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The Development of Digital Literacy Technology Acceptance Model (DLTAM)

W.G.S. Konarasinghe
School of Business, Western Sydney University, Australia

sinasisi@gmail.com

ABSTRACT

The digital revolution has changed the entire business world. Organizations are forced to invest on digitalized facilities to sustain in the competitive market. However, technology acceptance of users plays a crucial role in the success of digitalization. The Technology Acceptance Model (TAM), Unified Theory of Technology Acceptance and Use of Technology (UTAUT) and extensions of UTAUT are well-known models used to assess the technology acceptance of computerized systems. The TAM is superior to UTAUT models due to several reasons, but none of these models have considered the importance of Digital Literacy (DL) of users in technology acceptance. Hence this study is focused on filling the knowledge gap and developed a conceptual model to assess the technology acceptance of individuals. The new model is an extension of TAM, as such named it as Digital Literacy Technology Acceptance Model (DLTAM). The proposed model was tested with real life data, the population of the empirical study being Hospitality and Tourism (H&T) industry of Sri Lanka. Results of the study revealed that DL of tourists directly impact on Perceived Ease of Use (PE) of the system, Perceived Usefulness (PU) of the system and Attitudes Towards Using the system (ATU). Hence it is concluded that the DLTAM is valid and suitable for assessing the technology acceptance. It is recommended to test DLTAM on various fields of research.

Keywords: Technology Acceptance, TAM, UTAUT, DLTAM

1. INTRODUCTION

This part of the study gives the background of the study, research problem, objectives of the study and significance of the study.

1.1 Background of the Study

Technology acceptance refers to the willingness of individuals or organizations to adopt and use new technologies in their daily activities or work processes (Davis,1985). It is a critical concept in understanding how innovations are successfully implemented and integrated within societies, industries, and institutions. The studies of technology acceptance help identify the factors influencing users' attitudes and intentions toward technology use, thereby enabling policymakers, developers, and organizations to design systems that are more user-friendly and widely adopted.

Digital Transformation (DT), often referred to as the digital revolution, began in the 20th century with the introduction of partial automation in business processes (Gunal, 2019). DT involves the digital interconnection of stakeholders, including businesses and customers across all the states of the value chain, along with the integration of emerging technologies. It requires capabilities in data extraction, sharing, and analysis, as well as the ability to convert data into actionable insights (Schallmo et al., 2017). Hence academicians and researchers were concerned about user acceptance of digital technologies.

One of the most influential frameworks explaining digital technology acceptance is the Technology Acceptance Model (TAM) proposed by Davis (1985)**.** TAM suggests that two key factors determine an individual's acceptance of a technology: Perceived Usefulness (PU) and Perceived Ease of Use (PE)**.** Perceived usefulness refers to the degree to which a person believes that using a particular technology will enhance their performance, while perceived ease of use indicates how effortless the individual expects the use of the technology to be. These perceptions influence the user's Attitude Toward Using the technology (ATU), which in turn affects their behavioral intention to use it and Actual System Use (A).

Over time, several extensions of TAM have been developed to provide a more comprehensive understanding of technology adoption. The Unified Theory of Acceptance and Use of Technology (UTAUT) by Venkatesh et al., (2003) integrates elements from eight previous models, including TAM, the Theory of Planned Behavior (Ajzen, 1991), and the Innovation Diffusion Theory (Rogers, 2003). UTAUT identifies four main determinants of technology acceptance: Performance Expectancy, Effort Expectancy, Social Influence, and Facilitating Conditions. Later, UTAUT2 (Venkatesh et al., 2012) added three additional factors relevant to consumer contexts, they are: Hedonic Motivation, Price Value, and Habit.

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Digital literacy (DL) is identified as a crucial element for technology acceptance. DL comprises essential skills needed to interact with digital technologies (UNESCO, 2011). It involves the capability to search for, organize, interpret, evaluate, and critically analyze information using digital tools (Tabusum, Saleem, & Sadik 2014). Individuals lacking digital literacy or possessing only minimal skills may face challenges in adopting and effectively using digital technologies. As a result, individuals' digital literacy significantly impacts technology acceptance.

