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# The Moderating Role of Personal Innovativeness in Tourists' Intention to Use Web 3.0 Based on Updated Information Systems Success Model

Mohammed Abdo Albaom <sup>1</sup>, Fatimah Sidi <sup>1,\*</sup>, Marzanah A. Jabar <sup>2</sup>, Rusli Abdullah <sup>2</sup>, Iskandar Ishak <sup>1</sup>, Nur Anita Yunikawati <sup>3</sup>, Magistyo Purboyo Priambodo <sup>3</sup>, Mohammed Saleh Nusari <sup>4</sup> and Dhakir Abbas Ali <sup>4</sup>

<sup>1</sup> Department of Computer Science, Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, Serdang 43400, Malaysia

<sup>2</sup> Department of Software Engineering and Information System, Faculty of Computer Science and Information Technology, Universiti Putra Malaysia, Serdang 43400, Malaysia

<sup>3</sup> Faculty of Economic, Universitas Negeri Malang, Malang 65145, Indonesia

<sup>4</sup> Faculty of Business and Management, Lincoln University College, Petaling Jaya 47301, Malaysia

\* Correspondence: fatimah@upm.edu.my



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**Abstract:** Rapid technological development has led to an information explosion in the current Web environment. Recently, tourists have become reliant on the Internet as a tool to obtain information about the places they intend to visit. However, due to the overload of information, tourists face many challenges and difficulties in making the right choice. Despite the promise of Web 3.0's revolutionary solutions to address all of Web 2.0's shortcomings, there is still a significant gap between currently implemented systems and the useful innovation of future technologies in the tourism industry. This study proposes a theoretical model to examine the role of personal innovativeness in tourists' intention to use Web 3.0 based on the DeLone and McLean model. Although many attempts were made in prior work to address this issue, most of those studies focused on the evolution of Web 3.0 from the technical side and did not investigate it from the theoretical perspective in different domains in general and tourism in particular. The method of this study was based on a survey questionnaire with 643 participants. SmartPLS version 3.3.3 was used to analyze the study data. The results of this study reveal that information quality, system quality, service quality, social influence, and personal innovativeness had significant effects on tourists' intention to use Web 3.0, while awareness did not have a significant effect. This study provides further insights, expands our understanding of the study topic, and contributes to this growing research area, and the novel research framework can act as a fundamental theoretical model for future studies in different contexts.

**Keywords:** Web 3.0; information overload; updated DeLone and McLean information systems success model; awareness; social influence; personal innovativeness; tourists

## 1. Introduction

Tourism is one of the world's largest service businesses and is widely believed to be a significant driver of economic growth in the global economy. It contributes to the determination of the foreign currency rate, generates jobs, and benefits both local communities and tourists [1]. Technological development is a significant determinant of historical advancement. A fundamental driver of innovation is information technology, which provides a technological infrastructure and facilitates quality enhancement. As a critical component of the modern tourism sector, service innovation is inevitable. However, there are still numerous flaws in tourism services, which means that innovation has a considerable measure of practical significance [2].

Tourism was an early adopter of ICT and digital development, resulting in an expansion of the value chain and business-to-consumer relationships. The increasing availability

of information has unfortunately resulted in the emergence of an “informative syndrome,” which at times complicates and affects these relationships. While the increasing volume of information potentially boosts tourists’ understanding, it also increases the complexity of choices and makes it more difficult to conduct a systematic search for information [3].

As noted in [4], tourism is a highly information-intensive industry, with tourists increasingly relying on the Internet to acquire timely information. At the same time, tourists are struggling with challenges and difficulties in finding the right information about particular destinations they intend to visit due to the highly dynamic availability of information on the current Web. Moreover, since the Internet is hard to regulate, there is also a large amount of false travel information, which causes confusion. At the moment, there are a variety of resources for tourism on the Web. Tourism management agencies need to pay attention to these resources [5]. In addition, tourists should be able to look for information on activities that they are willing to take part in, and this will take considerable time and effort [6]. Many tourists have a hard time finding and using information because there is so much digital information available on the Web, as well as a wide range of search tasks, different user profiles, and many different types of devices. This has led to an increasing need to use contextual knowledge to improve the effectiveness of search functions [7].

The current Web has a huge amount of dynamic tourism information that is rapidly expanding. In this technological era, more travelers tend to search for travel information online [4]. With the current wave of tourism, travelers rely on information sources to make decisions and choose destinations. The Internet is now regarded the main source of product and service information for tourists. However, the sheer volume of information on the Web has made it difficult for tourists to assimilate information, whether pre- or post-trip. The challenge of travel planning is difficult, time-consuming, and changing. Travel budgets, number of nights planned at a place, food quality, number of tourists, mode of transport, leisure activities, and weather are some of the aspects involved in travel planning. Tourists’ search histories have regularly been used to improve existing models’ predictive capacity [8]. Existing portals for tourism on the Web only show accommodations and tourist facilities in their databases. Furthermore, many portals rely on outdated Web technology that cannot search efficiently for consumers’ requests, and the overload of data overwhelms tourists with information and services, making decision-making difficult [8]. A major problem with such information within the current Web 2.0 is that it is disorganized, chaotic, fragmented, unstructured, unclassified, inaccurate, and unpredictable. Users can update and customize Web pages [9]. Due to users’ so-called freedom of expression and the impossibility of filtering, the legality of content is a challenging issue to manage.

As a whole, Web 2.0 has various flaws and limitations that hinder its use in business, and except in cases of innovation, it cannot fix issues by itself. Only when it is fixed can Web 2.0 become profitable and help society [10]. As stated in [11], “most of the Web 2.0 applications are suffering from several shortcomings when it comes to supporting online environment interactivity, with typical concerns being related to the quality and redundancy of user generated content”. Regardless of anticipated or actual benefits, argumentation technology and other tools designed to make online interaction more organized and “logical” have failed to be widely adopted by businesses and online communities [12]. Time is also a limitation: as connectivity increases, we get increasingly distracted by all the noise [13].

Less information is displayed in Web 2.0 mode. Individuals can modify and personalize Web sites independently. The majority of Web 2.0 businesses lack a defined profit model [14]. According to [15,16], “the safety of the data on Web 2.0 is a major risk and credibility of information on the websites is still questionable”. In addition, traditional Web 2.0 sites rely heavily on keyword-based searches, which are typically time-consuming and inefficient since they require users to distinguish relevant from irrelevant information. Due to the deficiency of safe technology, it is difficult to preserve privacy and copyrights [14,17]. Almost all Web 2.0 application software is flawed, accessibility is limited, and the majority of users derive little genuine advantage from Web 2.0 [15]. Although the number of Internet

users is increasing, few are able to use the Internet to solve issues or obtain immediate benefits [18].

Web 2.0 cannot fix issues by itself, unless innovation is involved [18,19]. Web 3.0 promises to fix most of Web 2.0's flaws, especially in the tourism domain [9]. Despite the advantages Web 3.0 will bring and the claim that it will revolutionize search engines in different domains, including tourism, few researchers have addressed the problem. Most of the previous work focused only on the technical side of the evolution of Web 3.0 and ignored the factors influencing the intention to use it by consumers in general and tourists in particular. In order to determine the factors to study its effect on tourist intention to use Web 3.0, researchers have proposed and developed a theoretical model based on DeLone and McLean's updated model, extended with unique variables using personal innovativeness as a moderator. Moreover, many existing studies in the broader literature have examined personal innovativeness and employed it as a moderator using the technology acceptance model in the current information systems literature (e.g., [20]). However, studies were limited to investigating the role of personal innovativeness using the updated DMISM. Not only that, but as far as we know, no previous research investigated the role of personal innovativeness when examining factors influencing tourists' intention to use Web 3.0 based on DeLone and McLean's updated model.

In the final analysis, a primary research question is presented as a result of the previous discussion: What is the role of personal innovativeness in tourists' intention to use Web 3.0?

This paper makes a number of significant contributions to the literature in different aspects, as follows:

First, the proposed model used in this study, based on DeLone and McLean's updated model, was developed and extended with different variables to examine the factors influencing tourists' intention to use Web 3.0. According to the best knowledge of the researchers, this is the first single study to use DeLone and McLean's updated model to examine the research topic. Second, the proposed model was extended and developed using personal innovativeness as a moderator, which represents the originality and novelty of this study and enabled the researchers to identify not only the direct relationships but also the direct effects. Third, this study makes a significant contribution by filling in the gap in the tourism information system literature, since most of the previous work discussed the adoption of Web 3.0 in e-learning and other contexts. Fourth, in terms of the methodology, this study is based on a quantitative method and a survey questionnaire, and is the first study to use the quantitative approach to address the problem and test the research hypotheses. Finally, in this study we attempted to come up with an academic definition of the term "Web 3.0" in the tourism domain. In addition, this study presents a systematic comparison between Web 2.0 and Web 3.0, as shown in Table A1 in Appendix A. By explaining its main features, applications, advantages, and limitations, we can strengthen our understanding of the current Web and the Web of tomorrow, which has not been sufficiently investigated in the literature. In addition, the current study presents the benefits of applying Web 3.0 technology in the tourism domain with the aim of filling in the gap in the literature, since these shortcomings are rarely addressed.

The remainder of this paper is divided into the following sections: Section 2 defines Web 3.0, describes the benefits of applying Web 3.0 technology in tourism, and presents related work, hypotheses, and a brief description of the study model. Section 3 discusses the research methodology. Section 4 presents the analysis of the findings. Section 5 presents a discussion of the results, research practices and implications, limitations, and future research. Section 6 ends with the conclusion.

## 2. Literature Review

### 2.1. Web 3.0

Web 3.0 is the next generation and an extension of Web 2.0 [9]. As Web 3.0 is still in the early stages of development, its definition varies. In the literature, the definition is the source of a huge argument and continuous debate among scholars and experts. According

to several scholars, it is a synonym for the Semantic Web. Others consider it the intelligent Web or the “Web of tomorrow.” Others believe it refers to innovative ways of interacting with the Web and machines [10]. The authors of [21] state that “Web 3.0 technologies require a clear definition, as at best the definitions known for Web 3.0 are randomized, because limited studies have been conducted on Web 3.0.”

Web 3.0 is a redefined online application platform that incorporates user-generated content to create new context. It entails organizing vast amounts of available data while taking into account the context and needs of each user. It addresses the information overload caused by duplication, spam, remixing, and repurposing. It enables collaboration and interaction between machines and humans, and allows the machines to read, review, generate, retrieve, suggest and modify information automatically. Despite the current debate around the concept of Web 3.0 in the literature, the authors of [9] introduce a more comprehensive and inclusive academic definition: “Web 3.0 is the new innovative and revolutionary technological tool that analyses, integrates, and links data, which will help individuals as well as organizations to systematize the chaos of unorganized, interconnected, unfiltered, unarchived, unconnected, unclassified information using some different intelligent technological tools to provide meaningful information, which will lead to changing the future of the current web.”

