

## Article

# An Empirical Research: Incorporation of User Innovativeness into TAM and UTAUT in Adopting a Golf App

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**Abstract:** This current empirical study aims at investigating the incorporation of consumer innovativeness in TAM and UTAUT in the development of a golf app and how these influence consumer behavioral intentions in adopting the golf app. These models help illustrate consumer adoption of particular technologies and relate to the concept of innovation diffusion theory. Our research has obtained 394 responses and participants of the questionnaire were evenly divided by gender and age to reach the purpose of the current research. The main statistical methodology used the structural equation modeling (SEM) to evaluate the connection among user's innovativeness regarding the golf application, technology acceptance model (TAM), unified theory of acceptance and use of technology (UTAUT), behavioral intention, and word of mouth. In contrast to correlation assessments, SEM can measure the strength of the linear causative relationships between factors. Finally, this research concludes that TAM and UTAUT components determine the consumer's attitude towards accepting and using new technology. Consumers who are open to innovations are more likely to accept emerging technology products and use them with the least resistance.

**Keywords:** innovativeness of golf app; digital marketing; social media; TAM; UTAUT



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## 1. Introduction

The manner in which businesses interact with their customers is changing fast with the evolution of technology in the modern era. Through technology, innovations have made it much easier to carry out activities such as making purchases without necessarily being present at the retail shops or going anywhere [1]. The innovation of mobile apps in various industries has contributed to eliminating wait times and giving people the chance to get straight to the activities of interest [2]. Evidence suggests that many golf courses are struggling to keep their market competitiveness, and they strive to expand their accessibility on all fronts in order to remain market relevant. As the older generation retires from active golfing, golf managers are shifting their market segments to attract a younger, more tech-savvy generation to their courses, and one of the best ways to do so is to develop a golf app that improves the customer experience [3]. In addition to improving the customer experience, golf apps further help in streamlining operations for the business and capturing critical data that can be used in golf marketing and improving performance.

With the rising interest and demand for golf apps based on the fun and efficiency that they provide, most golf course managers have identified business opportunities hidden in developing the apps [4]. People's enthusiasm for the sport has fueled an increase in the number of golf software solution providers who are developing golf apps and associated platforms to boost business competitiveness among the younger generation [5]. In the development of golf apps, the technology acceptance model (TAM) plays a critical role in understanding human behavior as to whether the target audience will accept or reject the innovation with regard to its perceived usefulness and ease of use in accessing the desired

services. For this reason, UTAUT may influence golf app users' intention to determine if they will keep using the app based on various features such as effort expectancy, social influence, and facilitating conditions [6].

The advancement and development of smart technology have absolutely influenced most generations to change app users' behaviors and experiences. According to the prior study [7], the TAM and UTAUT model provide a theoretical foundation that can be used to predict user acceptance and behavioral intention to download and use a golf app. Based on the assumption that most users tend to prefer user-friendly applications, various studies have explored how the usability of mobile apps has an impact on the user experience [8,9]. Moreover, it is argued that the application of TAM and UTAUT plays a critical role in explaining the determinants of an individual's adoption decision with regard to particular applications or systems [10]. As a result, the level of innovativeness of the golf app would have a significant influence on consumer acceptance of the TAM and UTAUT model, as well as whether or not they would use golf apps.

The innovativeness of the golf app will have practical implications for users' acceptance of TAM and UTAUT model. As argued by previous research group [11], the perceived usefulness of technology is one of the most significant determinants of the intention of users to accept the innovation to improve their performance relative to traditional approaches. Therefore, the perceived usefulness that sport users have for the golf app will influence their intention to download the app as their favorite, especially when they consider the golf app to be useful in offering critical information on golf tournaments. This argument further provides intuition on the importance of the type of content posted in the app and the associated quality [12]. Hence, in the development of the golf app, it is important for golf managers and developers to ensure that the content provided is fun and enjoyable to capture the attention of the users and, moreover, the golf app should be upgraded regularly as an approach to maximizing its effectiveness in marketing and also keeping with the prevailing trends in usability.

The TAM and UTAUT theories form the basis for this research paper. The two theories have four key constructs. The UTAUT theme is made up of enabling conditions, effort expectancy, and performance expectancy while the TAM consists of behavioral intention, consumer attitudes, perceived usefulness, and ease of use [13–17]. Through these two theories, one can assess how well the consumer will likely adopt new technologies or products, such as the golf app. Consumer innovativeness refers to the learning process that ultimately influences an individual's cognitive process and is determined by aspects such as the environment and the attitudes that others may have toward a given technology. Given the interlinked nature of the TAM and UTAUT theories regarding consumer innovativeness, they must be used to assess how well individuals adopt the new technology and what factors play a key role in the acceptance process. Additionally, the two theories will be crucial in assessing whether consumers will likely use the golf app over the long term.

After assessing the consumers' behavior and intention, it will be crucial to evaluate their willingness to share information on the application with the members of their social environment. The "word of mouth" aspect of the study helps assess whether consumers are willing to write a review, recommend the app to others, introduce the app to other people, or simply share information on the application with other interested individuals. Consumers who show the intention of using the application for a long time are likely to opt to tell others about the application and how it has benefited them in their golf games. Therefore, an assessment of the "word of mouth" aspect is necessary for this study. A critical analysis of the study's findings provides key insights into the aspects that golf app creators must focus on to ensure that more users use the application for a long time and share their positive experiences with their social environment. Through this study, the authors establish the interlinked nature of the key concepts: TAM, UTAUT, consumer innovativeness, behavioral intention, and word of mouth.

### *The Necessity of the Research (Research Gap)*

This empirical study aims at investigating the incorporation of consumer innovativeness in TAM and UTAUT in the development of the golf app and how these influence consumer behavioral intentions in adopting the golf app. These models help illustrate consumer adoption of particular technologies and relate to the concept of innovation diffusion theory [18]. According to the previous work [19], this theory holds that consumer adoption of any form of technological system is dependent on various factors such as perceived relative advantage, complexity, and observability. Borrowing from the premise of this theory, it can be argued that TAM and UTAUT model contribute to understanding how golf app users' perception influences their behavioral intention in accepting and appreciating the innovation [20]. The acceptance behavior of golf app users will thus be influenced by the innovativeness of the technological system. Several empirical studies have explored the concepts of TAM and UTAUT to help explain the factors that determine the adoption decisions of many users of technological systems [21,22]. Therefore, this study provides a better understanding of the association between the variables of the TAM and UTAUT model and sports app technology acceptance and ultimate utilization.