1.2 Research Problem

According to the literature, Digital Literacy (DL) of users is an important element for the benefit of digital transformation (Gelter, 2017; Kononova, Prokudin & Tupikina 2020). On one hand, if the user does not have basic skills in using digitalized facilities, then he/she will not have the advantages of digitalized facilities in organizations. On the other hand, digitally illiterate user might consider the digitalized facilities as unnecessary burdens. As such, DL would play an important role in technology acceptance, but none of the technology acceptance models include the variable DL. Hence, there exists a theoretical knowledge gap.

Research Questions

According to the literature, Digital Literacy (DL) of users is an important element for the benefit of digital transformation (Gelter, 2017; Kononova, Prokudin &Tupikina, 2020). On one hand, if the user does not have basic skills in using digitalized facilities, then he/she will not have the advantages of digitalized facilities in organizations. On the other hand, digitally illiterate user might consider the digitalized facilities as unnecessary burdens. As such, DL would play an important role in technology acceptance, but none of the technology acceptance models include the variable DL. Hence, there exists a theoretical knowledge gap.

Research Questions

RQ1: Does Digital Literacy of users influence the technology acceptance?

RQ2: How to assess the technology acceptance of individuals?

1.3 Objectives of the Study

The study has following objectives;

1. To develop a conceptual model to assess the technology acceptance.
2. To test the developed technology acceptance model with real life data.

1.4 Significance of the Study

Digital transformation is a time consuming and costly process. If the users do not accept the digitalized facilities, the effort of governments and organizations on digitalization would be a waste. As such success of digital transformation depends on the user acceptance. Literature revealed the importance of digital literacy in technology acceptance, but none of the existing models identified digital literacy of user’s as a factor of determining the technology acceptance.

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This study is focused on filling the theoretical knowledge gap and developed a suitable model for assessing the technology acceptance. Also this study uses the real life primary data to test the model, hence fill a practical knowledge gap as well.

2. LITERATURE REVIEW

The literature review is focused in three parts;

2.1 Technology Acceptance Models.

2.2 The UTAUT Models vs, TAM.

2.3. Measuring Digital Literacy.

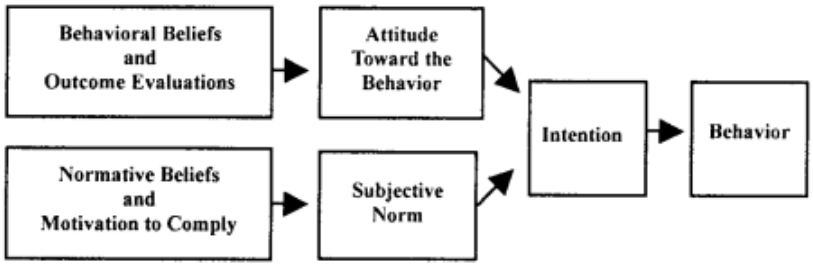
2.1 Technology Acceptance Models

The models, Theory of Reasoned Actions (TRA), Theory of Planned Behaviour (TPB), Technology Acceptance Model (TAM), Unified Theory of Acceptance and Use of Technology (UTAUT), UTAUT2, and UTAUT3, are widely applied in testing technology acceptance.

2.1.1. Theory of Reasoned Action (TRA)

The Theory of Reasoned Action (TRA) posits that an individual's behavior is primarily guided by their intention to perform that behavior. This behavioral intention is influenced by two main factors: the person's attitude toward the behavior and the impact of subjective norms (see Figure 2.1). The theory is based on the premise that individuals act rationally and are motivated by purposeful decision-making. Therefore, it suggests that a person's actions originate from their intentions, which are shaped by their personal evaluation of the behavior (attitude) and the perceived social expectations or pressures from others (subjective norms) (EL Archie, 2023).

Figure. 2.1: TRA Framework, Source: EL Archie (2023)



The Theory of Reasoned Action (TRA) is based on three key conditions: first, the behavioural intention used to predict an action must be as specific as the behaviour itself; second, the intention should remain consistent between the time it is measured and the time the behaviour occurs; and third, the individual must possess adequate volitional control to perform the behaviour.