This study defines Web 3.0 in terms of its ability to enable the current Web to respond to and meet the requirements of tourists and machines in a dynamic, interactive manner and to leverage service technologies. These services include the Semantic Web, which operates as a network for language processing search, information retrieval, machine learning, recommendation agents, and artificial intelligence technologies. Web 3.0 will leverage combined technology to incorporate tourists’ comments and then format the information to be more readable and searchable. At the core of Web 3.0 is the priority placed on actively interacting, experiencing life, and reflecting the involvement of users. Web 3.0 was designed to address the shortcomings of Web 2.0. Web 2.0 addresses the issue of individual independence, while Web 3.0 addresses the social mechanism of information, or maximum information consolidation. For instance, the user’s information can be automatically combined on the Internet based on their preferences. This is equivalent to a virtual platform: each person’s Internet Explorer home page is totally customized to their preferences for information and their behavioral patterns, demonstrating a high level of personalization. Continuing the humanistic notion from Web 2.0, there will be civilian specialists covering every business topic in the Web 3.0 environment [22].

## *2.2. Benefits of Applying Web 3.0 Technology in Tourism*

Web 3.0, a revolutionary innovative technological platform based on the Semantic Web, will enable information systems in the tourism industry to quickly access Web data, extract specific information, alter it, and store it for later use in business or decision-making. Web 3.0 has the capacity to comprehend, absorb, and retain knowledge as well as adapt rapidly and effectively to new situations. There are two aspects of intelligence that distinguish Web 3.0 applications from those that are not: the capacity to detect the environment and the ability to learn from past actions in order to optimize performance toward reaching certain goals [23].

The ontologies of Web 3.0 provide the framework necessary to manage diverse resource representations of tourist locations. Using a common representation and semantics, the domain model ontologies may be seen as a single structure that provides destination-related information [24]. The adaptability of an intelligent Web based on semantics extends to many user requirements: transit information, restaurants, accommodations, services, weather, events, itineraries, shopping, nightlife, day excursions, vehicle rentals, sports activities, etc. Semantic information must be added to the components of the tourist destination as a precondition. Applying Web 3.0 based on semantics enables customers and travel agents to create, maintain, and amend itineraries. In addition, it enables the consumer to provide a set of holiday preferences and request information to locate components such as

airline tickets, rental cars, and entertainment activities in real time, as it offers complete integration, adaptability, specialization, and customization, integrating management and marketing of a wide range of tourism products and services [25]. In terms of privacy, Web 3.0 supports personalization and customization, which can be done through exact targeting, specialization, specified location, browsing behavior, preferences, targeted data, analytics, and the input data of tourists semantically, providing users with the freedom to have full control of their information [23].

Through direct online marketing, tourist products and services can be targeted to the specific requirements of consumers based on the search engine optimization that is supported by Web 3.0 technologies. In addition, Web 3.0 will enable tourism sites to compete successfully by marketing themselves in the global online environment. Tourism organizations will become smarter by adopting Web 3.0, as it can improve the presentation of destinations, boost their image in three dimensions, and is designed virtually. This will encourage direct reservations with the tourism organizations and attract more tourists. In addition, targeting of market segments will be more effective and precise. As a result, Web 3.0 will bring a new era of tourism and enable the industry to provide tourists with high service standards and maintain a competitive advantage [9]. E-tourism websites can benefit greatly by applying artificial intelligence. Utilizing Web 3.0 features such as Semantic Web technologies can enhance interoperability in the tourism industry. Semantic Web technologies in ecotourism can enhance already accessible (online) solutions that do not utilize such an approach. In the same way, the Semantic Web can make it easier to find vacation packages and lessen the amount of work needed to keep existing e-tourism systems running [26]. The process produces semantically enhanced, structured, and hence machine-readable data with simple integration of tourism information from several apps. Personalization of websites allows material to be tailored to the user's profile. Tourism websites keep the majority of data related to vacation packages internally, thus only the use of intelligent Web services would facilitate their retrieval and representation in a machine-readable format [27].

Standardizing the manner in which various tourism services portray data would accelerate their integration. This would streamline the search for tourism bargains. Integrating geographical data would also reduce the workload of tourism agents responsible for feeding the system and maintaining data accuracy. If the data were consolidated into a repository accessible to travel brokers, maintenance efforts would be considerably reduced [28].

### 2.3. Development of Hypotheses

#### 2.3.1. Information Quality and Tourists' Intention

Information quality is defined in [29] as "the desirable characteristics of information as the output of an IS. It includes measures such as information accuracy, completeness, consistency, precision, or relevance". In this study, the quality of information was measured in eight dimensions (accuracy, timeliness, completeness, relevance, classification, reliability, usefulness, and understandability), which were adopted from previous studies (see Table A2 in Appendix A). Many studies have examined the relationship between information quality and the intention to use technological tools in different contexts, including e-commerce, e-learning, and health, as well as travel and tourism. For instance, studies found a positive relationship between information quality and intention to use [30,31]. For this reason, this study proposes the following hypothesis:

**Hypothesis 1 (H1).** *There is a significant effect of information quality on tourists' intention to use Web 3.0 in Malaysia.*

#### 2.3.2. System Quality and Tourists' Intention

System quality was defined in [29] as "the degree to which system users believe that a system is easy to use, user-friendly, easy to learn, easy to connect, and enjoyable to use".



Another study [32] noted that “system quality is a desirable characteristic of an IS and includes ease of use, system flexibility, system reliability, and ease of learning, as well as intuitiveness, sophistication, flexibility, and response time.” In this study, the system quality of Web 3.0 is defined based on measuring its dimensions. Few studies have examined tourism websites as information systems. From an information systems perspective, the key to the success of tourism websites is consumers’ continued use. However, with the rapid development of the Internet, blogs, virtual communities, and consumer review forums, continued use of tourism websites is no longer the sole determinant of success. The authors of [33] emphasized that “in tourism, the destination website is to be the IS in that it provides destination information and pictorial images through the Internet where potential tourists, by using the website, form a destination image in their mind prior to their travel, which corresponds to the pre-travel expectation as destination website quality has an effect on the confirmation; thus, we can hypothesize that the higher the quality of the destination website, the higher the performance of the destination website”. Many scholars have investigated the role of system quality as a factor influencing consumers’ intention; for instance in [34–36], the authors found that system quality had a positive significant effect on use intention. Therefore, based on the above discussion, the following hypothesis is made:

**Hypothesis 2 (H2).** *There is a significant effect of system quality on tourists’ intention to use Web 3.0 in Malaysia.*

### 2.3.3. Service Quality and Tourists’ Intention

The travel and tourism sectors have increasingly incorporated information systems to save costs, meet regulatory requirements, improve operational efficiency, and, most significantly, enhance customer experience and service quality [35]. In the era of smart tourism, services that deliver tourism information via smartphones are critical in promoting destinations and improving customer service. Tourists acquire information most commonly from travel booking websites, followed by stakeholder websites, online platforms, and destination promotion portals. As a result of adopting new technological tools, service providers play a critical role in enhancing the quality of services and facilities for tourists [37].

As defined in [32], service quality “represents the quality of the support the users receive from the IS department and IT support personnel in using the IS, such as training, a hotline, or a helpdesk”. This study used 11 items adopted from the past studies (see Table A2) to measure service quality and its influence on tourists’ intention to use Web 3.0. In this context, although many studies have investigated service quality in terms of consumers’ use intention in different domains, there is very limited work in the tourism domain in general and on tourists’ intention to use Web 3.0 specifically.

Therefore, based on the above justifications, we propose the following hypothesis:

**Hypothesis 3 (H3).** *There is a significant effect of service quality on tourists’ intention to use Web 3.0 in Malaysia.*

### 2.3.4. Awareness and Tourists’ Intention

Studying and having a conceptual understanding of awareness is always critical, since it affects the organization’s intention to adopt new technologies that can help it remain competitive in the marketplace [38]. The adoption and use of information technology applications is critical for exploring the influences involved in integrating information technology resources for individuals and organizations. Apart from being incorporated into information system theory, the application of information technology is also incorporated into the IS success model. This model serves two basic purposes: on one hand, it establishes a categorization of performance indicators, and on the other hand, it demonstrates that success measures are not mutually exclusive, with some being necessary for the attainment

of others. The IS success model is centered on the use of IT items. Measures of service, systems, and information quality all have an effect on intention to use [39].

As noted in [40], “technology is also one of the factors that will make people more aware of something that is offered by a company or organization, due to the technology revolution in this era, consumer awareness will be created, because from technology, all the work or tasks can be done much more easily and more quickly”. Customers’ knowledge or lack of knowledge about the product or customer experience is a focus of the “awareness” idea [40]. With regard to defining the concept, it was mentioned that “the concept of awareness attempts to explore how customers establish knowledge of the products or services and to what extent they are lacking information about it”. In [41], the authors define user awareness as the “user’s knowledge about the capabilities of a technology, its features, potential use, cost, and benefits”. Current studies on information systems fail to address user awareness as an important factor affecting the intention to use a particular technology, as scholars have ignored the critical role of user awareness in technology adoption. Moreover, in the tourism domain, as far as we know, no previous research has investigated awareness as an independent factor affecting the intention to use technology applications in general and Web 3.0 in particular. Aiming to fill the existing gap in the literature, the following hypothesis was developed:

**Hypothesis 4 (H4).** *There is a significant effect of user awareness on tourists’ intention to use Web 3.0 in Malaysia.*

#### 2.3.5. Social Influence and Tourists’ Intention

Although many studies on information systems have developed and validated the updated DeLone and McLean IS success model, the model has been subject to much criticism by scholars. For instance, the authors of [36] note that the updated DeLone and McLean IS success model “was designed and developed with its primary focus only on the system functions and features and ignored the characteristics of users who would use or have the intention to use such system”. The authors of [42] note that “future research should focus more on examining how users perceive various technological platforms in different contexts by using various D&M model modifications and incorporate social factors that explain users’ perceptions”. The concept of social influence has been defined as “the extent to which an individual perceives those important others believe he or she should apply the new system”. Many studies in the field of tourism have examined the relationship between social influence and intention and how it affects consumers’ intentions to use new technology (e.g., [43]). Therefore, aiming to fill the research gap by incorporating the social influence factor to extend and develop the updated DeLone and McLean IS success model, we propose the following hypothesis:

**Hypothesis 5 (H5).** *There is a significant effect of social influence on tourists’ intention to use Web 3.0 in Malaysia.*

#### 2.3.6. Personal Innovativeness and Tourists’ Intention

People are thought to be naturally influenced when it comes to innovative products and services. The term “personal innovativeness” refers to how each person reacts to new ideas and new ways of doing things, no matter what other individuals have done in the past. Personal innovativeness has been used in the literature to explain why people start using new products or IT techniques [44]. Rogers’s theory of innovation diffusion says that people’s individual characteristics can affect how they make decisions to do tasks [41]. On the Internet, people cannot be sure that the products or services they buy are useful, so they have to change directions compared to when they buy things in person. Personal innovativeness has been examined in the context of e-tourism as a concept of risk-taking tendency, because people who do things such as go online have to take a risk and be uncertain; for instance, they like the services that tourism portals offer more than

other people [45]. People are said to be innovative when they are the first to use a new thing. Researchers have said that it is important to distinguish between global and domain-specific innovativeness, because global innovativeness does not work well when it comes to specific innovation adoption decisions.