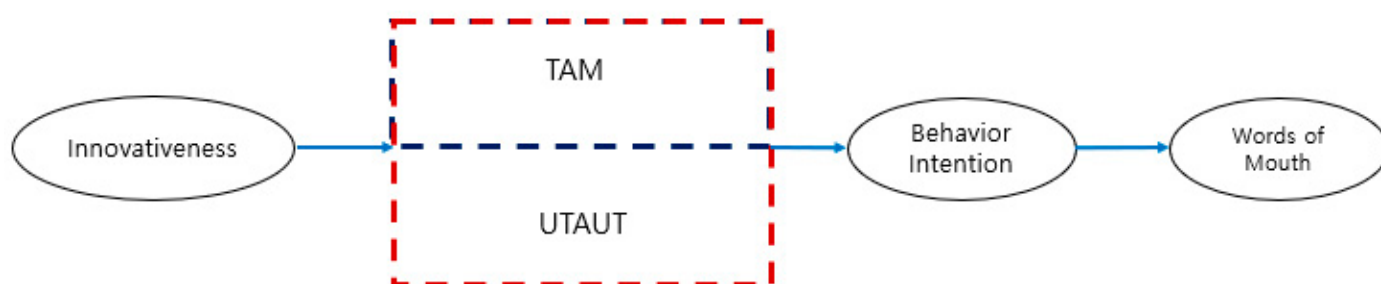
Technological advancements are changing every aspect of human life. One of the key areas significantly affected by technology is sports. Today, people are using technological equipment and applications to ensure that they are constantly improving and performing to the fullest potential in their respective fields. One of the sports that has gained increasing prominence in the United States is golf. Golf lovers and avid players are constantly searching for technology that can help them improve their game, which will determine whether they enjoy the sport. Golf apps are designed to help the golf industry better market its products and services. Golf apps allow golfing organizations to share promotion announcements, event invitations, reminders, and golf-related push notifications with their consumers [23]. Therefore, as a result of these apps, more people have the opportunity to be actively involved in the golfing community, which could lead to a greater love for the sport and an increased commitment to event attendance or the purchase of golf products. Besides serving as a marketing tool, golf apps have features that can significantly help golfers improve their performance in the game. Therefore, another key feature of golf apps is scorekeeping. With scorekeeping, players can track their games and assess whether they are getting better. Additionally, the scorekeeping feature can help golfers learn more about certain holes and the aspects they must consider when playing them.

Finally, besides scorekeeping, golfers can use the application for handicapping, which assesses individuals' abilities based on previous golf round scores. The handicapping feature can help golfers learn more about their failings and address them [23]. Markedly, these handicapping scores help golfers compare their skills to those of other golf players. As a result of the constant comparison, golfers can learn tips and tricks to improve at certain holes and ensure continual improvement at the various holes. Notably, these handicapping scores can also help golfers identify the people whom they can learn from while forming positive relationships with others in the golfing community. Therefore, golf apps continually help to ensure that more people develop a love for the sport while keeping the current golfers more intrigued and involved in the growth of their skills, commitment, and association with their local golfing organizations or courses.

Since the golf app executes applications such as a wide range of functions for its consumers, it is the most versatile technological product to use in this empirical study. The app will cater to different consumer needs, such as social interactions, game improvement, and quick access to relevant and verified information on golf. The many features increase the chances that consumers will find an aspect of the application they prefer and ultimately choose to use it over the long term. Therefore, studying this application will increase knowledge of what developers must focus on while creating consumer-focused apps. Furthermore, the results from this empirical study can help to inform future research on other sports-related technologies and their possible adoption by relevant consumers. Given that the world's dependence on technological products is bound to continue increasing,

developers can use the information provided in this study to design consumer-focused technologies. At the same time, marketers can learn more about the aspects that can increase consumer innovativeness with regard to technological products, especially in relation to TAM and UTAUT. The research question that has aided the authors in obtaining vital information is “In regard to the golf app, how can consumer innovativeness be incorporated in both TAM and UTAUT?”

Even though there is a high adoption rate of smartphone apps by both sport managers and fans, there is little empirical research that specifically explores golf. Considering the fact that there is limited empirical evidence legitimizing the use of mobile apps in golf and their utilization, there is a need to explore the research area since it is argued to relate to the psychological and consumptive behavioral intentions of golf app consumers. Using the foundational basis of the TAM and UTAUT model, the research determines how innovativeness in the golf app influences the behavior intention and words of mouth of its users (see Figure 1).

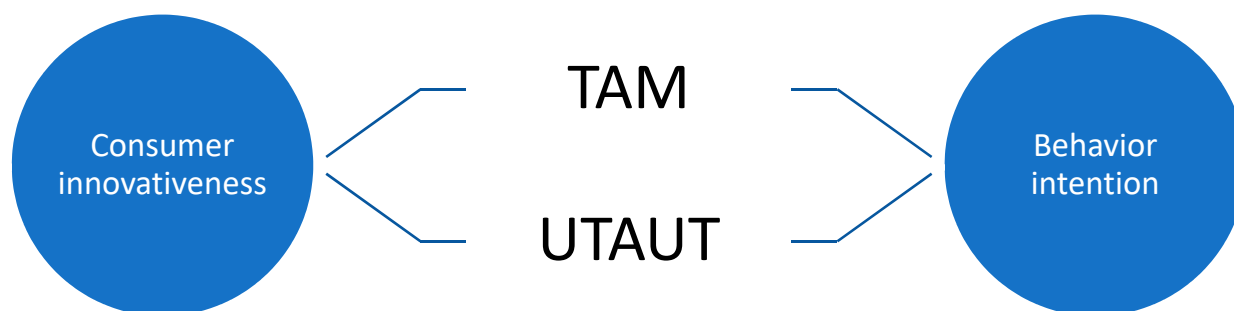


**Figure 1.** Research model of the current research.

## 2. Literature Review

### 2.1. A Brief Overview of TAM and UTAUT

TAM, UTAUT, consumer innovativeness, and behavioral intention are the main focus of this research article (see Figure 2). As a result, it is crucial to explain the key elements associated with these concepts. The TAM theory is founded on four constructs. The first is the perceived ease of use, which refers to one’s ability to use an application or technology with minimal effort [13,14]. The second construct is the consumer’s attitudes toward the technology, which refers to how positive they feel about it. Perceived usefulness is the third TAM construct; this construct is determined by the consumer’s belief in the technology’s ability to enhance performance [24]. Lastly, the TAM theory is based on the consumer’s actual behaviors or behavioral intention, which involves how people use the technology [13,14]. Evaluating these four constructs can help one better understand the TAM theory and its usefulness in assessing the consumer innovativeness of the golf app.



**Figure 2.** A Conceptual Framework illustrating the Relationship between the Key Constructs.

Besides TAM, this research paper will rely heavily on the UTAUT concept. Markedly, this theory helps explain the use of technology and the consumer’s subsequent behavior towards it. The four main constructs associated with this theory are performance expectancy,

effort expectancy, social influence, and enabling conditions [15–17]. Based on these constructs, one can assess how well consumers will adopt technological products, such as the golf app.

Consumer innovation is a key concern for marketers. The innovativeness people possess can be identified by certain types of characteristics, such as being eager to acquire new technological items. Markedly, there exists several theories associated with consumer innovativeness [25,26]. The first is the trait theory, which states that consumer innovativeness is a genetic trait. Therefore, only consumers with the trait can show innovativeness [27]. The second theory associated with consumer innovativeness is the attitude theory; this theory posits that consumer innovativeness results from external factors, such as the environment and the attitudes of other groups and people [28]. In the context of the golf app, consumer innovativeness is associated with the attitude theory since the adoption of the product is based on how useful and easy to use it is.

