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Customer Intention to Use Facial Recognition Technology at Quick-Service Restaurants

This study aims to provide a model that examines the predictors of intention to use facial recognition technology by customers in quick-service restaurants. The proposed model combines the unified theory of acceptance and use of technology (UTAUT) and contextual constructs, such as hedonic motivations, personal innovativeness, trust, perceived privacy, and security protection. The model was tested via structural equation modeling (SEM) by using data collected from a sample of quick-service restaurant customers. The findings of the study provide a valuable theoretical contribution to academia and practical implications for the restaurant managers.

Key words: facial recognition, biometric technology, quick-service restaurant, technology adoption, unified theory of acceptance and use of technology (UTAUT).

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Introduction

Facial recognition technology is a type of biometric technology that can identify a person based on their face contours (Maxie, 2017; Unar et al., 2014). Some quick-service restaurants, such as KPro by KFC in China (Hawkins, 2017), BurgerFi (Hamstra, 2018), CaliBurger in California (Wu, 2017), and Malibu Poke in Dallas, Texas (Rankin, 2017) have implemented facial recognition technology for the customers' account authorization. Quick-service restaurants and their customers may significantly benefit from using facial recognition. Implementing self-service technologies with facial recognition may speed up the service process at a restaurant and allow employees to concentrate on delivering customized and personal interaction with the patrons (Hawkins, 2017; Rankin, 2017). However, before investing in new technology, restaurant management should understand whether their customers are willing to use such technology and what factors influence their decision regarding technology adoption.

Despite practical importance, there is no empirical study that has investigated the customer intention to use facial recognition in quick-service restaurants. Thus, to address the industry problem and the gap in the academic literature, this study aimed to investigate factors that influence customers' perceived intention to use facial recognition in quick-service restaurants.

Literature review

The analysis of academic literature revealed only one study by Morosan (2011) that investigated restaurant customers' intention to use biometrics technology. Morosan (2011) extended the technology acceptance model (TAM) proposed by Davis (1989) with additional constructs of perceived innovativeness towards information technology and perceived security. The study by Morosan (2011) focused on the adoption of biometric technologies in the restaurant

industry in general. However, the quick-service restaurant customers have a different motivation for their dining and expectations for the service compared to customers of other types of restaurants (Morosan, 2011; Ryu, Han, & Jang, 2010). Therefore, Morosan (2011) recommended future exploration of intention to use biometric technologies by customers of quick-service restaurants.

This study used the unified theory of acceptance and use of technology (UTAUT) (Venkatesh, Morris, Davis, & Davis, 2003) to examine predictors of customers' intention to use facial recognition technology in quick-service restaurants. The UTAUT is a modified model based on the TAM (Davis, 1989) that includes constructs of performance expectancy, effort expectancy, facilitating conditions, and social influence as predictors of behavioral intentions to use and the actual usage of the technology (Venkatesh et al., 2003). This model has been previously tested and validated in various hospitality, tourism, marketing, and business studies (e.g., Khalilzadeh, Ozturk, & Bilgihan, 2017; Okumus, Ali, Bilgihan, & Ozturk, 2018).

Previously, Morosan (2011) found a significant indirect influence of perceived ease of use and usefulness on the adoption intention of biometric technology in restaurants through attitude towards biometric technology. Later, Morosan (2016) found statistically significant influence of performance expectancy and effort expectancy on the intention to use biometric e-gates in airports. Thus, as facial recognition technology is a type of biometric technology, this study hypothesized that perceived performance expectancy and effort expectancy have significant influence on customers' intention to use facial recognition in quick-service restaurants.

The opinion of significant people is proven to be influential for new technology adoption in many hospitality studies (e.g., Khalilzadeh et al., 2017; Okumus et al., 2018). Also, customers are more willing to use new technology in hospitality settings when they believe that there is support available to assist with the technology (Khalilzadeh et al., 2017; Okumus et al., 2018).

Therefore, the other two constructs of UTAUT proposed by Venkatesh et al. (2003), social influence and facilitating conditions, were also expected to affect intention to use facial recognition technology in quick-service restaurants in this study.

This study modified and extended the UTAUT model with constructs that can influence quick-service restaurant customers' acceptance of facial recognition. The UTAUT2 model proposed by Venkatesh, Thong, and Xu (2012) is an extended version of UTAUT that measures consumer acceptance and use of information technology with hedonic motivation as one of its constructs. The UTAUT2 explains that customers are willing to use technologies if they perceive them as fun and joyful (Venkatesh, 2012). Further, Ellerbrook (2011) discussed the hedonic motivation being one of factors influencing customers to use facial recognition. Thus, this study hypothesized that hedonic motivation influences customers' intention to use facial recognition system in quick-service restaurants.