The authors of [45] stated that customers who are more innovative are more likely to change the places they book on tourism websites because they are more likely to try new things. However, other authors [46] have argued that individual variables should be included as boundary requirements in order to comprehend IT use. Personal factors as moderators can assist in clarifying contradictory results in the literature, increasing the explanatory power of the research model, and providing a more comprehensive understanding of the phenomenon under study. In general, addressing personal factors as moderators enables researchers to investigate significant subgroup variations among users and enables professionals to conduct post-acceptance interventions [47]. This is because personal characteristics influence consumer behaviors, such as accepting new products, and innovativeness indicates openness to new experiences and stimulation. Personal innovativeness has also been defined as “the willingness of an individual to try out any new information technology” [48,49]. Other studies reported that personal innovativeness acted as a moderating factor [50].

Many studies in the broader literature have examined personal innovativeness and employed it as moderator using technology acceptance models, such as studies on information systems [20]. However, those studies were limited to investigating the role of personal innovativeness using the updated DMISM. In addition, as far as we know, no previous research investigated the role of personal innovativeness as a factor influencing tourists’ intention to use Web 3.0 based on the updated DeLone and McLean IS success model. Based on the above discussion, we propose the following sub-hypotheses:

**Hypothesis 6a (H6a).** *Personal innovativeness moderates the effect of the relationship between information quality and tourists’ intention to use Web 3.0 in Malaysia.*

**Hypothesis 6b (H6b).** *Personal innovativeness moderates the effect of the relationship between system quality and tourists’ intention to use Web 3.0 in Malaysia.*

**Hypothesis 6c (H6c).** *Personal innovativeness moderates the effect of the relationship between service quality and tourists’ intention to use Web 3.0 in Malaysia.*

**Hypothesis 6d (H6d).** *Personal innovativeness moderates the effect of the relationship between awareness and tourists’ intention to use Web 3.0 in Malaysia.*

**Hypothesis 6e (H6e).** *Personal innovativeness moderates the effect of the relationship between social influence and tourists’ intention to use Web 3.0 in Malaysia.*

Referring to Table 1 of the previous studies, this study makes a significant contribution to the domain of e-tourism in the era of the third generation of the world wide web. Firstly, this study has introduced an inclusive academic definition of Web 3.0 since the argument and exchanging different opinions between scholars to come up with a unified definition still continue. Secondly, due to the limited prior works in the literature, this study has presented and identified the potential opportunities emerging from Web 3.0 in the tourism domain. In the theoretical ground, this study has proposed a new theoretical model based on Delone and Mclean’s updated model. Additionally, this proposed theoretical model was extended and developed with unique variables to represent the novelty and originality of this study, with the aim of filling the existing gap in the literature. Moreover, this study not only used the latent variables to extend the theoretical model for the purpose of identifying the direct effect on the intention to use, but also, used a moderator to identify the indirect effect, which will help to provide a better and more comprehensive understanding of this research issue, as well as expand our knowledge and strengthen our contribution to



this emerging and growing area of research. Furthermore, this study makes a significant contribution from the analysis perspective since it is the first study the used the SmartPLS to analyze the study data with the purpose to identify the relationships of the study's independent variables on intention to use Web 3.0. Also, the level of awareness has not been investigated in the literature to find its effect on tourist's intention to use Web 3.0 as the result of this study in terms of awareness will enrich the literature in this context of study.

**Table 1.** Related studies that applied updated DeLone and McLean IS success model in tourism domain.

Reference	Purpose	Theory/Model/Framework	Findings
[51]	"to examine essential characteristics of virtual reality (VR) that influence individual visit intention toward touristic products".	DMISM	"VR, as a marketing medium, creates positive impacts and stimulates individuals' intention to visit destinations".
[52]	"to determine innovative technologies being deployed to lessen pandemic's impact on hotel industry in China".	DMISM	"Live-stream promotion and conferences can enhance information quality, while 5G technology and Wi-Fi 6 can enhance system quality, with innovative technological tools such as robots, artificial intelligence, and facial recognition used to help provide better service".
[53]	"to examine mediating role of management-, provider-, and system-based trust in relationship between tourism IS system, information, and service quality with employee satisfaction and intention to use and actually use system".	DMISM	"trust directly affects intention to use, actual use, and user satisfaction, and completely mediates the effect of IS qualities on these factors".
[54]	"to investigate influence of perceived security, perceived privacy, and satisfaction on users' intention to continue using Facebook".	DMISM	"perceived privacy and satisfaction have significant impacts on Facebook continuance intention".
[2]	"to propose a model for formation of relationship quality (customer satisfaction and trust), information system quality, perceived value, and customers' intention to continue in e-tourism environment".	DMISM	"customer satisfaction has a positive effect on continuance intention, and information system quality has a positive relationship with customer satisfaction, trust, and customer continuance intention".
[55]	"to explore how communication elements of social networking sites (SNSs), as part of STTs, enhance tourists' motivation and usage intention".	DMISM	"Internet self-efficacy, information quality, and systems quality trigger information-seeking motivation while service quality and source credibility positively determine relationship maintenance motivation".

#### 2.4. Research Framework

Many studies have investigated the factors that affect users' intention to use particular new technologies, whether at the organizational or individual level, which can be predicted using a variety of theoretical models in information system literature. The DeLone and McLean model is a well-known, internationally recognized model that is extensively adopted and commonly applied in many study contexts of studies. According to DeLone and McLean, the goal of the model is to discover and explain the relationships among

the most significant characteristics of IS success in an organization. The DeLone and McLean Model of Information Systems Success (DMISM) [56] and its later version have been tested and validated in many domains, including tourism [57]. However, the DMISM has difficulty determining the predictor variables for intention to use [36]. Furthermore, because behavioral intention to use is derived from psychology, whereas information and system quality are developed from communication theory, there will be internal consistency. A replacement variable for intention can be found in other areas that have a significant theoretical grounding in addressing behavioral intention.

This field is also known as technological acceptance or diffusion research [58]. Furthermore, a thorough understanding of IS success can be achieved by defining and demonstrating the relationships among the essential dimensions of success by which information systems are usually evaluated. The information systems success model is widely regarded as one of the most influential theories in the research on information systems. It helps us to comprehend the adoption of new technology at an individual level. In this study the use of the model can also help provide clear guidance and comprehensive understanding for tourism organizations as well as tourists.

One of the Web 3.0 technology applications is the Semantic Web, which can understand words and their meanings, and link and integrate data to provide the most relevant information by classifying it, organizing it, and making it more useful. The revised DeLone and McLean IS model has not been studied to find the elements influencing tourists' intention to use Web 3.0. Thus, the updated model is widely accepted as a paradigm for technology adoption and information system success. In the final analysis, after gaining the trust and recognition of multiple scholars, the DMISM has been confirmed, tested, and validated thousands of times in well-recognized scientific articles, and is one of the most widely used models in recent research in this area. Therefore, this model has been extended and developed with different variables, namely awareness, social influence, and personal innovativeness as a moderator, in order to empirically examine and test the research hypotheses, as depicted in Figure 1.

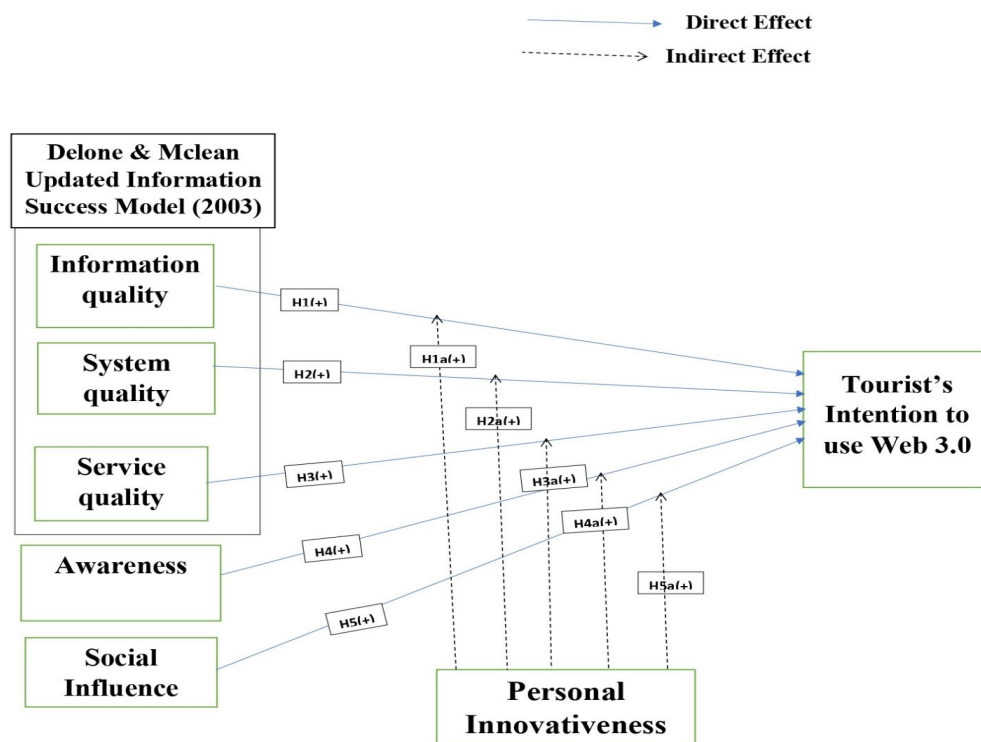


Figure 1. Research model.

### 3. Methods

This study is based on the updated DeLone and McLean Information Systems Model. The proposed model was extended to include user awareness, social influence, and personal innovativeness as moderators. The constructs used to extend the proposed model are focused on the characteristics of tourists, who are considered as users on the third generation of the Web, while the constructs of the updated DeLone and McLean model are focused on system features and functions only, and do not include the social factors that can affect users' intention to use new technology applications.

#### 3.1. Data Collection

The data in this study were gathered to test the research hypotheses. We used a questionnaire survey method, and the questionnaire was first distributed among 50 participants. This was considered as a pilot study to get feedback for the research framework before conducting the formal study, in which the questionnaire was distributed among 800 participants. The questionnaire was distributed through Google Docs, email, and WhatsApp groups. A total of 687 questionnaires were returned, for a response rate of 85.88%. After the final data were revised and screened, 17 responses were removed due to missing data and suspicious responses, and 27 questionnaires were removed due to outlier responses. Therefore, the overall number of participants was 643. This study was based on simple random sampling. According to authors [59,60], indicated that "simple random sampling enables researchers to make accurate assumptions or generalizations from the sample to the population under investigation". In this study, the target population was students at public and private universities in Malaysia.

The reason for choosing university students was that they are more up to date with new technology. The authors of [45,61] note that "the younger generation intend to use the latest technology devices compared to the older generation". In another study [62], the authors note that "student should be respondents' tourism related researches because they could be categorized as either foreign or domestic tourists that have visited various tourist centers in a bid to learn more about the culture and beauty of the host country with this strong argument in support of the reasons is that students at their study destination spend some time at a tourist destination without going back home during a long vacation as the unique among what students do is travelling to tourist destinations during long vacations, both outside and within the host country". Further, "the major implication in his study is that it has availed tourist researchers the opportunities to use foreign students as potential respondents in inbound tourist research" [62]. In addition, several studies considered international students as tourists and selected them to participate in their tourism research [63–74].

