Customers’ Motivation to Adopt Augmented Reality (AR) Technology in a Restaurant

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Abstract. The food service business has been completely transformed over a decade. It's due to the introduction of smart technology, which has resulted in an improved experience for customers while also enhancing the industry's operational efficiency. One of the advanced technologies that have recently been used by these service companies is Augmented Reality (AR). Using the cognitive evaluation theory, the purpose of the current study was to examine what motivates the customers to adopt AR applications at the restaurant. The study focuses on customers who have not used or experienced the AR application previously. This research adopts a quantitative approach and uses convenient samples involving 164 participants. The findings revealed that consumers' attitudes regarding AR apps in restaurants were shown to be positive when those apps offered both pleasant experiences (hedonic motivation) and effective data or functional advantages (utilitarian motivation). Moreover, it was revealed that attitude has a favorable impact on intention. It was hypothesized that consumers who had a positive view of AR applications were more likely to intend to use them. Drawing on principles from smart technology literature, this research advanced our understanding of how customers react to implementing augmented reality in the food service companies, especially in restaurants.

1 Introduction

The implementation of smart technology over the past few years has completely revolutionized the food service industry, making the customer experience better while also improving operational efficiency [1]–[3]. Furthermore, customers' interactions with restaurants have been revolutionized by technological advancements like digital menus, which customers can access by scanning a QR code with their mobile device or using an associated mobile application [4], [5]. Customers can peruse menus, tailor their orders to their preferences, and place orders using this technology, eliminating the need for an actual menu or a server. Also, nowadays, many restaurants offer cashless and contactless payment systems, which enable customers to purchase and pay using their cellular phone [6]. This technology can potentially cut down on waiting times and make the purchasing process more efficient [7], [8]. The implementation of smart technology in the food service industry potentially increase company performance, lower costs, and enhance the service quality provided to customers [9]. It is reasonable to anticipate that as technology continues to advance, we will see an increasing number of creative solutions that will revolutionize how customers engage with restaurants.

The implementation of smart technology in various hospitality businesses has significantly increased [10]. One of the advanced technologies that have recently been used by these service companies is Augmented Reality (AR) [10]. The use of Augmented Reality makes it possible for restaurant owner-managers to virtually display their menu items, products, and any adjustments that have been made to them. Hence, restaurants are now able to offer consumers a more immersive eating experience by assisting them in visualizing the items they intend to eat before placing their orders. This allows restaurants to provide customers with a more personalized dining experience.

Augmented reality (AR) is a technology that includes digital data, like a pictures, videos, and other virtual components, at the same world environment [11]. The customers’ experience of the actual world was improved by adding a layer of digital information that can be interacted and provides a sense of immersion [12]. AR can be encountered on various devices, including smartphones, tablets, smart glasses, and other wearable technology, among other options. The technology works by identifying and tracking the position and movements of the user using sensors, cameras, and software and then superimposing digital content onto the environment they are actually in [13].

Currently, various companies in the hospitality industry have adopted augmented reality as a tool to increase not only customer experience, but also the number of reservations. For example, Inamo restaurant in London have used AR as their marketing tools to increase...
we attempt to fill the gap in the literature. Recently, we conducted research in the context of food service in Indonesia. Nevertheless, we found very limited research that focused on this topic.

2.1 Augmented Reality in Foodservice Industry

Past study describes augmented reality as a smart technology application that incorporates digital data. For instance, AR combines pictures, videos, and animations to become reality from user point of view [19]. This study uses most exhaustive and frequently accepted definition of fun and excitement to the dining experience. Also, Augmented Reality (AR) technology in restaurants is still in early stage. Due to an increasing number of businesses considering adopting AR applications, it is very important to find out what would be the motivation and attitude of customers in adopting this technology. Therefore, this study attempts to examine the customers’ motivation to adopt augmented reality (AR) technology in the restaurant.