The final key concept addressed in this empirical study is behavioral intention, which is used to measure a user's motivational degree to exhibit a certain type of behavior [29–31].

In this case, the behavioral intention is assessed in relation to the use of the golf app. Besides purchasing and using a product, another key aspect of behavioral intention is the tendency of a consumer to share their experiences with the products they use with the members of their social circle. In the context of this study, the consumers' willingness to share this information is assessed through how well they spread the information to those around them through their word of mouth.

## 2.2. The Innovativeness That Golf App Users Possess Has a Strong Impact on the TAM Factors

Organizations believe that the introduction of new products is a critical aspect of attracting market demand and sustaining their level of competitiveness in the industry. These new products are aimed at altering the value dynamics in the market; however, the success of the new products is determined by consumer adoption and the diffusion of the product innovations [32]. Through users' recognized usefulness and the degree to which they easily accept innovation features, the procedure of technological adoption can be made clear to app users by TAM. As argued by Lai [24], the TAM holds the view that an individual's attitude towards a technological innovation directly affects their intention, whereas the perceived usefulness and ease of use of the innovation contribute to influencing their attitude. Therefore, based on this analogy, the TAM can help in predicting a consumer's intention to use and accept an innovation, and this can be applied in understanding user acceptance of the golf app.

However, most studies have focused on investigating the concepts of the TAM in adoption with little regard for consumers' emotional perceptions. In a study by Shi [33], the findings revealed that in the context of a social network, an individual's emotional factors are critical in influencing a person's intention to use and accept a new product on the market, relative to the associated technical factors. In this respect, consumer innovativeness in the development of the golf app influences the intention of the target audience in downloading and using the app, and this is associated with the perceived enjoyment of the technology. Developers must use entertaining quality content and animations to draw the attention of the target users to the golf app. Evidence suggests that the enjoyment that one receives from a product or service is an important determinant of one's attitude towards it. Truong [34] holds the view that the quality of satisfaction that a person receives from an innovation has a positive impact on their attitude and that this often has a corresponding impact on the value of the product.

Various researchers have introduced the concept of innovativeness into the TAM. In an article by Marangunić and Granić [35], the authors determined a positive association between consumer innovativeness and users' perceived usefulness and ease of use of technology. The golf app's innovativeness, through the use of accurate sports data and appealing quality content, can provide users with access to essential information about the sport at no additional cost of learning to understand the app's application. Hence, it is



believed that with higher innovativeness in technology, the demand for the golf app will enhance the perceived usefulness and ease of use of the technology [35]. Therefore, based on this argument, the study affirms that the innovativeness that golf app users possess has a strong positive impact on the perceived usefulness and ease of use of the golf app.

### *2.3. TAM Factors Have a Strong Impact on the Behavior and Intentions of Golf App Users*

The TAM is widely applied in understanding a person's beliefs with regard to acceptance and use of a given technology. The model is often preferred since it tends to focus on the use of information, thereby its arguments are based on the concepts of social psychology theory, and it further indicates parsimony. Kariapper [36] further stated that there is little doubt that behavioral intention directly affects the innovation acceptance willingness of most users so all individuals' attitudes to decide whether they keep using apps which are technically innovated depend on the perceived usefulness and ease of use in the TAM. This argument can extend to the case of golf applications, arguing that users rely on their beliefs in the decision to accept a new technology [36–38].

It is argued that there is a strong correlation between the perceived ease of use of the golf app and the users' attitudes towards adopting this new technology [39]. This is supported by Bashir and Madhavaiah [40], who indicated that an individual's perceived usefulness of a particular new product or service usually has a positive impact on their propensity to purchase. Hence, the perceived usefulness of the golf app has a corresponding impact on the users' attitudes and their willingness to accept the technology. Most of the users thus consider the golf app to be convenient, enjoyable to operate, and very easy to use compared to traditional methods.

### *2.4. Innovativeness of Golf App Users Has a Strong Impact on the UTAUT Factors*

Technological predisposition plays a critical role in determining whether users will adopt specific cutting-edge technology. Prior research [41] regards users' innovativeness as the tendency of an individual to be a pioneer of technology and an intellectual leader with an undying desire to experience, experiment, learn, or even talk about technology. People with innovative characteristics are often believed to be the first to adopt technology, and they are likely to learn to use it without any external assistance [42]. However, existing empirical evidence has shown that the innovativeness (INN) variable of users has a significant inverse association with their intention to use the technology. This is because people with high levels of INN are more likely to stop using the technology. Arguably, these people exhibit great expectations for the adoption of any new technology and are constantly on the lookout for emerging innovations that outperform their current technology.

The technological predisposition of golf app users has a strong impact on the UTAUT factors. The innovativeness of users influences their attitude towards new technology and hence their adoption of it. Past study [43] observes that whereas innovative people are highly likely to be the first to use the golf app, given their perception of ease of use and usefulness, they are less likely to continue using the app. This explains why people with a high technological disposition index are not always the early adopters of cutting-edge technology. This is the case of the previous work [44] that argued that there is a positive and significant association between the basic components of UTAUT theory and the technology readiness index (TRI) in the adoption of smart technology devices. The predispositions that golf app users have towards the technology affect their perceptions about adopting it and, hence, their actual use.

The innovative characteristics of golf app users impact the various technology adoption factors, including performance expectancy, effort expectation, social influence, and facilitating conditions, which are components in the UTAUT model. As prior study [45] observes, the innovativeness of technology users determines not only the adoption of new technology but also its continued use. People who are highly predisposed to emerging technology understand the importance of adopting the desired technology and have a positive attitude towards it [46]. However, given their innovative characteristics, these

people are more likely to move on to the next technology as soon as new and innovative applications are available. Therefore, it is safe to state that the innovativeness of golf app users has a strong impact on the UTAUT factors.

### *2.5. UTAUT Factors Have a Strong Impact on the Behavioral Intention of Golf App Users*

The degree of technology adoption among individual users is surely different depending on the willingness of users to keep continuing new technologies. The golf app users' intention to use the technology is a strong predictor and determinant of the actual use of the technology. It also predicts their likelihood to continue using the technology in the future. As a result, a core aspect of the TAM is how willing users are to adopt new innovations according to Widyanto and his associates [47]. However, prior researchers have not agreed with that. With an improved model, a past study [48] argued that the UTAUT 2 model focuses on illustrating a strong intensity of behavioral intention in the process of users adopting new innovations.

The prior study [48] further argue that UTAUT 2 manifests an increased ability to explain the user's behavioral intention to adopt technology. This is because the model has the most external factors, including price value (PV), habit (HT), and hedonic motivation (HM), that have the potential to directly affect the behavioral intention to adopt technology. Unlike the UTAUT model, which was designed to address technology acceptance, UTAUT 2 was specifically introduced to measure acceptance of consumer technologies, i.e., technologies designed for end consumers [49]. The three additional constructs, HM, PV, and HT, define the behavioral intention of consumers towards a target technology.