This study also examined the number of times international students traveled to ensure that the selected participants had the same tourism patterns, as the results of their profiles indicated that all of them traveled using the Internet and the number of trips was high, as depicted in Table 2.

#### 3.2. Measures

The measurement items were developed by conducting a review of previous research on the application of DeLone and McLean's updated model. The factors that were selected to develop and extend the DMISM were user awareness, social influence, and personal innovativeness as moderator to investigate their influence on tourists' intention to use Web 3.0. One construct was excluded from the original DMISM, user satisfaction, in order to achieve the objective of this study. All items were measured on a 5-point Likert scale, ranging from "strongly disagree" to "strongly agree". The construct definitions and item measurements are shown in Table A2.

**Table 2.** Respondents' profile ( $n = 643$ ).

Demographic Categories	Frequency ( $n = 643$ )	Percentage (%)
Gender		
Female	165	26%
Male	478	74%
Age		
20–24 years	385	60%
25–29 years	194	30%
30–40 years	61	10%
41–50 years	3	1%
Marital Status		
Single	568	88%
Married	75	12%
Education Level		
Bachelor	475	74%
Master	100	16%
PhD	68	11%
University Name		
University of Malaya (UM)	46	7%
University Putra Malaysia (UPM)	232	36%
University Teknologi Malaysia (UTM)	35	5%
International Islamic University Malaysia (IIUM)	35	5%
Limkokwing University (LUCT)	139	22%
SEGi University, Malaysia (SEGi)	89	14%
Asia Pacific University of Technology & Innovation (APU)	49	8%
Taylor's University	18	3%
Times Traveling Using Internet		
1–2 times	322	50%
3–4 times	246	38%
4–5 times	59	9%
More than 5 times	16	3%

#### 4. Analysis and Results

##### 4.1. Frequency Distribution of Respondents' Profiles

In order to describe the sample characteristics, a number of variables were utilized. The demographics of the respondents included gender, age, marital status, education level, university name, travel using the Internet, and rate of travel (Table 2). As shown in Table 2, the final profile demonstrates that among the respondents, 478 (74%) were men and 165 (26%) were women. Regarding their age, 385 (60%) were 20 to 24 years old, 194 (30%) were 25 to 29 years old, 61 (10%) were 30 to 40 years old, and 3 (3%) were 41 to 50 years old. Marital status results show that 568 (88%) were single and 75 (12%) were married. The level of educational of respondents was divided into three groups, bachelor, master, and PhD. Table 2 shows that most of the respondents (475, 74%) had a bachelor's degree, 100 (16%) had a master's degree, and 68 (11%) had a PhD. The results show that among the respondents, 46 (7%) were from the University of Malaya (UM), 232 (36%) were from University Putra Malaysia (UPM), 35 (5%) were from University Teknologi Malaysia (UTM), 35 (5%) were from International Islamic University Malaysia (IIUM), 139 (22%) were from Limkokwing University (LUCT), 89 (14%) were from SEGi University Malaysia (SEGi), 49 (8%) were from Asia Pacific University of Technology and Innovation (APU), and 18 (3%) were from Taylor's University. Regarding the number of times traveling using the Internet, 322 of respondents (50%) used the Internet one or two times when traveling, 246 (38%) used it three to four times, 59 (9%) used it four to five, and 16 (3%) used it more than five times.

#### 4.2. Empirical Results

PLS path modelling was used, which is a frequently used tool in academic research [47,75]. SEM was used to determine whether the results of the survey adequately fit the research model and empirically test the research hypotheses.

#### 4.3. Item Reliability (Factor Loading Test)

Factor loading calculations can be used to determine the reliability of specific indicators/items. As PLS-SEM factor loading estimates are standardized, the squared factor loading estimate accurately represents expected indicator reliability. Factor loadings greater than 0.708 are generally regarded as acceptable, indicating that the associated item explains more than half the variance in a single indicator. Additionally, it is worthwhile to investigate the utility of factor-loading estimations in this scenario. Table 3 summarizes the study's factor loading predictions. At first, one item, INFQ 08, did not meet the low cut-off; thus, it was removed, and the analysis was redone. After eliminating one item, the findings indicate that the reliability of the individual indicator/item was sufficient and acceptable.

**Table 3.** Factor loadings (individual item reliability).

Variable Name	Item Label	Factor Loading
Information Quality	INFQ_01	0.858
	INFQ_02	0.891
	INFQ_03	0.794
	INFQ_04	0.835
	INFQ_05	0.869
	INFQ_06	0.834
	INFQ_07	0.865
	INFQ_08	Item deleted due to low loading
System Quality	SYSQ_01	0.906
	SYSQ_02	0.916
	SYSQ_03	0.899
	SYSQ_04	0.896
Service Quality	SERQ_01	0.851
	SERQ_02	0.772
	SERQ_03	0.737
	SERQ_04	0.802
	SERQ_05	0.800
	SERQ_06	0.624
	SERQ_07	0.847
	SERQ_08	0.826
	SERQ_09	0.565
	SERQ_10	0.823
	SERQ_11	0.875
User Awareness	AW_01	0.785
	AW_02	0.716
	AW_03	0.737
	AW_04	0.852
	AW_05	0.848
	AW_06	0.721
	AW_07	0.600
Social Influence	SI_01	0.835
	SI_02	0.935
	SI_03	0.865
	SI_04	0.903
	SI_05	0.904



**Table 3.** *Cont.*

Variable Name	Item Label	Factor Loading
Tourists' Intention to Use Web 3.0	TIN_01	0.886
	TIN_02	0.902
	TIN_03	0.856
	TIN_04	0.878
	TIN_05	0.922
Personal Innovativeness	PIIT_01	0.969
	PIIT_02	0.923
	PIIT_03	0.786
	PIIT_04	0.945

The second phase is to assess the reliability of internal consistency, which is frequently accomplished using the composite reliability approach. Increased values imply a higher degree of reliability. Author [76], suggested a cut-off value of 0.7 or more for internal consistency reliability when evaluating composite reliability coefficients. Cronbach's alpha is a similar threshold-based reliability measurement. While Cronbach's alpha is conservative and composite reliability is liberal, the genuine reliability of a concept is some-times defined as the value between these two extremes, as determined by the rho A test. Cronbach's Alpha, rho A, and Composite Reliability values in Table 4 suggest that the measures have enough internal consistency and reliability. The third stage of the reflective measurement model assessment is to determine the convergent validity of each concept measure. Convergent validity refers to the extent to which a construct converges to explain the variance of its components. The criterion for convergent validity is the average variance extracted (AVE) for all items for each topic. AVE represents the extent to which the latent variable can explain the variance in the indicators. The AVE is calculated by squaring each indicator's loading on a construct and calculating the mean value. A score of 0.50 or greater implies that the concept accounts for at least 50% of the variation between its components. However, the AVE should be at least 0.50 or above to establish a construct's convergent validity. According to the AVE values in Table 4, all values are greater than 0.5 (between 0.571 and 0.825), indicating that this study does not have an issue with convergent validity.

**Table 4.** Internal consistency reliability (Cronbach's alpha, rho\_A, composite reliability, and convergent validity (average variance extracted (AVE))).

Variable	Cronbach's Alpha	rho_A	Composite Reliability	Average Variance Extracted (AVE)
Information Quality	0.936	0.938	0.948	0.722
System Quality	0.926	0.940	0.947	0.818
Service Quality	0.934	0.942	0.944	0.609
User Awareness	0.876	0.915	0.902	0.571
Social Influence	0.934	0.950	0.950	0.791
Personal Innovativeness	0.928	0.948	0.950	0.825
Tourists' Intention to Use Web 3.0	0.934	0.936	0.950	0.791

Fornell-Larcker criterion: the Fornell-Larcker criterion was also used to evaluate discriminant validity. To measure discriminant validity, a construct must share more variance with its underlying variables than any other construct in the study model, according to the Fornell-Larcker criterion. In statistical terms, the square root of each construct's Average Variance Extracted (AVE) should be higher than its association with other constructs in the study model. The Fornell-Larcker matrix's diagonal elements (i.e., square root of AVEs) should be higher than the off-diagonal values in the corresponding rows and columns.

There is a lack of discriminant validity when off-diagonal values are higher than diagonal values (i.e., square root of AVEs). In addition, Fornell and Larcker recommended AVE with a value of 0.5 or above use as a rule of thumb. Referring to Table 5 the discriminant validity matrix shows there is no correlation between any two latent variables of the study. Since none of the correlations was greater than or even equal to the square root of underlying constructs' AVEs. As a result, it has been inferred that all of the measures utilized in this study have the appropriate level of discriminant validity.

**Table 5.** Discriminant validity (Fornell–Larcker criterion).

	INFQ	SYSQ	SERQ	AW	SI	TIN	PIIT
INFQ	<b>0.850</b>						
SYSQ	0.626	<b>0.904</b>					
SERQ	0.761	0.652	<b>0.780</b>				
AW	−0.157	−0.080	−0.098	<b>0.756</b>			
SI	−0.741	−0.511	−0.707	0.174	<b>0.889</b>		
TIN	0.828	0.742	0.827	−0.138	−0.659	<b>0.889</b>	
PIIT	0.524	0.654	0.537	−0.109	−0.526	0.635	<b>0.909</b>

INFQ, information quality; SYSQ, system quality; SERQ, service quality; AW, awareness; SI, social influence; TIN, tourists' intention; PIIT, personal innovativeness. Diagonal (bold) elements are square roots of AVE values and off-diagonal elements are correlations among constructs.

The measurement model's goal is to specify which items correlate to each latent variable in this way. As a result, the measurement model used in this study explains how each measure is loaded onto a certain composite or latent variables [75]. Thus, author [76], suggested that for assessing the measurement model; authors need to determine (1) individual item reliability: calculating the factor loadings of each individual item, with a suggested threshold of greater than 0.708. (0.4 to 0.7). Their item loadings, as presented in Figure 2, greater than 0.708 are commonly considered acceptable, implying that the related item is explaining more than half of the variance in a single indicator and all indicated statistical significance.

#### 4.4. Hypothesis Testing Using Path Coefficients

First, H1 proposes that there is a significant effect of information quality on tourists' intention to use Web 3.0 in Malaysia. The results in Table 6 show that there is a significant relationship between information quality and tourists' intention to use Web 3.0 ( $\beta = 0.271$ ,  $SE = 0.030$ ,  $t\text{-value} = 9.075$ ,  $p\text{-value} < 0.001$ ,  $CI = 0.211, 0.328$ ). Hence, H1 is supported.