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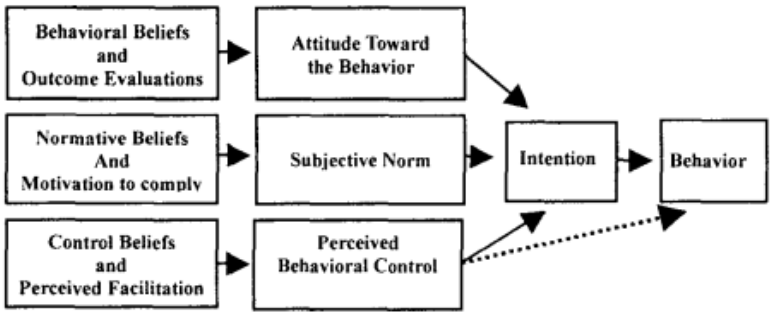
2.1.2 Theory of Planned Behaviour (TPB)

The Theory of Planned Behavior (TPB) is an extension of the Theory of Reasoned Action (TRA) (Ajzen, 1991). Accordingly, behavioural intention depends on three conditions: Attitudes, Subjective Norms, and Perceived behavioural control (see Figure 2.2).

Figure 2.2: TPB Framework: EL Archie (2023)

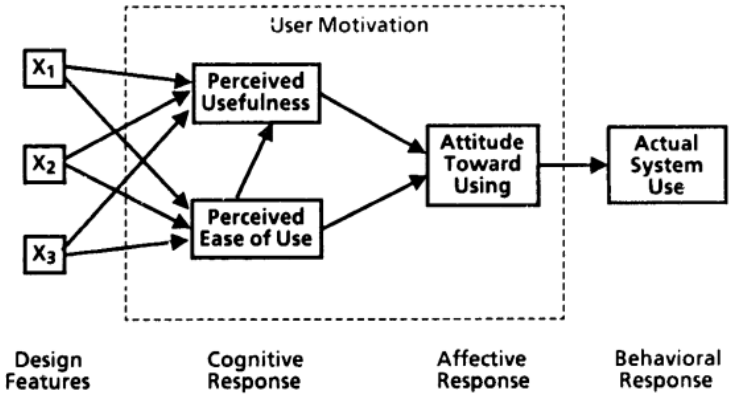


According to the Theory of Planned Behavior (TPB), behavioural intention is influenced by three main factors: attitudes toward the behaviour, subjective norms, and perceived behavioural control. Attitude toward the behaviour is shaped by behavioural beliefs and outcome evaluations; subjective norms are determined by normative beliefs and the motivation to comply; and perceived behavioural control is influenced by control beliefs and perceived facilitation. Ultimately, actual behaviour is determined by both perceived behavioural control and behavioural intention.

2.1.3 Technology Acceptance Model (TAM)

Davis (1985) developed a conceptual model to examine how system characteristics influence user acceptance of computer-based information systems. The model is named 'Technology Acceptance Model (TAM), Figure 2.3 shows the model of Davis (1985).

Figure 2.3: Technology Acceptance Model (Source: Davis et al. 1985, p 24)



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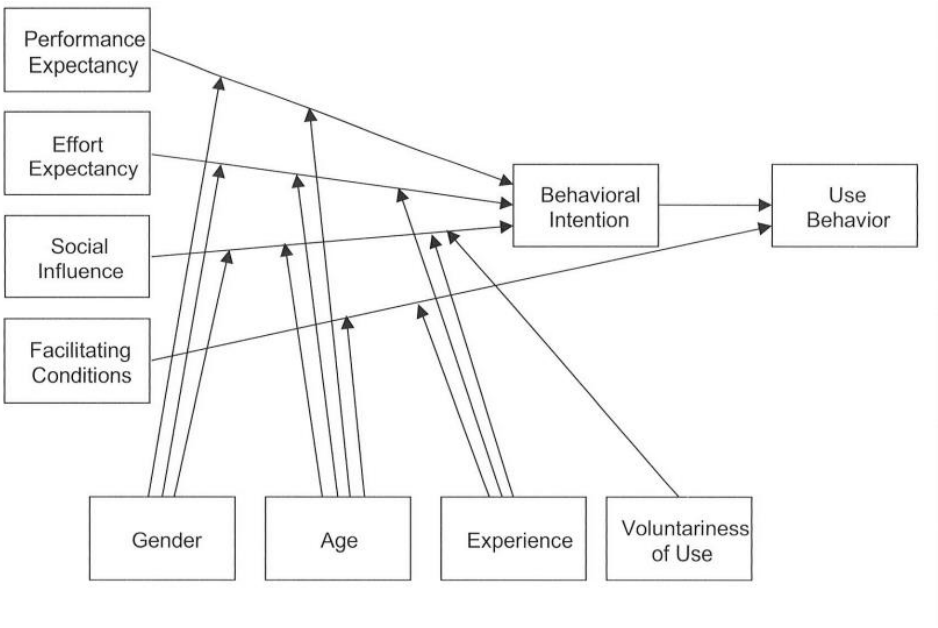
This model proposes that the features of computer-based systems, known as external variables, influence two key perceptions: Perceived Usefulness (PU) and Perceived Ease of Use (PE). Perceived Usefulness refers to the extent to which an individual believes that using a specific system will enhance their job performance, while Perceived Ease of Use reflects the belief that the system requires minimal effort and makes tasks easier. The model establishes a causal link among these factors, suggesting that PE directly affects PU, and together, both PE and PU determine the individual's Attitude Toward Using (ATU) the system, which subsequently impacts Actual System Use (A).