Recently, many scholars have place special attention to the adoption of Augmented Reality (AR) in restaurants [16]. For instance, a recent study [17] has examined how the presence of augmented reality (AR) can influence consumers' demand for depicted foods and their likelihood of purchasing those foods. In this study, they found that by showing the food items trough AR to the customers, there will be an increase in the customers’ desirability and likelihood to purchase the food. Nevertheless, we found very limited research have conducted in the context of food service in Indonesia. This study is important for several reasons. Firstly, we attempt to fill the gap in the literature. Recently, there are many studies have focused on the accessibility of augmented reality (AR) technology and its utilization in hospitality, lack of attention has been paid to the "pre-experience" aspect of augmented reality applications in restaurants [18]. Specifically, very little study has been recorded to determine the underlying motives of customers toward augmented reality and their attitude toward the deployment of this type of smart technology platform[18]. Moreover, prior research [16] has mostly focused on illustrating the deployment of augmented reality in the tourism sectors. Less studies have focused on restaurant industry.

Secondly, other research was mainly focused on the approval of customers that already experienced or used AR previously [19], [20]. Therefore, with this research, we hope to better understand customers' interest and motivation in using AR application in the restaurants. Particularly, this study focuses on the customers who have not used or experience the AR application previously. In the following section, we will review the existing literature that focused on this topic.

2 Literature Review

2.1 Augmented Reality in Foodservice Industry

While Augmented Reality (AR) is an exciting new marketing communication tool, it also creates some unique challenges [22]. It has been studied extensively in the field of computer science, as well as in the areas of human-computer interaction (HCI) for quite some time [23]. Even while Augmented Reality (AR) has been increasingly popular in recent years, the technology is still in its infancy, and its full potential has not yet been realized. [16], [24]. Artistic and aesthetically pleasing experiences can be created by using a augmented reality technology due to its immersive and sensory features, especially visual [25]. However, augmented reality consists of a wide range of technologies directly or indirectly related to immersion, thus their uses are not limited to these two dimensions. Numerous disciplines, including engineering, computer science, and design, have devoted considerable time and energy to studying AR interfaces and applications [26], and consumer behavior [27].

Similarly, the deployment of Augmented Reality (AR) is the latest trend in various tourism and hospitality sectors. For instance, AR is being used by the travel and tourism sector as a novel advertising platform to build destination brands [28], refine interactive advertising [29], and improve visitors' perceptions of their experiences [30], [31]. Meanwhile, Augmented reality (AR) is also being used in the food service industry to provide customers with an interactive and immersive experience [24], [32]. With the advent of food delivery [33] and digital menus [34], the restaurant industry is ripe for the adoption of augmented reality (AR) technology. With augmented reality, restaurant owner-managers may virtually showcase their menu items, products, and any customizations made to them. Because of this, restaurants are now able to provide patrons with a more immersive dining experience by assisting customers in visualizing the dishes they intend to eat prior to placing their orders [24].

Customers' reactions to the use of augmented reality in restaurants have been mostly positive. There are several reasons to explain this phenomenon. First, Augmented Reality (AR) in restaurants is still a relatively new concept, and customers often find it entertaining and novel [20], [35]. The use of technology adds an element of fun and excitement to the dining experience. Also, Augmented Reality can help customers engage with the food and the dining experience in new ways. Customers can interact with the virtual elements of the experience and feel more connected to the food they are about to eat.

Generally, customers’ perception on augmented reality adoption in restaurants is positive, as it provides a unique and engaging dining experience that enhances the presentation of the food and improves customer satisfaction. Thus, the principal reason of this study was to examine the customers' motivation in using Augmented Reality in a restaurant. This research used the
Technological Acceptance Model (TAM) [36] and the cognitive evaluation theory [37].

2.2 Theoretical Background

This study's objective was to evaluate the elements that motivate customers' attitudes about augmented reality (AR) applications and their intention to use them at the restaurant. We have designed our study to build upon the findings of a previous study [18] to advance our understanding of AR adoption in the restaurant sector and its impact on customer behavior. Therefore, we also concentrated our attention, especially on hedonistic and utilitarian forms of motivation.