**Table 6.** Hypothesis testing using path coefficients.

H	Relationship	Std Beta	Std Error	t-Value	p-Value	Result	CI LL	CI UL
H1	Information Quality → Tourists' Intention to Use Web 3.0	0.271	0.030	9.075	<0.001	Supported	0.211	0.328
H2	System Quality → Tourists' Intention to Use Web 3.0	0.141	0.029	4.812	<0.001	Supported	0.084	0.198
H3	Service Quality → Tourists' Intention to Use Web 3.0	0.215	0.031	6.838	<0.001	Supported	0.154	0.277
H4	User Awareness → Tourists' Intention to Use Web 3.0	0.005	0.015	0.319	0.750	Unsupported	−0.027	0.033
H5	Social Influence → Tourists' Intention to Use Web 3.0	0.092	0.031	2.916	0.004	Supported	0.032	0.155

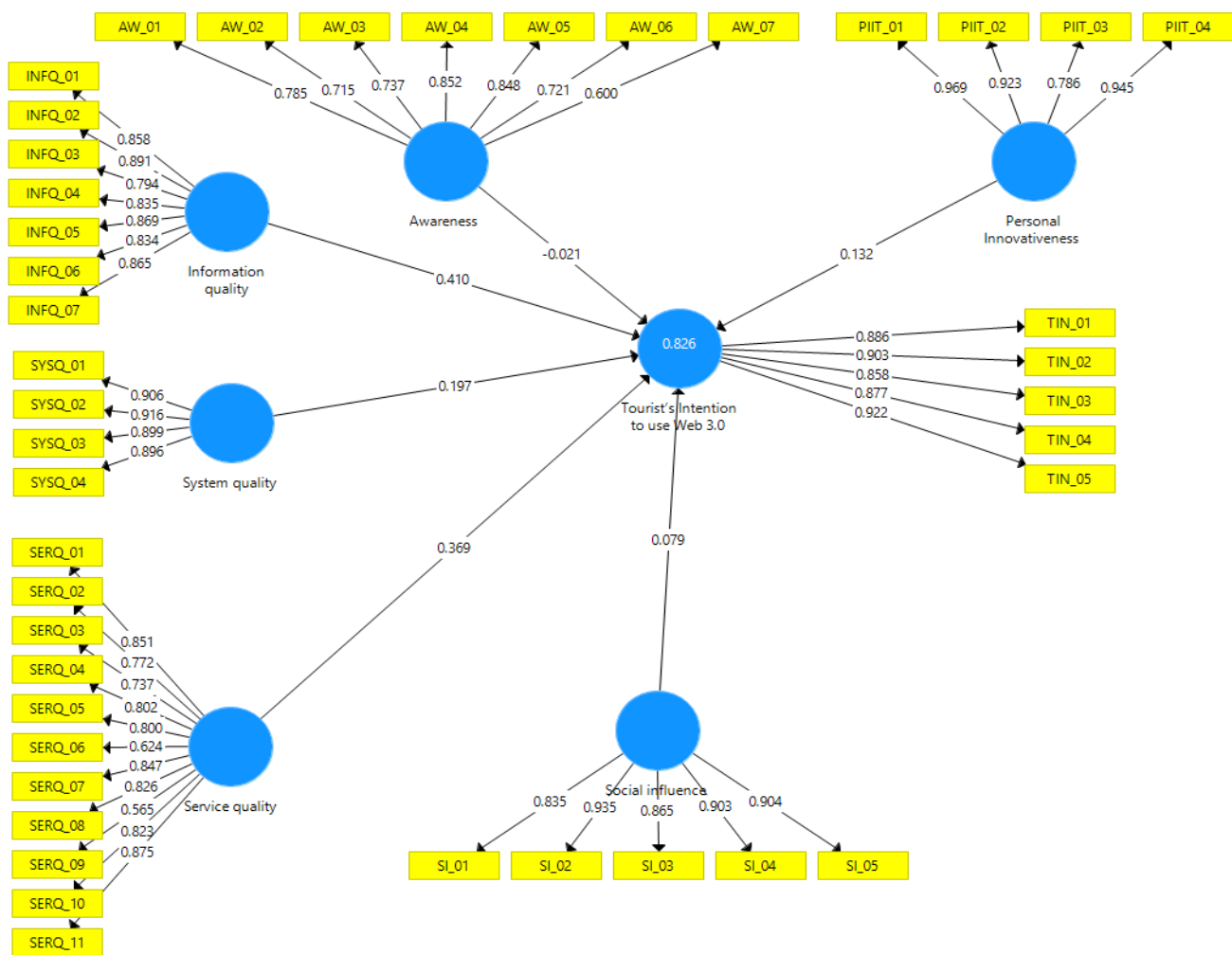


Figure 2. Measurement model of the study.

Second, H2 proposes that there is a significant effect of system quality on tourists' intention to use Web 3.0 in Malaysia. The results in Table 6 show that there is a significant relationship between system quality and tourists' intention to use Web 3.0 ( $\beta = 0.141$ ,  $SE = 0.029$ ,  $t\text{-value} = 4.812$ ,  $p\text{-value} < 0.001$ ,  $CI = 0.084, 0.198$ ). Hence, H2 is supported.

Third, H3 proposes that there is a significant effect of service quality on tourists' intention to use Web 3.0 in Malaysia. The results in Table 6 show that there is a significant relationship between service quality and tourists' intention to use Web 3.0 ( $\beta = 0.215$ ,  $SE = 0.031$ ,  $t\text{-value} = 6.838$ ,  $p\text{-value} < 0.001$ ,  $CI = 0.154, 0.277$ ). Hence, H3 is supported.

Fourth, H4 proposes that there is a significant effect of user awareness on tourists' intention to use Web 3.0 in Malaysia. The results in Table 6 show that there is no significant relationship between user awareness and tourists' intention to use Web 3.0 ( $\beta = 0.005$ ,  $SE = 0.015$ ,  $t\text{-value} = 0.319$ ,  $p\text{-value} = 0.750$ ,  $CI = -0.027, 0.033$ ). Hence, H4 is not supported.

Fifth, H5 proposes that there is a significant effect of social influence on tourists' intention to use Web 3.0 in Malaysia. The results in Table 6 show that there is a significant relationship between social influence and tourists' intention to use Web 3.0 ( $\beta = 0.092$ ,  $SE = 0.031$ ,  $t\text{-value} = 2.916$ ,  $p\text{-value} = 0.004$ ,  $CI = 0.032, 0.155$ ). Hence, H5 is supported.

#### 4.5. Moderating Path Coefficient Assessment

According to [49], "moderation plays a significant part in many social science theories which a moderator is the one that moderate the effects of a predictor on its endogenous construct". This study looked at how personal innovativeness affects/strengthens the link between information quality, system quality, service quality, user awareness, and social

influence and tourists' intention to use Web 3.0 in Malaysia. A moderator variable is one that alters the connection between two other variables, based on the conceptual model of moderation shown in Figure 3. For instance, if the association between information quality, system quality, service quality, user awareness, and social influence and tourists' intention to use Web 3.0 in Malaysia was moderated by personal innovativeness, they would have an impact on the strength or direction of the association. Figure 3 illustrates how the model characterizes moderation conceptually and statistically. The model uses the predictor variable, the hypothesized moderator, and their interaction to predict the result. In order for the term "interaction" to be used in a scientific study, both the predictor and the moderator must be included, and they must be continuous rather than categorical. In many cases, researchers will have a variable that they think can make a specific association between two latent variables stronger or weaker, and that this variable can change the direction of interaction between them. For the five major hypotheses in this paper, five sub-hypotheses (moderating effects) were tested, as presented in Table 7. Hypotheses H6a to H6e were used to evaluate the moderation evaluation. To examine the interaction impact, a bootstrapping approach was used with 5000 replicates. A discussion of the results of the moderating effect follows.

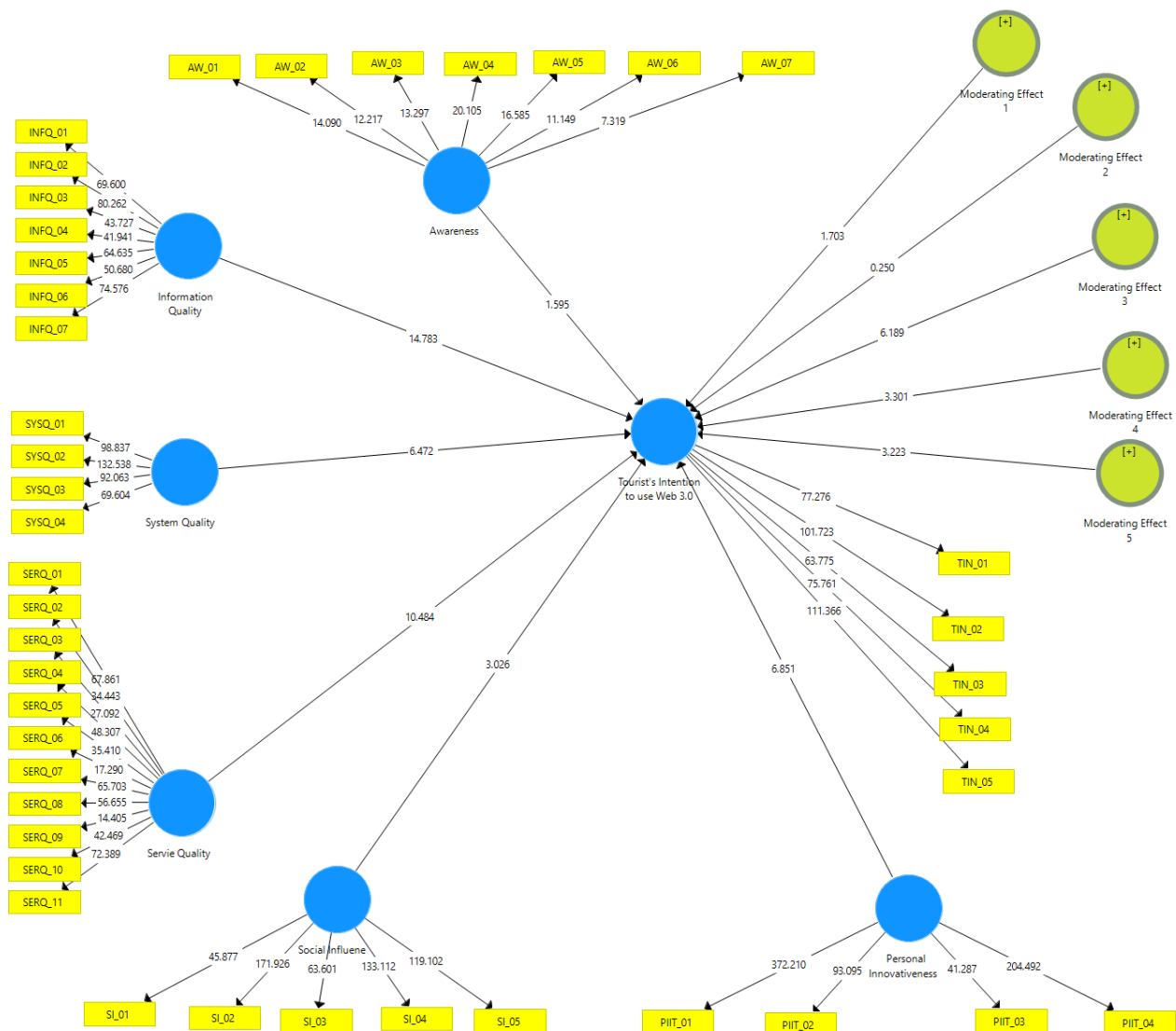


Figure 3. Structural model of the study.

