos, in addition to creating a healthy dining experience. This innovative menu opens up opportunities for customers to explore and create a realistic/immersive dining space combined with healthy eating.

The consumption of food and beverages is one of the common daily activities in human life, which is not easy to control. In striving towards a healthy society, it is important for all concerned parties to work together to inform and motivate diners towards healthy eating behaviour. This is particularly important in light of the rising cases of various non-communicable diseases associated with unhealthy eating. This development can also have a domino effect on the country's economy as public healthcare costs rise and the society's productivity level decreases.

Internationally, various measures are being implemented to educate consumers on healthy eating such as controlling portion size, but the AR-integrated menu can have a greater impact as today's diners are personally attached to their smartphones and are highly attracted to visuals. So, restaurateurs should take this opportunity to use the AR-integrated menu to provide accurate estimation of food portion size or nutritional information so that diners can make healthy eating choices.

Future Research

A healthy lifestyle is important for everyone, so designing AR-integrated menus with health-related functions can help diners control their food intake and reduce their health risks. In this regard, future studies should focus on the effectiveness, applications, applicability and perceived satisfaction of the AR-integrated menu for diners.

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