According to the cognitive evaluation theory [37], there are two types of motivation, namely hedonic and utilitarian motivations. Hedonic motivation was defined as the person's likelihood of involvement in any behavior resulting in an increase in positive experiences, a sense of playfulness, and enjoyment [37]. Hence, individuals are motivated when they participate in a particular activity merely because it provides them pleasure rather than because the action confers any form of advantage external to the activity.

In contrast, the utilitarian theory of motivation places emphasis on extrinsic behaviors carried out by individuals in exchange for extrinsic incentives such as monetary compensation [37]. A person's tendency to engage in behaviors that would result in the enhancement of some practical advantages, such as their utility, is what is meant by the phrase "utilitarian motivation," which refers to an individual's tendency to engage in the behavior [38].

According to the findings of various research [38], hedonistic and utilitarian motivations are crucial antecedents in the process of technological acceptance. Similarly, another study found that hedonistic motivations have a good influence on AR satisfaction, whereas utilitarian motivations also have this effect [13], [31]. It has been determined that the best way to forecast when guests will use self-service technology in a hospitality setting is to use historical data.; one must consider both the hedonistic and the utilitarian incentives that drive them [39]. Also, research in the hospitality industry has shown that a combination of hedonic and utilitarian motivation is the best predictor of a customer's willingness to use self-service devices [39]. Hence, the following hypotheses were developed:

H1: Customers' attitudes toward the implementation of AR technology in restaurants are positively influenced by hedonic motivation.

H2: Customers' attitudes toward the implementation of AR technology in restaurants are positively influenced by utilitarian motivation.

2.3 Personal Innovativeness

Since augmented reality is a cutting-edge technology, individuals' openness to novelty will likely affect how they feel about using it. According to [40], personal innovativeness is flexibility to change in an individual. Individual propensity and skill in using cutting-edge technologies are what we mean by "personal innovativeness" here. Personal innovativeness is an important construct in the fields of innovation and technology adoption, as it can influence individuals' adoption decisions and their willingness to take risks [41]–[43].

Research has shown a positive relationship between personal innovativeness and technology acceptance [42], [44]. Individuals who are more innovative tend to be more willing to adopt new technologies, whereas those who are less innovative may be more resistant to change and less likely to adopt new technologies [45]. Furthermore, Individual propensity for innovation has been found to be a strong indicator of willingness to adopt new technologies. [46]–[48]. Individuals who are naturally inventive are also more inclined to adopt and make good use of cutting-edge technologies because they view them as practical and intuitive. [46]. Based on the discussion that has taken place thus far, the following hypotheses have been developed:

H3: Customers' attitudes toward the implementation of AR technology in restaurants are positively influenced by personal innovativeness.

2.4 Customer's Attitude and Intention to Adopt AR in the restaurant.

According Theory of Reasoned Action (TRA), Intentions are influenced by behaviors, which are in turn affected by beliefs and traditions held by the individual. [49]. Thus, an individual's beliefs as well as their evaluations influence the individual's attitude. The subjective standard, on the other hand, is considered to be influenced by the individual's beliefs and their level of drive. [50]. According to the Theory of Planned Behavior (TPB), A person's behavior is determined by the goals they set for themselves. [49]. Attitude, norms, and belief in one's own ability to manage their actions all play a role in shaping these intents. [49]. The application of the technology acceptance model confirmed the relationships between the quality of the information system, the perceived usefulness, and the user acceptance of hotel front office systems [36]. Furthermore, based on a past study [18], tourists' propensity to use augmented reality (AR) at popular attractions is influenced by their good feelings about the technology. This leads us to hypothesize the following:

H4: Customers' inclination to use augmented reality (AR) at the restaurant is influenced by their attitude toward the technology.