2.1.4 Unified Theory of Technology Acceptance and Use of Technology (UTAUT)
The Unified Theory of Acceptance and Use of Technology (UTAUT), proposed by Venkatesh et al., (2003), is a comprehensive model designed to explain user intentions to adopt information technology and subsequent usage behavior. UTAUT integrates elements from eight earlier models of technology acceptance, including the Theory of Reasoned Action (TRA), the Technology Acceptance Model (TAM), and the Theory of Planned Behavior (TPB), among others, providing a unified framework for understanding technology adoption. Figure 2.4 shows the UTAUT model of Venkatesh et al., (2003).

Figure 2.4: UTAUT Model (Source: Venkatesh et al., 2003)



The model identifies four key determinants of behavioral intention and technology use:

1. Performance Expectancy (PE): The degree to which an individual believes that using the system will help them achieve gains in job performance. This factor is considered the strongest predictor of intention across various contexts.

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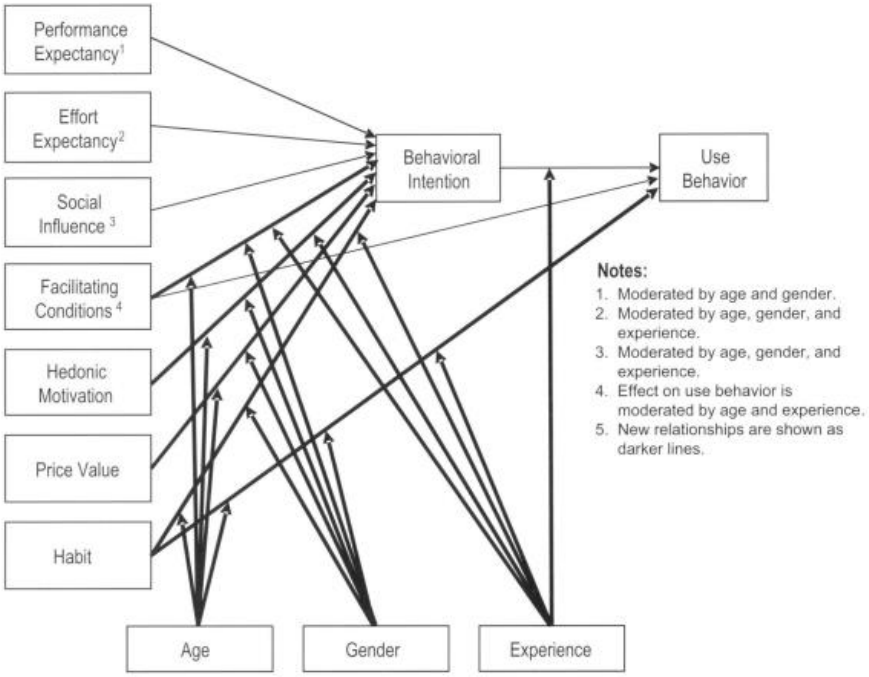
2. Effort Expectancy (EE): The perceived ease of using the technology. Systems that are easier to use are more likely to be accepted.
3. Social Influence (SI): The degree to which individuals perceive that important others believe they should use the technology. Peer pressure, managerial support, and societal norms influence this factor.
4. Facilitating Conditions (FC): The extent to which an individual believes that the organizational and technical infrastructure exists to support the use of the system. Unlike the other factors, facilitating conditions directly influence actual usage rather than behavioral intention.