Furthermore, some people may want to use new technology and some may not want; it depends on their level of innovativeness towards information technology (Goldsmith & Hofacker, 1991). The previous research tested and proved the direct and indirect effect of personal innovativeness towards information technology on behavioral intention to use biometric technologies in hotels (Morosan, 2012a), at security check points in airports (Morosan, 2012b), for access to a bank account through ATM (Byun & Byun, 2013), and a library account (Lancelot Miltgen, Popovic, & Oliveira, 2013). Also, the previous study by Morosan (2011) found that customers' perceived innovativeness towards information technology influences customers' intention to use biometric technology in restaurants. Thus, in context of this study, perceived innovativeness towards information technology may also affect QRS customers' intention to use facial recognition.

Biometric technology, including facial recognition technology, is known as not only quick and convenient technologies for authorization but also controversial technologies because of privacy and security of the customers' information issues (Breward, Hassanein, & Head, 2017; Ellerbrok, 2011). Previous literature showed that perceived privacy protection (Breward et al., 2017; Lancelot Miltgen et al., 2013; Pai, Wang, Chen, & Cai, 2018), perceived security protection (Breward et al., 2017; Kim, & Bernhard, 2014; Morosan, 2011), and trust in the system (Lancelot Miltgen et al., 2013; Pai et al., 2018) directly or indirectly influence customers' intention to use biometric technology. Therefore, these constructs were also added to the UTAUT to enhance the model explanatory power of customers' behavioral intentions to use facial recognition technology in quick-service restaurants.

Methods

A self-administrated survey with seven-point Likert scales from 1 being "strongly disagree" to 7 being "strongly agree" was used as the instrument to measure variables for this study. The measurement items were adopted from previous literature (e.g., Morosan, 2011; Venkatesh et al., 2003; 2012) and modified to fit the study context. The online questionnaire was created in Qualtrics and distributed through Amazon Mechanical Turk (MTurk). A pilot test was also conducted through MTurk before the data collection for the main study to check the reliability of constructs and transparency of the questions. The questions in the questionnaire were also validated by information systems and hospitality researchers.

The target population of this study was adults (18 year old and older) who reside in the U.S. and have dined in a quick-service restaurant within one year. The first section of the questionnaire included screening questions about the participants' age and quick-service restaurant

dining experience. In the next section, participants were presented with the definition of facial recognition technology followed by a scenario where they were asked to imagine that they were ordering food in a quick-service restaurant and could use facial recognition technology during the order process. After reading the scenario, those participants who answered correctly on the attention check question were asked to answer questions for study variables. The last section of the questionnaire contained demographic questions and questions about participants' dining behavior.

Findings

The data were collected from 602 quick-service restaurant customers. After cleaning the data, a total of 558 completed responses were used for analysis. The sample was almost equally distributed between males (49.8%) and females (49.5%). Nearly half of the respondents (49.6%) have dined in a quick-service restaurant within a few days before participating in the survey.

A partial least squares structural equation modeling (PLS-SEM) was used to test the proposed structural model and hypotheses (Hair, Ringle, & Sarstedt, 2011). Before the PLS-SEM testing, the proposed measurement model was assessed. Convergent validity and internal consistency reliability of the constructs were ensured based on factor loadings, composite reliability, and average variance extracted. Discriminant validity of the model was established based on cross-loadings and the Fornell-Lacker criterion (Hair et al., 2011).

The results of PLS-SEM revealed statistically significant effect of perceived performance expectancy, social influence, hedonic motivations, perceived security protection, and trust on consumers' intention to use facial recognition technology in quick-service restaurants. However, perceived effort expectancy, facilitating conditions, consumers' perceived personal innovativeness

towards information technology, and perceived privacy protection did not influence the intention to use facial recognition technology by quick-service restaurant customers.

Conclusions

The study provides a model that can be used to test the determinants of customers' intention to use facial recognition technology in quick-service restaurants. The findings of the study provide the predictors of customers' intention to use facial recognition technology at quick-service restaurants, such as perceived performance expectancy, social influence, perceived security protection, and trust towards the system. At the same time, effort expectancy, facilitating conditions, perceived personal innovativeness, and perceived privacy protection did not have significant effect on customers' willingness to use facial recognition technology in quick-service restaurants.

This study provides a valuable contribution to the body of academic literature in hospitality and tourism field. This is the first study that explores factors influencing customers' intention to use facial recognition technology in quick-service restaurants. Some previous studies provided the models for customers' intention to use biometric technology as a whole concept (e.g., Morosan, 2011, 2016); other studies tested the models for intention to use different types of biometric technologies other than facial recognition technology (e.g., Breward et al., 2017; Kim & Bernhard, 2014). Furthermore, this study extends the UTAUT proposed by Venkatesh et al. (2003) with additional constructs, such as hedonic motivations, personal innovativeness, trust, perceived privacy, and security protection, as predictors of customers' intention to use facial recognition technology at quick-service restaurants.

The model developed in the study can be helpful for the quick-service restaurant management to support informed decision making regarding utilizing facial recognition technology in their business. The findings of the study also have applications in promoting the use of facial recognition technology among the customers of quick-service restaurants. The model developed in this study should be validated and may be used in different settings beyond the restaurant industry, including lodging, airports, clubs, spas, theme parks, and retail.

Finally, the model proposed by this study may be further tested in different settings, for different age and gender groups, and geographical locations. Also, the proposed model can be tested for other types of biometric technology.

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