The following (fig. 1) is the research framework used in this study. This framework was based on the Technological Acceptance Model [36] and the Cognitive Evaluation Theory [37]. This model was used in a past study [18].
3 Methods

The study's objective was to examine customers' motivation to adopt Augmented Reality applications at the restaurant. To achieve the research objective, we include the question that identifies whether the respondents have used or experienced the AR application previously. We excluded all the respondents that already used or adopted AR applications in the restaurant previously.

In this study, we used convenient samples involving 164 research participants. We used Google Forms to collect the data held in February 2023. There were three sections to the survey. A consent form, a screening question, and a definition of augmented reality with an emphasis on its uses in dining establishments made up the first section. Important constructs that were being measured were included in the second section. The final question inquired about the respondents' socio-demographic details.

All the measuring items were taken from previously published research and then changed to reflect the primary purpose of this study as well as wider uses of augmented reality in restaurant settings. The hedonistic and utilitarian motivations were each evaluated using four questions taken from past research [51]. The level of attitude was evaluated using three questions from Davis [36]. Meanwhile, to measure the customers' intention to use AR in restaurants, the present study adopts the instrument used by [39] that consists of six items. Lastly, personal innovativeness was evaluated based on responses to three questions developed by Jung and his friends [52]. The 7-point Likert or semantic differential scale was used to evaluate each construct through a battery of questions.

SmartPLS 3.0 was used to analyze data. When it is acceptable for the study to do so, partial least square analysis is utilized to examine measurement and structural models. [53]. The measurement model was validated by a number of confirmatory factors analyses in order to determine whether or not the measurements were adequate. Using the bootstrapping method (n= 5,000), we analyzed the structural model's path coefficient and path significance.

4 Result

We gathered a total of 164 responses, all of which were complete. For the socio-demographic data, the age group of 18 to 35 years old had the largest proportion of respondents (79.5%), followed by the age group of 36 to 45 years old (15.5%). From this result, we can conclude that most of the respondents are young generation. Furthermore, the majority of the responders were female (56.4%), making up over half of the total. Most importantly, the questionnaire has been designed to ensure that all of the participants have never used the Augmented Reality (AR) previously.

4.1 Measurement model examination

To determine whether the scales that were utilized in the process of measuring latent constructs were accurate, Cronbach's Alpha and Composite Reliability (CR) scores were applied. As we can see from Table I below, both measures of reliability were found to have values more than the threshold of 0.70, considered acceptable [54]. Both convergent validity and AVE scores were used to assess the validity. Convergent validity required that all observed variables be loaded into their corresponding latent constructs, with regression weights greater than 0.60, and that the AVE of all variables is greater than the recommended cut-off value of 0.5. The results of the inquiry into the reliability and validity of the research are presented in Table 1.

<table>
<thead>
<tr>
<th>Construct</th>
<th>Indicator</th>
<th>Mean</th>
<th>Factor loading</th>
<th>CR</th>
<th>AVE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hedonic Motivation</td>
<td>HM_1</td>
<td>5.21</td>
<td>0.822</td>
<td>0.92</td>
<td>0.76</td>
</tr>
<tr>
<td></td>
<td>HM_2</td>
<td>4.54</td>
<td>0.813</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>HM_3</td>
<td>4.46</td>
<td>0.832</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HM_4</td>
<td>4.34</td>
<td>0.827</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Utilitarian Motivation</td>
<td>UM_1</td>
<td>5.32</td>
<td>0.836</td>
<td>0.89</td>
<td>0.83</td>
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<tr>
<td></td>
<td>UM_2</td>
<td>5.41</td>
<td>0.824</td>
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<tr>
<td></td>
<td>UM_3</td>
<td>4.67</td>
<td>0.794</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>UM_4</td>
<td>4.21</td>
<td>0.759</td>
<td></td>
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<tr>
<td>Innovativeness</td>
<td>INN_1</td>
<td>4.23</td>
<td>0.735</td>
<td>0.91</td>
<td>0.87</td>
</tr>
<tr>
<td></td>
<td>INN_2</td>
<td>4.33</td>
<td>0.807</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>INN_3</td>
<td>4.29</td>
<td>0.823</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attitude</td>
<td>ATT_1</td>
<td>4.51</td>
<td>0.843</td>
<td>0.93</td>
<td>0.79</td>
</tr>
<tr>
<td></td>
<td>ATT_2</td>
<td>4.47</td>
<td>0.853</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>ATT_3</td>
<td>4.09</td>
<td>0.794</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Intention</td>
<td>INT_1</td>
<td>5.35</td>
<td>0.842</td>
<td>0.90</td>
<td>0.89</td>
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<tr>
<td></td>
<td>INT_2</td>
<td>5.28</td>
<td>0.882</td>
<td></td>
<td></td>
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<tr>
<td></td>
<td>INT_3</td>
<td>4.89</td>
<td>0.873</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4.2 Test of structural model