**Table 7.** Hypothesis testing using path coefficients (moderation effect).

H	Relationship	Std Beta	Std Error	t-Value	p-Value	Result	CI LL	CI UL
H6a	Moderating Effect 3 →. 10: Tourists' Intention to Use Web 3.0	0.172	0.033	5.252	0.000	Supported	0.109	0.238
H6b	Moderating Effect 4 →. 10: Tourists' Intention to Use Web 3.0	0.080	0.026	3.094	0.002	Supported	0.028	0.130
H6c	Moderating Effect 5 →. 10: Tourists' Intention to Use Web 3.0	−0.104	0.035	2.956	0.003	Supported	−0.172	−0.034
H6d	Moderating Effect 7 →. 10: Tourists' Intention to Use Web 3.0	−0.003	0.016	0.217	0.829	Unsupported	−0.035	0.027
H6e	Moderating Effect 8 →. 10: Tourists' Intention to Use Web 3.0	−0.052	0.023	2.289	0.022	Supported	−0.096	−0.007

H6a proposes that personal innovativeness moderates the association between information quality and tourists' intention to use Web 3.0 in Malaysia. The results in Table 7 show that personal innovativeness significantly moderates the relationship between information quality and tourists' intention to use Web 3.0 ( $\beta = 0.172$ ,  $SE = 0.033$ ,  $t\text{-value} = 5.252$ ,  $p\text{-value} < 0.001$ ,  $CI = 0.109, 0.238$ ). Therefore, H6a is supported.

H6b proposes that personal innovativeness moderates the association between system quality and tourists' intention to use Web 3.0 in Malaysia. The results in Table 7 show that personal innovativeness significantly moderates the relationship between system quality and tourists' intention to use Web 3.0 ( $\beta = 0.080$ ,  $SE = 0.026$ ,  $t\text{-value} = 3.094$ ,  $p\text{-value} = 0.002$ ,  $CI = 0.028, 0.130$ ). Thus, H6b is supported.

H6c proposes that personal innovativeness moderates the association between service quality and tourists' intention to use Web 3.0 in Malaysia. The results in Table 7 show that personal innovativeness significantly moderates the relationship between service quality and tourists' intention to use Web 3.0 ( $\beta = -0.104$ ,  $SE = 0.035$ ,  $t\text{-value} = 2.956$ ,  $p\text{-value} = 0.003$ ,  $CI = -0.172, -0.034$ ). Hence, H16c is supported.

H6d proposes that personal innovativeness moderates the association between user awareness and tourists' intention to use Web 3.0 in Malaysia. The results in Table 7 show that personal innovativeness does not mediate the relationship between user awareness and tourists' intention to use Web 3.0 ( $\beta = -0.003$ ,  $SE = 0.016$ ,  $t\text{-value} = 0.217$ ,  $p\text{-value} = 0.829$ ,  $CI = -0.035, 0.027$ ). Hence, H6d is not supported.

H6e proposes that personal innovativeness moderates the association between social influence and tourists' intention to use Web 3.0 in Malaysia. The results in Table 7 show that personal innovativeness significantly moderates the relationship between social influence and tourists' intention to use Web 3.0 ( $\beta = -0.052$ ,  $SE = 0.023$ ,  $t\text{-value} = 2.289$ ,  $p\text{-value} = 0.022$ ,  $CI = -0.096, -0.007$ ). Hence, H6e is supported.

#### 4.6. Predictive Ability of the Model (R-Squared)

After assessing the path coefficients of the parameters, the model was evaluated by looking at the coefficient of determination (R-squared,  $R^2$ ) [76].  $R^2$  shows how well the endogenous and exogenous constructs explain each other and is used by scholars to illustrate how much a change in a dependent variable can be explained by one or more predictor variables. It was found that an  $R^2$  value of 0.10 is good enough for PLS-SEM, a value of 0.60 is substantial, 0.33 is moderate, and 0.19 is weak. There are three ranges of  $R^2$  values: 0 to 49, 50 to 69, and more than 70, and these are considered weak, moderate, and strong predictors. The  $R^2$  value for this study was 0.861, indicating that exogenous factors



make up about 86% of the variation in this study. This suggests that information quality, system quality, service quality, user awareness, and social influence together explain 86% of the variance in tourists' intention to use Web 3.0 in Malaysia. Accordingly, the acquired  $R^2$  value is substantial, as it is sufficiently higher than the permissible minimum cut-off of 0.10.

#### 4.7. Evaluation of Effect Size (*f*-Squared)

In addition, Cohen's effect size, or *f*-squared ( $f^2$ ), is used to quantify the influence of each independent predictor on the dependent predictor. The  $f^2$  statistic indicates how important each independent variable is in explaining dependent variables. The relevance of external constructs in explaining endogenous constructs is measured by effect size (by re-calculating  $R^2$  through blindfolding) [77]. The  $f^2$  range is 0 to 1, and a value close to one indicates a higher effect. Effect sizes of 0.02, 0.15, and 0.35 are considered as small, moderate, and substantial, respectively, and most components will not have a big impact on the model [78]. Referring to Table 8, the  $f^2$  value of information quality is 0.140, which indicates a small effect; for system quality the value is 0.048, which indicates a small effect; for service quality the value is 0.088, which indicates a small effect; for user awareness the value is 0.000, which indicates no effect; for social influence the value is 0.023, which indicates a small effect; and for personal innovativeness the value is 0.037, which indicates a small effect. A small effect size does not indicate that the effect is insignificant; a weak effect can be meaningful.

**Table 8.** Effect size (*f*-squared).

Tourists' Intention to Use Web 3.0	
Information Quality	0.140
System Quality	0.048
Service Quality	0.088
User Awareness	0.000
Social Influence	0.023
Personal Innovativeness	0.037

#### 4.8. Assessment of Predictive Relevance of the Model (*Q*-Squared)

Calculating the  $Q^2$  value is another way to evaluate the prediction accuracy of the PLS path model. The overall predictive relevance of the structural model, commonly known as Stone–Geisser's  $Q^2$  value, is the next to last stage in evaluating the structural model. This measure is based on the blindfolding technique, which involves removing single points from a data matrix, imputing the removed points with the mean, and estimating model parameters, thus  $Q^2$  is not a measure of out-of-sample prediction, but rather of in-sample explanatory power and out-of-sample prediction. As noted in [76], "the predictive relevance is a suggested additional evaluation since the goodness-of-fit (GoF) measure is not adequate for model validation because it cannot distinguish between valid and invalid models". Further, "The blindfolding technique predicts the data points that were eliminated for all variables using these estimations as input. Small differences between the predicted and the original values translate into a higher  $Q^2$  value, thereby indicating a higher predictive accuracy". As a guideline,  $Q^2$  values should be larger than zero for a specific endogenous construct to indicate the predictive accuracy of the structural model for that construct [35]. The cross-validated redundancy ( $Q^2$ ) output is summarized below; a  $Q^2$  value greater than zero indicates that the model has predictive relevance:

SSO	SSE	Q <sup>2</sup> (=1 – SSE/SSO)		
Tourists' Intention to Use Web 3.0	3215	950.720	0.704	

## 5. Discussion

Due to the ongoing information revolution, it is fundamental that search engines adopt new semantics network technology and keep up with the constant development in order to provide accurate search results on the current Internet, where there is a vast amount of information available. Because of the current state of the Internet, it has become increasingly difficult for users to find relevant information. As a result, the third generation of the World Wide Web (Web 3.0) was developed to connect all of the data and make it available for use in various technical applications, such as indexing, categorizing, storing, and analyzing. Smart search engines integrate semantic network features in order to generate accurate results for users by applying personalization, customization, and search suggestion systems. Despite the anticipated relevance of Web 3.0 in the future and its applicability in various business fields, recent studies have focused on its progress from a technological rather than theoretical perspective [9].

This research hypothesizes that there is a significant effect of overall quality (information, system, and service quality) on tourists' intention to use Web 3.0. Based on the measurements of information quality, it can explain the capability of using Web 3.0 as an e-tourism tool to provide up-to-date information in terms of accuracy, relevance, comprehensibility, classification, organization, understandability, reliability, and usefulness. Equally important, the system quality of Web 3.0 technology applications can be measured in terms of accessibility, readability, precision, and structure. Additionally, the service quality can be measured through system services such as responsiveness, remote usage, control of tourism activity plan design, interactivity of the service, effectiveness of communication between service providers and tourists, safety, reliability and security of the service, and finally the efficiency of Web 3.0 to provide the right solutions for tourists and the consistency of the response time.

The results of this study show that there is a significant positive relationship between information quality and tourists' intention to use Web 3.0 ( $\beta = 0.271$ ,  $SE = 0.030$ ,  $t\text{-value} = 9.075$ ,  $p\text{-value} < 0.001$ ,  $CI = 0.211, 0.328$ ). Hence, H1 is supported. There is also a significant positive relationship between system quality and tourists' intention to use Web 3.0 ( $\beta = 0.141$ ,  $SE = 0.029$ ,  $t\text{-value} = 4.812$ ,  $p\text{-value} < 0.001$ ,  $CI = 0.084, 0.198$ ). Hence, H2 is supported. There is also a significant positive relationship between service quality and tourists' intention to use Web 3.0 ( $\beta = 0.215$ ,  $SE = 0.031$ ,  $t\text{-value} = 6.838$ ,  $p\text{-value} < 0.001$ ,  $CI = 0.154, 0.277$ ). Hence, H3 is supported. Therefore, hypotheses H1, H2, and H3, which are considered variables of the DeLone and McLean model, were found to have a positive influence on tourists' intention to use Web 3.0. These hypotheses were confirmed and supported by previous studies [2,79,80].

In addition, individuals' willingness to accept new technologies that can help them perform efficiently and successfully is directly influenced by their awareness and understanding of the technology. In order to investigate the effect of integrating information technology resources into individuals' and organizations' daily routines, it is necessary to examine how people embrace and use IT applications. Adoption and use of an IT application is also incorporated into the IS success model, which is separate from information system theory. The categorization of performance indicators and the demonstration of success metrics are not mutually exclusive in this model, which does both at the same time. The IS success model is based on the effective use of information technology (IT) resources. The overall quality of the service has a direct impact on the user's awareness of it [39].

According to [81], "If customers have enough knowledge and information and as well its availability, the possibility of acceptance and using would be higher". This is important, because according to [82], "familiarity with the innovation or product as a result of information search will give greater confidence to potential adopters that the service may fit into their current lifestyle both socially and personally". Consistently, being knowledgeable about a new product or service influences the decision to adopt or reject it. According to [83], "Awareness is one of the most factors that directly affect the consumers

intention to accept new technology as it has been seen that awareness strong influencer on the individuals to accept new technology”.

However, it is essential to mention that recent studies in the field of technology adoption have demonstrated that users’ experiences and awareness have not been sufficiently considered. Previous studies have reported conflicting findings regarding the effect of user awareness. Several studies have explored the effects of awareness on the intention to adopt new technologies. For instance, the authors of [82] suggested that a technological advancement is only accepted by the target audience when they are sufficiently aware of it. The authors indicated that when people are aware of the latest input, they are more confident about using it. The authors of [84] noted that “there is a great significance of technology awareness in order to facilitate intention to use”. The authors further explained that there are many emerging economies where the lack of technological awareness hinders the use of e-services. Accordingly, there is a lack of intention to use, because there is a strong connection between e-services usage and intention.