HM describes the user's acceptance of technology in terms of the fun or enjoyment resulting from its usage. People who conceive that the technology would be enjoyable to use are more likely to accept and adopt the technology [50]. Within the consumer context, those who accept and use the technology are likely to bear the monetary cost that comes with it. This implies that PV also affects their adoption and continued use of technology. According to Hanif and his colleagues [51], PV denotes the users' cognitive trade-off between the perceived technology benefits and the monetary cost of adopting it. If the benefits outweigh the related costs, then the users are more likely to adopt the technology. Gunawan et al. [52] define habit as the extent to which technology users perform certain behaviors automatically without thinking because of learning. This variable defines the ability to use technology. There is little doubt that users will keep continuing to accept new innovations if they become more comfortable with using the technology.

Overall, all the components of UTAUT 2, including price value (PV), habit (HT), hedonic motivation (HM), performance expectancy (PE), effort expectancy (EP), facilitating conditions (FC), and social influence (SI), have a significant effect on users' behavioral intentions to use the desired technology. The resulting behavioral intention to adopt the technology affects the user's behavior, which is the actual adoption and continued use of the technology. Thus, the golf app users' intention to use the application is dependent on their perception of its value [53]. This value is conceived in terms of ease of use, being recommended by significant others, the availability of relevant resources to use the app, its price value, perceived fun, and the users' habit of using such technologies.

### *2.6. The Mediating Role of the TAM Affects the Innovativeness and Behavioral Intention of Golf App Users*

The effect of the TAM has an association with the user's behavior intention. According to the previous research, a strong indirect effect of the TAM between independent and dependent variables correlates with the perceived usefulness and ease to understand, and then, finally, users have a strong intention to adopt new innovation and technology. The model explains and predicts consumers' behavior regarding technology adoption and usage. According to the extant study [54], golf app users are influenced by the perceived usefulness of the technology, perceived ease of use, and associated attitude and behavior towards the innovative system. When users perceive the golf app as useful for efficiently

ordering and paying for products without much difficulty, they are likely to adopt and continue to use the application. However, if they conceive the app to be complex and not as reliable, then they are less likely to use the system [55]. Similarly, when consumers have a positive attitude towards the golf app and demonstrate behavioral intentions to use it, they are likely to adopt the use of the technology.

Overall, the TAM provides broad details about the use of technology by those who want to use it. Thus, the innovativeness of golf app users will influence the adoption of golf apps. Those users who demonstrate a high level of innovative characteristics are less likely to adopt and continue to use the app [56]. This tendency is tied to their behavioral characteristics of always looking out for more innovative technology. Furthermore, the behavioral intentions of golf app users will influence the adoption and retention of the apps. Namahoot and Rattanawiboonsom [38] observe that the user's behavior and intention to adopt technology, in this case a golf app, are strong predictors of actual technology use. Consumers who demonstrate behavioral intentions to use technology are highly likely to adopt the technology and incur the necessary costs required to use it. They are also more likely to continue using the system in the future.

### *2.7. For Golf App Users, the Mediating Role of UTAUT Affects the Innovativeness and Behavior Intention of Golf App Users*

The UTAUT model's extended version explains the relationship between consumers' behavioral intentions to use technology and their actual use behaviors. This points to the pivotal mediating role that UTAUT has in determining the adoption of the golf app. According to Nysveen and Pedersen [57], the model shows that users' positive feelings about an application are a useful predictor of their acceptance of the technology and its usage. When users perceive an application as useful in delivering on its promises, then they are likely to adopt and continue using the application in the future. Similarly, the availability of necessary resources and support for use of the application also determine whether users will use the technology [58]. Users are likely to use technology they perceive as easy to use and that has considerable convenience, helping their understanding of technical usage. This is critical for users who manifest highly innovative characteristics. According to prior research [59], the innovativeness of golf app users determines the adoption of a delivery app. The components of UTAUT 2, including price value (PV), habit (HT), hedonic motivation (HM), performance expectancy (PE), effort expectancy (EP), facilitating conditions (FC), and social influence (SI), play a fundamental role in determining the attitude and hence the use of a delivery app. As a mediating variable, UTAUT would influence the app user's attitude towards the system vis-à-vis its intended purpose [60]. The perceived value of the golf app, recommendations from important others, and the availability of relevant resources all influence users' behavioral intentions toward the app. They will equally influence their actual adoption and continued use of the technology in the future [61]. Thus, users who demonstrate a positive attitude towards the golf app are more likely to show positive behavioral intentions to use the system and are more likely to use the technology in their daily lives. In other words, attitude triggers the behavioral intention that influences the actual usage of the system.

All in all, this research consists of seven hypotheses (see Figure 3) via previous research works as follows;

**Proposition 1.** *The innovativeness that golf app users possess has a strong impact on the TAM factors.*

**Proposition 2.** *TAM factors have a strong impact on the behavioral intention of golf app users.*

**Proposition 3.** *The innovativeness that golf app users possess has a strong impact on the UTAUT factors.*

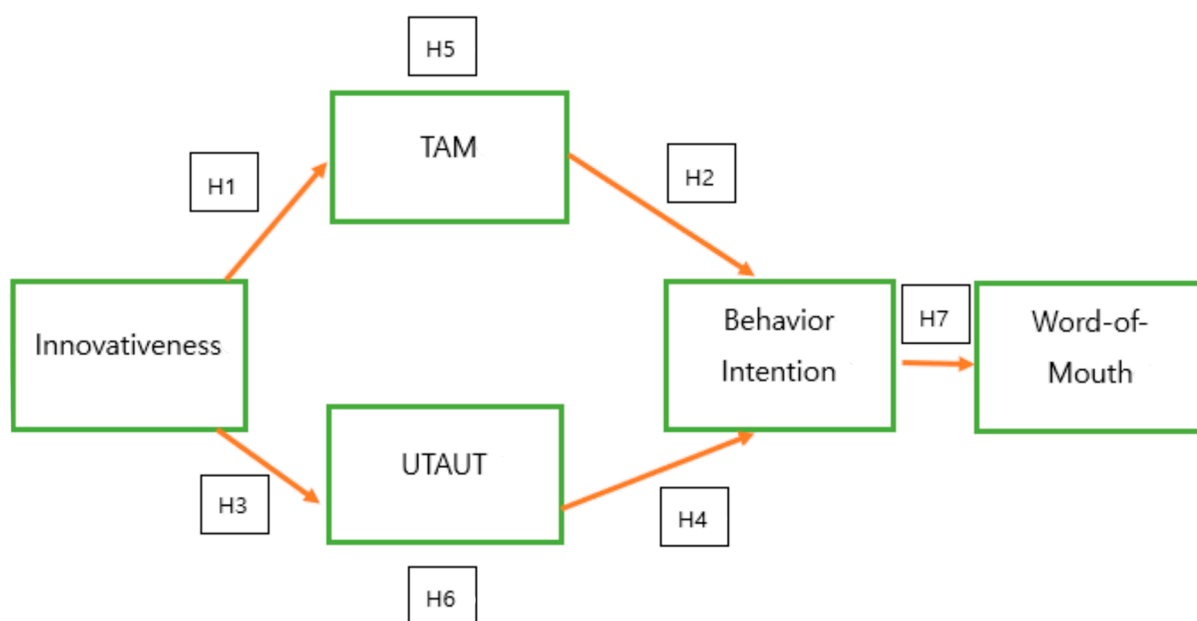
**Proposition 4.** *UTAUT factors have a strong impact on the behavioral intention of golf app users.*



**Proposition 5.** TAM factors will mediate the relationship between the innovativeness that golf app users possess and the behavioral intention of golf app users.