UTAUT also incorporates moderating variables, age, gender, experience, and voluntariness of use that affect the strength of the relationships between the key determinants and behavioral intention or usage behavior.

2.1.5 UTAUT 2 and UTAUT 3

The Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), proposed by Venkatesh et al., (2012), extends the original UTAUT model developed by Venkatesh et al., (2003).This revised model introduces three additional constructs: hedonic motivation**,** price value, and habit. *Hedonic motivation* reflects the pleasure or enjoyment derived from using a technology, while *price value* represents the user's assessment of the technology's benefits in relation to its cost. *Habit* refers to the extent to which individuals perform behaviors automatically as a result of prior experiences or learning. These components are depicted in Figure 2.5.

Figure 2.5: UTAUT 2 Model (Source: Venkatesh et al., 2012)



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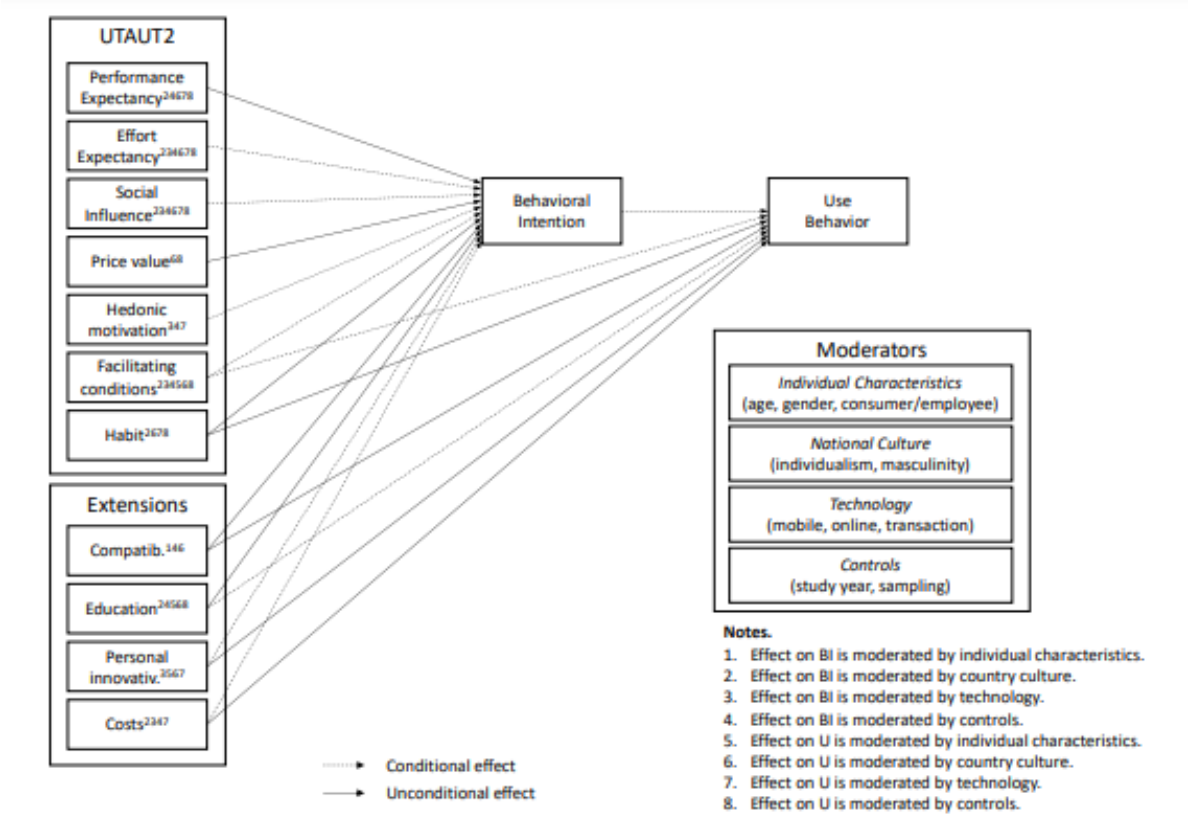
Blut et al. (2022) conducted a meta-analysis of the UTAUT and UTAUT2 models, employing this approach as a systematic method to assess the evolution of existing theories and support their further refinement. The study evaluated the strength and comprehensiveness of the UTAUT frameworks by examining key variables, predictors, and moderating factors. Findings indicated that the theoretical basis of UTAUT is less robust than generally assumed. As a result, Blut et al. (2022) proposed an enhanced version of the UTAUT2 model, introducing four new independent variables, technology compatibility**,** user education**,** personal innovativeness**,** and technology costs along with four categories of moderators: individual characteristics**,** national culture**,** technology-related factors**,** and control variables (see Figure 2.6).