In addition, the literature has not provided sufficient evidence to examine the user’s awareness in general; rather, most studies focused in investigating the user’s awareness based on social group categories such as gender, age, sex, and level of education. For example, some studies [85–87] noted that “it is reasonable to argue that the higher the degree of awareness among the members of the social group, the stronger the group norms about using protective technologies”.

Based on the measurements in this study, the participants indicated that they were not aware that Web 3.0 technology as an e-tourism tool could provide support for online intelligent search in the tourism domain. The participants also indicated that they were not aware that Web 3.0 can provide personal assistance with choosing travel destinations, or of its benefits, level of importance, and the opportunity to have sufficient information about tourism. There is very limited research examining tourists’ awareness about adopting new technologies. One of the few such studies [88] noted that “one of the main challenges for the successful implementation of DMSs in destinations is the insufficient awareness of technologies”. Additionally, “if customers have enough knowledge and information and as well its availability, the possibility of acceptance of new technology and using would be higher” [81]. However, they further emphasize the limited number of studies examining consumers awareness about adopting new technologies.

The present study findings show that there is no significant relationship between user awareness and tourists’ intention to use Web 3.0 ( $\beta = 0.005$ ,  $SE = 0.015$ ,  $t\text{-value} = 0.319$ ,  $p\text{-value} = 0.750$ ,  $CI = -0.027, 0.033$ ). Hence, H4 is not supported. This is consistent with the results of previous studies in which no significant difference was found between the genders with regard to e-book reader awareness, interest, and intention to use [89]. Similar findings that agree with this study were found in a recent study [90] that investigated the role of employees’ awareness of information security in the intention to resist social engineering. Another study found that awareness was an insignificant factor, noting that “awareness of mobile and WAP/GPRS devices, play insignificant roles in predicting the adoption of M-commerce”. Further, awareness of and knowledge about M-commerce services was not found to be an important factor in adopting such services among employed mobile phone users in Bangladesh [91].

The result of H4 in this study is contrary to the majority of findings in previous research in various domains, including tourism [82,84,86,92–98]. Those studies found that awareness is a significant factor in adopting new technology. As mentioned before, despite the limited research examining technology awareness in the tourism domain, one of the very few studies that did also showed contradictory results to the results of this study [88]. In that study, the authors report, “Technology awareness was found to be significantly and positively related to the intention to participate in the destination management system (DMS) as this implies that tourism stakeholders who have a higher level of awareness of the technology will have more intention to participate”.

In fact, in other studies it was known that awareness, knowledge, and information about the third-generation Web are very limited and insufficient. In addition, this technology has not yet been fully launched and implemented, except for some applications designed based on Web 3.0 such as Semantic Web, virtual reality, augmented reality, blockchain technology, and the current metaverse. From our perspective, the responses of the participants in this study and the result of H4 were expected and logical, because one of the challenges and obstacles addressed in this study was that several respondents were unaware of this technology and its significance. Accordingly, we simplified the Web 3.0 concept for the participants and designed a video to provide a simple and concise explanation of this technology, such as its function and usefulness, supported by examples. However, this does not imply that the respondents are aware of it, because the measurements in this study assessed their knowledge of and experience with the concept of Web 3.0 technology and its implications for future trends and prospects. Therefore, despite the importance of awareness as a factor, which was emphasized in this study and could bring benefits to tourists, H4 was not supported.

Customer reviews are widespread and effective sources of travel information, as they have a clear impact on travel decisions. It is debatable how social influence emerges in the current online environment. Social influence has played an essential part in the evolution of consumer behavior and hospitality/tourism. Particularly, normative and informational impacts are applicable, as online reviews offer a variety of informative and normative indicators. These concepts were developed under very different circumstances than the current online environment [43]. Numerous studies indicate that tourist evaluations constitute an aspect of psychological influence [99–102]. Theories of social influence explain how individuals are impacted by the opinions, perceptions, beliefs, and attitudes of others. The use of social media in the tourism business has increased, as digital technology assists tourists in planning their trips and ultimately impacts their behavior and decisions. To reaffirm the importance of information in the context of tourism, it has been observed that technology influences the behavior of tourists, depending on their travel purpose [103].

For example, business travelers may use social media differently than tourists travelling for leisure [103,104]. Recent studies have demonstrated the increasing significance of social media, including research conducted in Romania that examined the influence of YouTube on prosumers, concluding that it has become an essential source for the promotion of tourism destinations [105]. In this manner, social media users influence the behavior of prospective tourists. These users are frequently referred to as “travel thought leaders”; despite their tiny numbers, they affect the behavior of others based on the information they provide and the destinations they choose. Despite the growing relevance of social media in the tourism sector, the literature overlooks the mechanisms by which visitors’ behavioral intentions and actual conduct are influenced [106]. This clearly explains the significance of social influence as a powerful predictor of the intention to adopt new technology, such as Web 3.0.

In this study, H8 proposes that there is a significant positive effect of social influence on tourists’ intention to use Web 3.0. The results show that there is a significant positive relationship between social influence and tourists’ intention to use Web 3.0 ( $\beta = 0.092$ ,  $SE = 0.031$ ,  $t\text{-value} = 2.916$ ,  $p\text{-value} = 0.004$ ,  $CI = 0.032, 0.155$ ). Hence, H5 is supported. This result was confirmed and similar to many studies [107–112].

According to another study [113], due to the fast advancement of information technology and networking sites, social platforms for spreading information on the Internet have increased. According to their communication features, media platforms can be categorized into mobile media, social media, search engines, mainstream media, and interpersonal media. These new platforms allow tourists to instantly and efficiently obtain more relevant tourism information. However, the information overload on the current Web is a major problem that has a negatively impact on tourists’ decision-making. Although there are several types of sites that influence tourists’ use intention, the influence of new technology such as Web 3.0 and its applications on tourists’ intention is not investigated adequately in

the literature. Therefore, it can be concluded that social influence factors are very strong predictors in this research. Based on the measurements in this study, the participants indicated that people who are important to them, particularly family members and colleagues, influence their intention to use Web 3.0 as an e-tourism tool for personal travel planning. In the final analysis, it is important to mention that the moderator used in this study is personal innovativeness, since there was limited prior work investigating the role of personal innovativeness in the tourism domain from the theoretical perspective using the updated DeLone and MacLean model. Another study [20] reported that many studies in the broader information systems literature examined personal innovativeness as moderator using a technology acceptance model. Personal innovativeness in the proposed model served as a moderator to demonstrate the originality and novelty of this study as well as to expand our understanding of and provide more insights on the research topic. In addition, a closer look at the literature reveals that many studies that used personal innovativeness as a moderator also explained its important role in the acceptance of using information systems to explore the relationship direction, demonstrating the strength or weakness of the relationships between independent and dependent variable, or to show how innovative adopters could be affected by innovative technology applications. However, studies were limited to investigating the role of personal innovativeness using the updated DMISM and not consider using this construct as moderator with the updated model. Although several attempts were made to use personal innovativeness as a factor in various domains, most research typically ignored investigating its moderating role in the tourism domain. In addition, as far as we know, no previous research investigated the role of personal innovativeness as a factor influencing tourists' intention to use Web 3.0 based on DMISM. As a result, a key strength of the research lies in the fact that it presents the proposed model to provide a better understanding of the research topic, enrich the literature, and fill in the existing gap in this research area.

Therefore, it can be concluded that the sub-hypotheses were supported, except H6d. As mentioned above, this is supported by previous studies but contradicts the majority of existing studies in the literature. Personal innovativeness in the proposed model served as a moderator to demonstrate the originality and novelty of this study and to expand our understanding and provide more insights on the research topic. Similar work showed results similar to this study's results [45,114,115].

It can be seen that even though many studies used personal innovativeness to address different research issues in information systems, it was found that personal innovativeness was not much investigated as a moderator either practically (tourism domain) or theoretically (DeLone and McLean model). As can be seen below Table 9 is summarized the whole study hypotheses results.

**Table 9.** Summary of hypothesis results (direct and moderating).

H1: There is a significant effect of information quality on tourists' intention to use Web 3.0 in Malaysia.	Supported
H2: There is a significant effect of system quality on tourists' intention to use Web 3.0 in Malaysia.	Supported
H3: There is a significant effect of service quality on tourists' intention to use Web 3.0 in Malaysia.	Supported
H4: There is a significant effect of user awareness on tourists' intention to use Web 3.0 in Malaysia.	Not Supported
H5: There is a significant effect of social influence on tourists' intention to use Web 3.0 in Malaysia.	Supported
H6a: Personal innovativeness moderates the relationship between information quality and tourists' intention to use Web 3.0 in Malaysia.	Supported
H6b: Personal innovativeness moderates the relationship between system quality and tourists' intention to use Web 3.0 in Malaysia.	Supported



**Table 9.** *Cont.*

H6c: Personal innovativeness moderates the relationship between service quality and tourists' intention to use Web 3.0 in Malaysia.	Supported
H6d: Personal innovativeness moderates the relationship between user awareness and tourists' intention to use Web 3.0 in Malaysia.	Not Supported
H6e: Personal innovativeness moderates the relationship between social influence and tourists' intention to use Web 3.0 in Malaysia.	Supported

### 5.1. Research Practice and Implications

The tourism industry can quickly become integrated into the technological environment and adopt Web 3.0 as an innovative solution for the defects in Web 2.0, adhere to the “user-centered” concept, and continuously improve quality, attract more users to participate in travel planning, provide more personalized, customized, and intelligent information services for users, and play a significant role in consulting services, so that tourism and its resources can serve travelers professionally. The tourism industry must fully use the advantages of Web 3.0 and develop a successful network marketing mode to promote their activities. The business opportunities that can be created for tourism and hospitality enterprises are tremendous. However, if organizations, whether governmental or private, do not adopt Web 3.0, they will not retain a competitive advantage. Moreover, this research can be of great benefit for governments, policymakers, tourism agencies, tourists, and other individuals. Additionally, since this research topic is still in its infancy, particularly from a theoretical perspective, the proposed model in this study can be used as a fundamental guide for future studies in various contexts with different samples in different countries.

### 5.2. Limitations and Future Research

Despite the importance of this study in this emerging research area, it has several limitations that can be addressed in future studies. Initially, the results of this investigation cannot be generalized worldwide, since the sample only included university students in Malaysia. Most of the respondents in this study were young, ranging in age from 20–29 years. Future studies could cover larger sample sizes in different countries involving a wider range of ages and perform statistical comparisons between age groups as well as investigate the impact of information quality, system quality, service quality, and social influence on different age groups. Future studies should build a tourist site supported by Web3.0 functions to test the platform among the selected participants of the study during the questionnaire survey. In terms of visualization, the 3D graphics feature of Web 3.0 creates a new dimension of virtual engagement by blurring the line between the actual and virtual worlds. Therefore, future studies can conduct sample experiments including a graphical user interface (GUI) variable to measure its impact on tourists' intention. Future research can also include sociodemographic variables to examine the impact of culture, regulation, and freedom on the use of the third-generation Web. In this study SmartPLS 3.3.3 was used for analysis. Future studies can use CB-SEM (AMOS) software to analyze the proposed model. Finally, future research can use another theoretical model, extending it with various factors to obtain broader insights into the research topic.