**Proposition 6.** UTAUT factors will mediate the relationship between the innovativeness that golf app users possess and the behavioral intention of golf app users.

**Proposition 7.** The behavioral intention of golf app users is positively connected to word of mouth.



**Figure 3.** Hypotheses of the study.

### 3. Research Design

#### 3.1. Variables

Employing two explanatory variables (innovativeness and behavioral intention), we examine and evaluate a total of seven hypotheses to uncover pathways and their degree of commitment in the golf app context. In total, 29 items were included in the questionnaire to accomplish this objective. The description of questionnaire items numbers is given in Tables 1 and 2 with detailed explanations regarding used items. We developed each survey question predicated on various prior investigations.

**Table 1.** Used Survey Variables.

Factors	Number of Questions	Resources
Innovativeness	5	Ali et al. [62], Sahin [63]; Rogers [64]
TAM	8	Agarwal & Karahanna [65], Venkatesh & Davis [66], Davis [67]
UTAUT	7	Rakhmawati & Rusydi [68], Bozan et al. [69], Zhou et al. [70], Yu [71]
Behavioral Intention	5	Sánchez-Prieto et al. [72],
Word of Mouth	4	Yasir et al. [73], Dost et al. [74]

**Table 2.** Description of Questionnaire Items.

Main Factors	Questionnaire Items
Innovativeness	(1) When a product or service using a new technology is released, I want to try it before others. (2) When I hear about a new technology, I will find a way to try it out myself. (3) I want to be the first to try a product or service that others have never used. (4) I like to use new technology products or services. (5) When a product or service incorporating new technology is released, I tend to use it before others.
TAM	(1) Using the golf app is useful. (2) Using a golf app can increase your sense of achievement. (3) A golf app can help you achieve your goals faster. (4) Using a golf app can increase efficiency for golf. (5) Using the golf app is easy. (6) How to use the golf app is clear. (7) The features of the golf app are easy to understand. (8) I skillfully handle golf apps.
UTAUT	(1) People who influence me think I should use the golf app. (2) The people who are important to me prefer that I use the golf app. (3) I am using an actual golf app at the recommendation of my acquaintances. (4) You have the prior knowledge required to use the golf app. (5) It has the resources needed to use the golf app. (6) The golf app is compatible with any other equipment or technology I use. (7) You can get help from others when using the golf app is difficult.
Behavioral Intention	(1) I intend to use the golf app in the future. (2) I will continue to use the golf app in the future. (3) I plan to use the golf app frequently in the future. (4) I will try to use the golf app in my daily life in the future. (5) I actually like the golf app I have been using it continuously (for a long time).
Word of Mouth	(1) I am willing to write a review for a golf app. (2) I want to recommend the golf app I use to others. (3) I am willing to introduce the golf app I use to others. (4) I want to share information related to the golf app I use through SNS.

### 3.2. Data Analysis and Collection

The statistical tools (AMOS 27 and SPSS 24) were used to gauge the quality of the instrument (reliability, conversion validity, discriminant validity, construct validity) to investigate the linkages between the main instruments. Additionally, we assessed whether the square root of the AVEs has significantly more data than similar constants with other constructs to ascertain the scalability of the research proposal using operational formula simulation. This was carried out to assess the extent of potential underpinning for central themes.

Between 15 March 2022 and 7 April 2022, the research sought to collect more than 300 results, and the questions were submitted electronically. The final number of obtained samples was 479 responses, the final usable sample included 394 responses because 85 participants answered survey questions illogically as follows: (1) some participants did not respond to more than 20 percent of the questions in the survey. (2) Some of the participants answered most survey questions with the same answer. Previous research has advised that before undertaking quantitative analysis, each researcher should first determine if the final sample they have collected has any incomplete information [75]. This is because treating incomplete information correctly can boost the degree of data correctness. Table 3 displays the detailed information of the data obtaining process.

Table 3 provides detailed information about the participants in the present research. The table shows the general characteristics of the study subjects who filled out the questionnaire. To obtain a reliable real dataset and ensure collecting samples by equal age and gender groups, the current authors hired a professional research agency in South Korea. This gave the significant benefits of handling data professionally and managing them accurately. This agency conducted a random sampling method to obtain respon-

dents, which means that they tried to collect all age and gender groups similarly. This method's randomization procedure can ensure that different demographic subdivisions can be allocated evenly. However, we were not able to obtain accurately distributed data according to age groups because we could not find many participants in age groups (50s and 60s), comparing other ages groups (20s, 30s, and 40s). This result probably is because the number of app users in old age groups (50s and 60s) is less than young age groups. There were 220 males and 174 females with a gender percentage of 55.8% (male) and 44.2% (female). Regarding the respondents' age distribution, information can be seen in Table 4. The research company was fully open regarding how the dataset was collected from participants. According to the company, all panels belonging to the company were invited to fill out the survey but were not forced to fill out the questionnaire if they did not accept it.

**Table 3.** Final Usable Participants.

	Total	Percentage (%)
Distributed Surveys	600	100
Collected Surveys	479	79.8
Discarded Surveys	85	14.17
Final Usable Surveys	394	65.67

**Table 4.** Final Sample Information.

	Number of Participants	Percentage (%)
Gender		
Male	220	55.8
Female	174	44.2
Age distribution		
20s	74	18.8
30s	78	19.8
40s	128	32.5
50s	63	16.0
60s	51	12.9

## 4. Results

### 4.1. Descriptive Statistics

Conducting several descriptive measurements such as mean, median, and standard deviation, this study tried to establish a starting point for a quantitative approach (see Table 5). Additionally, to measure the difference between variables of our key factors, we selected a five-point Likert scale which has been widely used in prior statistical analysis. As shown in Table 5, “behavioral intention” was disclosed by the mean and “word of mouth” by standard variance values.

**Table 5.** Result of Descriptive statistics.

Instrument	Mean	Median	Max–Min	STD
Innovativeness	3.69	3.73	4 (5–1)	0.722
TAM	3.72	3.77	4 (5–1)	0.635
UTAUT	3.74	3.81	4 (5–1)	0.683
Behavioral Intention	3.93	4.04	4 (5–1)	0.745
Word of Mouth	3.78	3.84	4 (5–1)	0.763

### 4.2. Reliability Analysis

In this section, statistical results will be presented using the final dataset (total 394 respondents). All tables and figures will provide analyzed mathematical results based

on the SPSS and AMOS statistical tools with detailed explanation of findings. All statistical results will be evaluated by the acceptance rules which have been used in the prior literature for decades. Table 6 points out that all key factors have Cronbach's alpha values greater than 0.6 and that implies that every variable of main instruments can be accepted to be reliable to gauge all seven assumptions of the current study [76].