The result of hypothesis testing is shown in Table 2 below. According to the results of the data analysis, all the hypotheses were supported. Specifically, the findings revealed that hedonic motivation significantly influences customers' attitudes toward AR applications in the restaurant ($\beta = 0.253, t = 4.652, p > 0.05$). Hence, Hypothesis 1 was supported. The findings also indicated that utilitarian motivation has a positive and significant influence on customers' attitude toward AR application in the restaurant ($\beta = 0.397, t = 4.224, p < 0.05$). Hence,
Hypothesis 2 was supported. Moreover, this study also found that customers’ personal innovativeness positively and significantly influences their attitude toward AR applications in the restaurant context ($\beta = 0.129, t = 4.879 \ p < 0.05$). Thus, this research confirmed Hypothesis 3. Lastly, Hypothesis 4 was also supported ($\beta = 0.387, t = 3.756 \ p < 0.05$), indicating that customers' attitude toward AR applications in the restaurant context has a positive and significant influence on customers' intention to use the Augmented Reality based application.

### Table 2. Path Analysis

<table>
<thead>
<tr>
<th>Hypothesis/path</th>
<th>Estimate</th>
<th>p-value</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>H1: Hedonic → Attitude</td>
<td>0.253</td>
<td>0.012</td>
<td>Supported</td>
</tr>
<tr>
<td>H2: Utilitarian → Attitude</td>
<td>0.397</td>
<td>0.009</td>
<td>Supported</td>
</tr>
<tr>
<td>H3: Personal innovativeness → Attitude</td>
<td>0.129</td>
<td>0.000</td>
<td>Supported</td>
</tr>
<tr>
<td>H4: Attitude → Intention</td>
<td>0.387</td>
<td>0.002</td>
<td>Supported</td>
</tr>
</tbody>
</table>

### 5 Discussion and Conclusion

The purpose of this study was to analyze the motivations of customers that influence their attitude toward augmented reality applications at the restaurant. According to the findings of this research, hedonic and utilitarian motivations all had considerably significant effects on customers' attitudes toward AR applications. To put it another way, customers' attitudes regarding AR apps at the restaurant were more positive when the apps offered pleasurable experiences (a motive known as hedonic motivation), helpful information, or tangible advantages (a motive known as utilitarian motivation).

Moreover, the study also finds that customers' personal innovativeness has significant influence on their attitude toward AR adoption. It means that if the person perceived the technology adoption as an innovation, then this individual is expected to have a positive behavior toward AR implementation in the restaurant. Lastly, it was found that attitude has a favorable impact on intention, which is in line with findings from earlier studies. Customers who had a positive outlook on AR applications were more likely to intend to use them while dining at the restaurant.

By drawing on principles from smart technology literature, this research advanced our understanding of how customers react to augmented reality (AR) applications in the food service industry, especially in restaurants. Regarding practical implications, the study uncovered the main drivers of customer adoption of AR applications. If restaurant owners and operators focus on their customers' motivations, they can create and market their establishments more effectively. Restaurant managers will convince customers’ interest in an augmented reality dining experience by focusing on the identified primary motivators of augmented reality adoption.

### References