## 6. Conclusions

Tourists are faced with an overload of diverse information, which leads not only to wasting time but also to obtaining information they do not want, and the information might not be accurate and reliable. Based on the issues described above, experts claim that Web 3.0 is the future of the Web, where all search engines will be able to provide users with very accurate search results, because the information stored in databases will be organized, classified, and structured according to the user's search behavior, based on personalization, customization, user preferences, and content recommendations. The main aim of Web 3.0 technology is to extract information from different online sources and

provide the most reliable, accurate, and meaningful search results to users. In the final analysis, the main objective of this study was to examine the role of personal innovativeness in tourists' intention to use Web 3.0 based on the updated information systems success model. The results show that all factors had a positive influence on tourists' intention to use Web 3.0, except awareness, which was found to have a negative effect. The results of this study can help us learn more about how Web 3.0 applications will be used as an innovative solution for the defects in Web 2.0. The study provides clear guidance on the role of personal innovativeness in tourists' use of new technological tools such as Web 3.0 and explains the determinants that influence tourist's intention to use such tools, particularly in the digital era, when the explosion of information has become a huge phenomenon in the fourth industrial revolution.

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## Appendix A

**Table A1.** Systematic Comparison Between Web 2.0 And Web 3.0 Generations.

World Wide Web Platforms	Founder/Creator	Main Features	Application Examples	Advantages	Limitations	Source
Web 2.0	Tim O'Reilly (2004)	<ul style="list-style-type: none"> <li>• Interactivity</li> <li>• Knowledge sharing and content distribution</li> <li>• User-generated content</li> <li>• Information publication</li> <li>• Advertising</li> <li>• Value lies in content, not software used to display content</li> <li>• Users encouraged to create, collaborate, edit, categorize, exchange, and promote information</li> </ul>	YouTube Blogs MySpace Flickr Online games iTunes Forums Gmail Google Docs Google Earth Yahoo Skype Zoom Snapchat Google+ Line Instagram Pinterest TripAdvisor (Facebook and Twitter email, instant messaging apps (e.g., WhatsApp, Signal) Really Simple Syndication (RSS) news feeds Search engine optimization (SEO) Tagging (metadata used to describe Web content) BitTorrent Napster LinkedIn Wikis Tagging (folksonomy)	<ul style="list-style-type: none"> <li>• Availability and remote accessibility</li> <li>• Diverse social media networking tools</li> <li>• Easy to use</li> <li>• Learners can actively be involved in knowledge building</li> <li>• Dynamic learning communities</li> <li>• Anybody can be author and editor, every edit made can be tracked</li> <li>• Real-time discussion</li> <li>• Connections among people</li> </ul>	<ul style="list-style-type: none"> <li>• “Overload of information and exponential growth of data and knowledge on the Web</li> <li>• Search functionality based on keywords</li> <li>• Search results are less accurate”.</li> <li>• “Heterogeneity due to lack of standardization and common vocabulary, preventing easy search, information exchange, and communication”.</li> <li>• Spamming, phishing, and online scams and fraud</li> <li>• “Data leaking and lack of privacy and confidentiality”.</li> <li>• “Security risks associated with intrusion by hackers or malicious malware”.</li> <li>• “Randomized, unclassified, and unreliable information, leading to mass of information”.</li> <li>• “Increased network load and network latency”.</li> <li>• Questionable credibility of websites and information on them</li> </ul>	[116–124]

Table A1. Cont.

World Wide Web Platforms	Founder/Creator	Main Features	Application Examples	Advantages	Limitations	Source
Web 3.0	Tim Berners-Lee (still evolving and being defined)	<ul style="list-style-type: none"> <li>Semantic Web</li> <li>User profile personalization</li> <li>Content customization</li> <li>Smart interface</li> <li>Intelligent search</li> <li>Expanding Web browser capabilities</li> <li>Full content integration</li> <li>Linked data</li> <li>Automation and re-use of information</li> <li>Machine interaction with Web information</li> <li>Understandable information</li> <li>Decentralized Web</li> <li>Human-like machine reading of content</li> <li>Web-based technology architecture applications run in multiple devices</li> <li>Functional support with accurate search results</li> <li>Scholarly and social Web</li> </ul>	SIOC Project Dbpedia Three-dimensional (3D street view, 3D games, metaverse, avatars, 3D graphics, augmented/virtual reality technologies, brave browser) Voice Assistants (Siri) Blockchain technology (smart contracts, cryptocurrency, Wolfram Alpha Interplanetary File System (IPFS))	<ul style="list-style-type: none"> <li>Will enable computers to generate, read, understand, and recommend information</li> <li>Highly protected security, reliability, and privacy of information</li> <li>Based on artificial intelligence, automated reasoning, cognitive architecture, composite applications, distributed computing, knowledge representation, ontology of Web services, recombinant text, scalable vector graphics</li> <li>Automation and autonomous locating, selecting, employing, composing, and monitoring of Web services</li> <li>Reduced network load and latency</li> <li>“Organized search engine information based on context within a document, not just recognition of phrases, using natural language processing and Web 3.0 technologies”.</li> <li>More connected with Internet of Things (IoT)</li> <li>More ubiquitous, available anytime, anywhere, through any channel or device</li> <li>Knowledge connection</li> <li>Improved data management</li> <li>High portability (mobile and consumer electronics)</li> <li>Content based on location, personalized profile, customization, preferences, and user search behavior</li> <li>Only relevant information presented</li> <li>Information expressed in a precise, machine interpretable form</li> <li>Flexibility to link different databases</li> <li>Coherence in two major areas, reliability of resources and relevance of information</li> <li>Collaborative marketing, or marketing 3.0.</li> </ul>	<ul style="list-style-type: none"> <li>Existing websites will be forced to upgrade to Web 3.0 technologies</li> <li>Privacy policies are needed</li> <li>Web 3.0 will be incompatible with less sophisticated devices</li> <li>Can be complicated for beginners to understand</li> <li>Technology not yet capable of overcoming all current obstacles</li> </ul>	

**Table A2.** Measurements of the study.

Construct	Code	Measurement Item	Source
System Quality	SYSQ1	"I believe Web 3.0 technology applications as an e-tourism tool to be easy to use".	[29,36,125]
	SYSQ2	"I believe Web 3.0 technology applications as an e-tourism tool will allow information to be readily accessible to me".	[29,36,126]
	SYSQ3	"I believe Web 3.0 technology applications as an e-tourism tool will easily allow me to find the information I'm looking for".	[29,36,127]
	SYSQ4	"I believe Web 3.0 technologies applications as an e-tourism tool to be more well-structured".	[29,36,127]
Information Quality	INFQ1	"Using Web 3.0 as an e-tourism tool provides up-to-date information about tourism".	[29,36,128]
	INFQ2	"Using Web 3.0 as an e-tourism tool provides accurate information about tourism".	[29,36,129]
	INFQ3	"Using Web 3.0 as an e-tourism tool provides relevant information".	[29,36,130]
	INFQ4	"Using Web 3.0 as an e-tourism tool provides comprehensive and complete set of information".	[29,36,130,131]
	INFQ5	"Using Web 3.0 as an e-tourism tool provides organized and classified information".	[29,36,130]
	INFQ6	"The information provided by Web 3.0 as an e-tourism tool is understandable".	[29,36,127]
	INFQ7	"The information provided by Web 3.0 as an e-tourism tool is reliable".	[29,36,127]
	INFQ8	"The information provided by Web 3.0 as an e-tourism tool is useful".	[29,36,127]
Service Quality	SERQ1	"Web 3.0 technology as an e-tourism tool provide quick responses to my requests".	[29,36,132]
	SERQ2	"I could use Web 3.0 technology services as an e-tourism tool at anytime, anywhere I want".	[29,36,129]
	SERQ3	"Web 3.0 technology as an e-tourism tool allow tourists control over their tourism activity".	[29,36,133]
	SERQ4	"Web 3.0 technology as an e-tourism tool can present tourism activities more organized and accurate".	[29,36,133]
	SERQ5	"Web 3.0 technology as an e-tourism tool enables interactive communication between tourism agents and tourists".	[29,36,133]
	SERQ6	"Web 3.0 technology as an e-tourism tool makes it easy for me to share my trips with my friends".	[29,36,128]
	SERQ7	"I feel safe when I use tourism sites supported with Web 3.0 technology applications".	[29,36,134]
	SERQ8	"Tourism sites using Web 3.0 technology applications are secure".	[29,36,130]
	SERQ9	"Tourism sites using Web 3.0 technology applications are reliable".	[29,36,130]
	SERQ10	"When I use a search engine to seek information about specific tourism destinations, Web 3.0 technology provides the right solution to my request".	[29,36,135]
	SERQ11	"In general, the response time of Web 3.0 as an e-tourism tool is consistent".	[29,36,136]



Table A2. Cont.

Construct	Code	Measurement Item	Source
User Awareness	AW1	"I am aware that Web 3.0 technology as an e-tourism tool will provide support for online intelligent search in the tourism domain".	[96,137,138]
	AW2	"I am aware that Web 3.0 will help me to choose tourism destinations that I want to visit".	[96,137]
	AW3	"I receive enough information about the benefits of Web 3.0 in the tourism domain".	[96,137]
	AW4	"I am aware of the importance of Web 3.0 and its applications in the tourism domain".	[96,137]
	AW5	"I am aware that Web 3.0 as an e-tourism tool will help to ease my travel-related arrangements".	[96,137]
	AW6	"I'm aware that Web 3.0 as an e-tourism tool will enhance my tourism travel experience".	[96,137,139]
	AW7	"I believe that Web 3.0 as an e-tourism tool will give me the opportunity to have sufficient information about tourism".	[96,137,139]
Social Influence	SI1	"People who influence my behavior think that I should use Web 3.0 as an e-tourism tool".	[57,136,140]
	SI2	"People who are important to me think that I should use Web 3.0 as an e-tourism tool".	[57,140,141]
	SI3	"People whose opinions I value prefer that I use Web 3.0 as an e-tourism tool".	[57,140,141]
	SI4	"I believe that some of my colleagues use Web 3.0 as an e-tourism tool for their personal travel".	[57,140–142]
	SI5	"I believe that my colleagues expect me to use Web 3.0 as an e-tourism tool for my personal travel".	[57,140–142]
Personal Innovativeness	PI1T	"Generally, I spend a lot of time exploring how to use new online services".	[143,144]
	PIT2	"Among my peers, I am usually the first to try out new online services".	[143,144]
	PIT3	"If I heard about a new information technology, I would look for ways to experiment with it".	[143,144]
	PIT4	"I like to experiment with new information technologies".	[143,144]
Intention	INT 1	"I will intend to use Web 3.0 for tourism purpose whenever the service is available".	[145–150]
	INT 2	"Whenever possible, I intend to use Web 3.0 applications to find any information relevant to tourism".	[145–150]
	INT 3	"I absolutely intend to search online for tourism related products and services through search engines that adopt Web 3.0 as an e-tourism tool".	[145–150]
	INT 4	"I predict that I will use Web 3.0 applications in the next year".	[145–150]
	INT 5	"I intend to use Web 3.0 services when they are widely launched".	[145–150]

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