**Table 6.** Results of Cronbach's Alpha.

Subfactors	Question Number	The Value of Cronbach's $\alpha$
Innovativeness	5	0.717
TAM	8	0.805
UTAUT	7	0.836
Behavioral Intention	5	0.756
Word of Mouth	4	0.739

#### 4.3. Exploratory Factor Analysis (EFA)

For assessing and checking the data volume and repeated format of parameters, exploratory factor analysis was conducted by the present authors, identifying internal consistency. The Kaiser–Meyer–Olkin (KMO) score must be, at minimum, higher than 0.6, according to earlier research, and in the current study the value was 0.831. This means the dataset could be selected for an instrument analytical model as it was within a trustworthy range (between 0 and 0.05). As a result, it was regarded as appropriate.

Utilizing a Varimax research design (orthogonal rotation), the factor extraction by main factors was conducted. Prior studies consistently found that key factors can be taken into consideration if the deviation of the eigenvalue is greater than 1. As anticipated, the requirements were fulfilled by five main factors, each of which had 29 parameters. As a result, the factors for categorizing into 5 categories by applying EFA were defined using the research questionnaire from the current research. The deviation of all parameters was 85.63%, which can be considered an element analysis-acceptable deviation regarding the validity of a structure [77] (see Tables 7 and 8).

**Table 7.** Suitability Test Results between Variables.

Variable	KMO		Bartlett's Test	
	Suitable Value	Received Value	Suitable Value	Received Value
29 variables	More than 0.50 (>0.9 = very good)	0.831	$p$ -value < 0.05	<0.01

**Table 8.** Eigenvalue and Two Kinds of Variances.

Component	Key Instruments	Item Number	Eigenvalues	% of Variance	Cumulative % of Variance
1	Innovativeness	5	8.26	17.02	17.02
2	TAM	8	7.94	16.11	33.13
3	UTAUT	7	9.93	19.34	52.47
4	Behavioral Intention	5	8.06	16.80	69.27
5	Word of Mouth	4	7.42	16.36	85.63

#### 4.4. Confirmatory Factor Analysis

This research included a confirmatory factor analysis (CFA), after completing the EFA investigation, to identify three core approximation elements and check transition correctness. The systemic equation framework was implemented using the CFA methodology, which verifies and validates the AMOS program's link between the quantified and underlying parameters [78]. The component load between the inactive and observed factors can be used to identify changing dependability efforts to analyze how reliably the main notion is assessed. If the elements are not below 0.5, they are reliable.

Prior studies have consistently indicated that CFA investigation could be accepted when all AVE values are greater than 0.5 [79]. In the current research framework, as Table 9 indicates, for all individual variables of key factors it could be confirmed that all inserted values of the average variance extracted are at least 0.7. The internal consistency was given in the previous section (Cronbach's alpha value) and past research has also suggested measuring the value of construct reliability (CR) to double-check the reliability for the research instrument. Prior studies have recommended that the value of CR should be at least 0.7.

**Table 9.** The statistical results of CFA.

Variables	Unstandardized Factor Loadings	Standardized Factor Loadings	S.E.	Critical Ratio	AVE	Construct Reliability
INV1	1.00	0.89			0.815	0.829
INV2	0.85	0.74	0.5	17.43 ***		
INV3	0.79	0.65	0.5	16.36 ***		
INV4	0.82	0.72	0.5	17.71 ***		
INV5	0.73	0.64	0.5	16.99 ***		
TAM1	1.00	0.91			0.831	0.766
TAM2	0.82	0.71	0.5	19.64 ***		
TAM3	0.81	0.70	0.5	19.51 ***		
TAM4	0.86	0.75	0.5	19.95 ***		
TAM5	0.84	0.74	0.5	20.36 ***		
TAM6	0.82	0.72	0.5	21.32 ***		
TAM7	0.75	0.63	0.5	20.16 ***		
TAM8	0.77	0.65	0.5	19.66 ***		
UTAUT1	1.00	0.92			0.868	0.811
UTAUT2	0.83	0.74	0.5	21.54 ***		
UTAUT3	0.88	0.77	0.5	21.63 ***		
UTAUT4	0.81	0.72	0.5	21.15 ***		
UTAUT5	0.92	0.83	0.5	22.25 ***		
UTAUT6	0.94	0.82	0.5	23.11 ***		
UTAUT7	0.89	0.79	0.5	22.76 ***		
BI1	1.00	0.90	0.5	21.45 ***	0.791	0.806
BI2	0.76	0.65	0.5	21.42 ***		
BI3	0.79	0.68	0.5	22.47 ***		
BI4	0.85	0.74	0.5	22.13 ***		
BI5	0.88	0.78	0.5	22.83 ***		
WM1	1.00	0.89	0.5	21.25 ***	0.768	0.799
WM2	0.87	0.77	0.5	22.81 ***		
WM3	0.82	0.73	0.5	22.69 ***		
WM4	0.83	0.74	0.5	23.02 ***		

\*\*\*  $p < 0.001$ .

#### 4.5. Discriminant Validity

Another complex method of evaluating the caliber of the techniques utilized was included in the questionnaire method for the present research. Both transition validity and discriminant validity were tested in the study, and both were supported by measurements of scholastically distinct notions that should not be greatly correlated among themselves [80]. Additionally, much earlier research emphasized the possibility that the findings of a correlation assessment between parameters could produce selective factuality accuracy. After determining the convergent validity, Fornell and Lacker's law [81] was used to determine the discriminant validity. The discriminant validity identifies the potential encompassing values and evaluates how the variables are connected. According to Table 10, comparing the off-sloping components, the square roots of AVEs strongly indicated that those values are acceptable in every case. They, therefore, suggest that the accuracy of the



fundamental classifier has been verified. For measuring the discriminant exactness, our research framework was satisfied to obtain the necessary quality.

**Table 10.** Discriminant Validity Result.

Key Concepts	1	2	3	4	5
Innovativeness	0.879				
TAM	0.729	0.923			
UTAUT	0.695	0.807	0.863		
Behavioral Intention	0.653	0.756	0.783	0.799	
Word of Mouth	0.636	0.725	0.734	0.745	0.892

#### 4.6. Structural Equation Modeling (SEM)

The current research used structural equation modeling (SEM), which is described as a collection of quantitative methodologies utilized to investigate the relationships between observable and underlying factors to measure the connections between primary determinants. In contrast to correlation assessments, SEM can measure the strength of the linear causative relationships between factors. It even quantifies the missteps, implying returns may be predicted and wholly erased, denoting no sampling errors on identified parameters [82]. As a result, SEM can be a more powerful tool for examining interrelations between structures than regression methods [75]. Additionally, the SEM generates a better reasoning framework for bridging research to measure an indirect impact, evaluating intricate and numerous moderating variables in a single study [83].

$$Y = \beta + E1X1 + E2X2 + E3X3 \dots + \epsilon \quad (1)$$

E is the slope parameter, which denotes the relationship between the primary components. The impact of innovativeness on the TAM is shown by E in the conceptual framework for the current investigation. The letter Y denotes the dependent factor (DF), which in this research can be any of the major variables other than innovativeness. X represents the independent factor and it indicates that this may exist as a key factor in the differentiation of behavioral intent. Depending on the number of parameters the interdependent component contains, X in Equation (1) will vary. For example, since UTAUT has seven elements,  $(Y = \beta + E1X1 + E2X2 + E3X3 + E4X4 + E5X5 + E6X6 + E7X7 + \epsilon)$  is the formula of immediate influence for UTAUT on the BI. Equation (1) shows an important aspect of inaccuracy, indicating DF and IF. However, the value of  $\beta$  can be expressed as an interception. After this observation, to solve the normality issue, the current authors investigated fitness based on the SEM of this research.

We employed  $\chi^2$ , root mean square residual (RMR), TLI, goodness of fit index (GFI), CFI, and root mean square error of approximation (RMSEA) to measure the adequacy of the conceptual framework. The conceptual model's compatibility with our principal reasons was assessed using the convergent validity of SEM. Tucker–Lewis index and comparative fit index (CFI) may be utilized to determine progressive compatibility. Moreover, the present authors measured compatibility to check if the assessment parameter, which was 247.39, was greater than the degree of freedom. This measurement could assess a theoretically pertinent degree. We, therefore, accept our  $\chi^2$  and reject the default assumption because  $247.39 > 95$ . Previous research has stated that scores of CFI and TLI should be higher than 0.90 to signify a satisfactory level of reliability of performance, and our findings demonstrated that both the CFI and TLI values of this research are higher than 0.9. Both RMR and RMSEA were also measured for the fitness of our SEM and, fortunately, they were within the acceptance range (see Table 11).

**Table 11.** Main Statistical Findings.

Channel	Unstandardized Coefficients	Standardized Coefficients ( $\beta$ )	S.E.	T
IV to TAM	0.38	0.32	0.07	0.633 ***
TAM to BI	0.44	0.39	0.07	0.625 ***
IV to UTAUT	0.38	0.31	0.07	0.667 ***
UTAUT to BI	0.36	0.32	0.07	0.681 ***
BI to WM	0.41	0.36	0.05	0.622 ***
Fitness Measurement	Recommendation Area		Present Range	
RMR	<0.08		0.031 (Accepted)	
GFI	between 0 and 1		0.828 (Accepted)	
TLI	0.90<		0.949 (Accepted)	
CFI	0.90<		0.964 (Accepted)	
RMSEA	<0.08		0.059 (Accepted)	

$\chi^2 = 247.39$  ( $df = 95, p < 0.001$ ); \*\*\*  $p < 0.001$ .

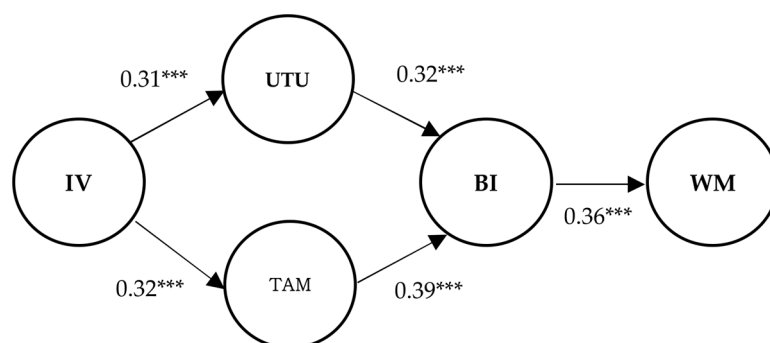
The construction of IV had a substantial favorable (+) (0.32) impact on TAM (H1) and UTAUT (H3) (0.31), according to the study of the route coefficient's final values. A significant association between TAM and the BI (H2) (0.39) as well as between UTAUT and BI (H4) (0.32) was also established. The current authors accepted the first four assumptions based on the results presented in Table 11. Lastly, a strong connection was also found between BI and WM (see Table 11).

Finally, the moderating impact of TAM and UTAUT between IV and BI was then examined to assess our 5th and 6th assumptions. An appropriate linear formalism for indirect impact, according to the prior study [84], was as follows:

$$Y = \beta + E1X1 + E2X2 + E3X3 \dots + KM + e \quad (2)$$

$$M = \beta + R1X1 + R2X2 + R3X3 \dots + KM + e \quad (3)$$

K is the regression (slope) coefficients in Equation (2), implying the relationship between the primary components. B highlights the direct impact of the TAM on BI in the present study paradigm. M acts as a moderating factor when there are several factors. As previously mentioned, the current research evaluated two mediating components (TAM and UTAUT). In the present study paradigm, IV and BI in Equation (2) can be X and Y, respectively (see Figure 4). Equation (3) is, thus, true for the M linear expression.

**Figure 4.** Path Analysis Finding. \*\*\*  $p < 0.001$ .

The bootstrap" strategy predicts the variables by first constructing the dispersion of variables depending on experimental values without considering the dispersion of the populace [75]. Additionally, it creates a measure not grounded on the large-sample concept, allowing for more secure application to smaller datasets [85]. In this instance, 5000 bootstrap samples were utilized, and 0 is not contained in the indirect effect's 95 percent credibility

range. In any case, the moderating impact is a remarkable asset. Tables 12 and 13 below show that (1) 0.18 was the indirect impact of the TAM between the IV and BI and (2) 0.15 was the indirect impact of UTAUT between the IV and BI (see Table 12).

**Table 12.** The Research Framework results of Individual Variables.

Path	Standardized Coefficients ( $\beta$ )	Path	Standardized Coefficients ( $\beta$ )
From IV to IV1	0.62	From BI to BI1	0.63
From IV to IV2	0.74	From BI to BI2	0.67
From IV to IV3	0.69	From BI to BI3	0.59
From IV to IV4	0.81	From BI to BI4	0.71
From IV to IV5	0.72	From BI to BI5	0.61
From TAM to TAM1	0.89	From UTAUT to U1	0.67
From TAM to TAM2	0.82	From UTAUT to U2	0.59
From TAM to TAM3	0.73	From UTAUT to U3	0.70
From TAM to TAM4	0.81	From UTAUT to U4	0.68
From TAM to TAM5	0.90	From UTAUT to U5	0.62
From TAM to TAM6	0.86	From UTAUT to U6	0.68
From TAM to TAM7	0.77	From UTAUT to U7	0.72
From TAM to TAM8	0.71		
From WM to WM1	0.79		
From WM to WM2	0.88		
From WM to WM3	0.85		
From WM to WM4	0.69		

**Table 13.** The Mediating Role of TAM and UTAUT.

Channel	Indirect Outcome	S.E.	95%CI (Bias-Corrected Bootstrap)
IV $\rightarrow$ TAM $\rightarrow$ BI	0.18	0.06	(0.09–0.19)
IV $\rightarrow$ UTAUT $\rightarrow$ BI	0.15	0.06	(0.09–0.19)

Bootstrap Number: 5000.

We looked into the following values to confirm the findings of the moderating impact of the TAM and UTAUT: (1) IV to TAM: 0.32, TAM to BI: 0.39, and (2) IV to UTAUT: 0.38, UTAUT to BI: 0.36 (see Figure 4 and Table 11). Therefore, we could confirm that indirect impacts between IV and BI exist when the TAM and UTAUT carry out their moderating functions. Lastly, the indirect impact data demonstrated that our 5th and 6th assumptions were likewise supported in the manner we anticipated, allowing us to accept them. That confirmed that both the TAM and UTAUT can mediate between the innovation users possess and user's intention to use.

## 5. Discussions

The research question addressed through this empirical study is “In regard to the golf app, how can consumer innovativeness be incorporated in both the TAM and UTAUT factors?” Intending to research this topic more extensively, the authors developed seven distinct hypotheses, all of which posit that consumer innovativeness affects the TAM and UTAUT factors. Furthermore, the hypotheses developed also call for the authors to assess whether the TAM and UTAUT factors affect behavioral intention and consumer innovativeness. That implies that, using both the TAM and UTAUT variables, our research may take a look at the meaningful linkages among the innovation app users possess and behavioral intent.

The present authors have addressed four main ideas and concepts throughout the paper. The first is the TAM theory, which posits that the acceptance of a product is based on the consumer's behavioral intention. The key constructs linked to this theory are perceived ease of use, perceived usefulness, consumer attitudes, and behavioral intention. The second

main idea addressed in this study is UTAUT, a theory that explains how consumers use a product and their subsequent behavior toward it. UTAUT is made up of a total of four contents (1) social influence, (2) performance, (3) effort expectancy, and (4) enabling conditions. Consumer innovativeness is the third key concept in this study, and it refers to people's proclivity to accept and utilize a new product. In this study, the authors sought to understand how external factors, such as the usability of the golf app, contributed to consumer innovativeness. Behavioral intention refers to the degree of sharing and use of a new technology and it is the final key instrument for the current study. All these concepts play a key role in addressing how well the target audience can accept a golf app.

The study findings have significant empirical implications for the existing body of literature. The study has shown that technology users' innovativeness can be incorporated into both the TAM and UTAUT model with complete success. Arguably, the variables of the two models, including effort expectancy (perceived ease of use), perceived usefulness (performance expectancy) of technology, and facilitating conditions, all play a fundamental role in determining the users' behavioral intention and hence their use of technology [86]. When deciding whether to use an innovative application, users must consider these variables. Thus, consumers who are open to innovation are more likely to accept and use technology products [87]. In other words, consumers with higher innovativeness characteristics are likely to manifest less innovation resistance and are hence more likely to accept new technologies.

The practical implications could be applied to the newly emerged technical model, double-checking consumers' acceptance degree based on the statistical results of the present research. Technology consumers are more likely to accept innovative systems that provide practical solutions to the challenges of daily life [88]. Technology consumers are more likely to accept innovative systems that provide practical solutions to the challenges of daily life. This implies that technology must aim to address the pain points that consumers want addressed. Users want innovative applications to help solve these problems. The perceived value of the technology, its ease of use, and the available materials relevant to its operations would determine its acceptance and use. In practice, golf app users should use these empirical findings to help them decide what technology to accept and use in their daily lives. In light of both the TAM and UTAUT model, golf app users should consider the various variables of the application, including its ease of use, its benefits, the available materials supporting its operations, and its contribution to the performance of golf, before accepting and using the technology.

The study also has implications and practical applications in marketing and technology. In marketing, individuals can learn how best to sell technological products to an increasingly technology-dependent audience. Developing insights into how the TAM and UTAUT affect consumer innovativeness and behavioral intention will play a key role in helping marketers improve their effectiveness, especially when handling technological products. Regarding the technological domain, developers can use this study to educate themselves about the aspect they should focus on when designing their products. When the TAM and UTAUT factors influence technology design, there is a greater chance that their products will be accepted by the wider market, leading to increased sales. Therefore, the study findings will be valuable in helping companies and individuals learn how to develop and market their technological products and ensure their absorption into the market.

Although there are numerous research findings which provide useful implications for golf app practitioners, on the other hand, the research has some limitations. The study focused on respondents from a particular centralized location, which might have contributed to skewed data findings. Moreover, data were collected using online survey questionnaires, which, despite being effective for a large pool of individuals, had a risk associated with the absence of human presence to provide clarification to the participants and encourage higher return rates of the survey. The study was also restricted to a specific sport context, providing a wealth of knowledge in that sporting activity. Based on the findings on applying TAM and UTAUT to the innovativeness of golf app users' behavioral

intentions, future studies can be replicated in various sports contexts to ascertain the impacts that the models have in different sports.

Furthermore, this study was limited to the inclusion of situational constraints in the TAM and UTAUT model. Based on the Discussion, the research offered evidence on the use of combined the TAM and UTAUT model, thus providing a comprehensive view of the factors determining consumers' behavioral intention toward technology relative to when a single theory of technological acceptance was applied. However, since the present study was primarily explanatory, the focus was on having an integrated technology acceptance model that can help explain the external factors that can further determine user behavior towards golf apps. Despite the fact that the research has justified its hypotheses, future studies should broaden their scope and capture sport-related factors that can influence consumers' behavioral intention to accept and adopt the use of sports apps such as the golf app as the foundational basis for understanding user behavior.

## 6. Conclusions

This research is an empirical study examining how users' innovativeness can be incorporated into both the TAM and UTAUT in the golf app case study. There is little doubt that both the TAM and UTAUT may influence golf app users positively to acquire recent technology. In the TAM, the perceived usefulness of a new technology is the strongest predictor of its overall acceptance and, hence, adoption. Golf app users will intend to accept the application if the system demonstrates some significant levels of usefulness in terms of improving their performance in golf. People are generally pragmatic in their new technology acceptance decisions; they tend to review the usefulness of any application before deciding to accept and use it [89]. They are more likely to accept and even use an innovative application when they deem it useful in their practice or performance in golf. In addition, if users are eager to have "ease of use", this recognition will affect obtaining new technology.

As previous study [90] observe, when users find technology easy to use and can quickly get around its operations without intense training, then they are more likely to accept the system. However, when the technology presents difficulties in understanding how to use it, users are more likely to develop a negative attitude towards the application, which will negatively affect its acceptance and usage.

On the other hand, in the UTAUT model, effort expectancy and facilitating conditions are the strongest predictors of golf app acceptance and hence use. When people believe that the target technology has significant benefits and can be useful in their practice, they become motivated to accept and use it. According to Asastani et al. [91], an increase in the user's perceived value in terms of practicality in its use, in this case golfing, may contribute to its reinforcement as a useful application, leading to its acceptance. In other words, users' beliefs about the importance of an application help them decide on accepting and using the technology. This emphasizes what Marangunić and Granić [35] state: technological solutions should be designed in a manner that is not only convenient to the user but also manifests their value to them to minimize possible non-acceptance. Similarly, when users perceive the technology as requiring little effort to learn its operations, they are more likely to accept and use it. This is tied to the TAM's ease-of-use variable, which influences users' attitudes towards accepting and using technology. Golf app users would accept and use technology that has a minimal learning curve, which implies it is easy to use [60]. Overall, TAM and UTAUT components determine the consumer's attitude towards accepting and using new technology. Consumers who are open to innovations are more likely to accept emerging technology products and use them with the least resistance.

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