Figure 2.6: UTAUT 3 (Source: Blut et at. 2022)



The findings of Blut et al. (2022) revealed that behavioural intention is influenced by eleven independent variables: performance expectancy**,** effort expectancy**,** social influence**,** price value**,** hedonic motivation**,** facilitating conditions**,** habit**,** technology compatibility**,** user education**,** personal innovativeness, and technology costs. Furthermore, user behaviour was found to be directly associated with behavioural

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intention, facilitating conditions, habit, technology compatibility, user education, personal innovativeness, and technology costs.

2.2 The UTAUT Models versus the TAM

There is no doubt that the UTAUT models are more complex than the Technology Acceptance Model (TAM). The UTAUT model includes ten variables, the UTAUT2 model incorporates twelve, and the UTAUT3 model expands to seventeen variables. Although the UTAUT models were designed to achieve greater empirical (predictive) accuracy compared to the simpler TAM, it is worth questioning whether this improvement justifies the loss of parsimony. This issue becomes even more significant given that the empirical robustness of the UTAUT models remains a topic of debate (Blut et al., 2022).

The lack of consensus regarding robustness can largely be attributed to factor proliferation. The inclusion of numerous variables often leads to multicollinearity among independent variables, resulting in less reliable statistical inferences. In regression analysis, the normality and independence of residuals are essential assumptions; however, these are difficult to satisfy when multicollinearity is present. Consequently, even though the R^2 value is commonly used to indicate the proportion of variance in the dependent variable explained by the model, under multicollinearity conditions, this measure can be misleading.

Moreover, empirical testing of UTAUT models typically relies on structured questionnaires. The instrument developed by Venkatesh (2003, 2012) includes 79 items for a single computerized system; if multiple systems are evaluated, the number of items multiplies accordingly. Such lengthy questionnaires tend to result in higher non-response rates or inaccurate, unreliable responses, thereby reducing the statistical power of analyses. In addition, the presence of numerous moderators further increases the model's complexity.

In contrast, the simpler TAM maintains the advantage of theoretical parsimony and avoids severe multicollinearity issues to the same extent as the UTAUT models. For these reasons, TAM is preferred as the foundational model for modification and application in the present investigation.

2.3 Measuring Digital Literacy (DL)

DL comprises a fundamental set of skills necessary for handling digital media, as well as for processing and retrieving information (UNESCO 2011); it requires skills in locating and using information and critical thinking. In fact, the concept of digital literacy dates from 1960, and the definition of DL has changed with the changes in technology (Reddy, Sharma & Chaudhary, 2020). Recognizing this, Reddy et al., (2020) proposed a comprehensive definition: DL is an individual's ability to locate and assess information, apply it effectively, generate new content, and communicate it using suitable digital technologies.

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This study adopts the definition of Reddy et al. (2020) as it presents a well-grounded and holistic perspective on digital literacy.

Turning to the question of measurement, Bunker (2010) measured DL by five dimensions: information literacy, computer or ICT literacy, media literacy, communication literacy and technology literacy. Information literacy refers to the ability to search for, retrieve, manipulate, evaluate, synthesize, and produce digital content. Computer literacy is the ability to effectively use digital hardware and software. Media literacy is the ability to gather information in the forms of textual, sound, image, and video from multiple streams of information and manipulate and use such information. Communication literacy is the skill to convey information effectively, both individually and to larger audiences, using traditional and modern channels such as email, phone calls, and text messages. Technology literacy refers to the ability to use programming languages and create new products, services, and digital technologies.

3. METHODOLOGY

This part of the study describes the development of conceptual model and operationalization of the study.

3.1 Development of the Conceptual Model

As previously discussed, technology acceptance refers to the extent to which individuals adopt and use information and communication technology (El Archie, 2023). Various models have been proposed to explain technology acceptance, including the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Technology Acceptance Model (TAM), and the Unified Theory of Acceptance and Use of Technology (UTAUT) and its later extensions.

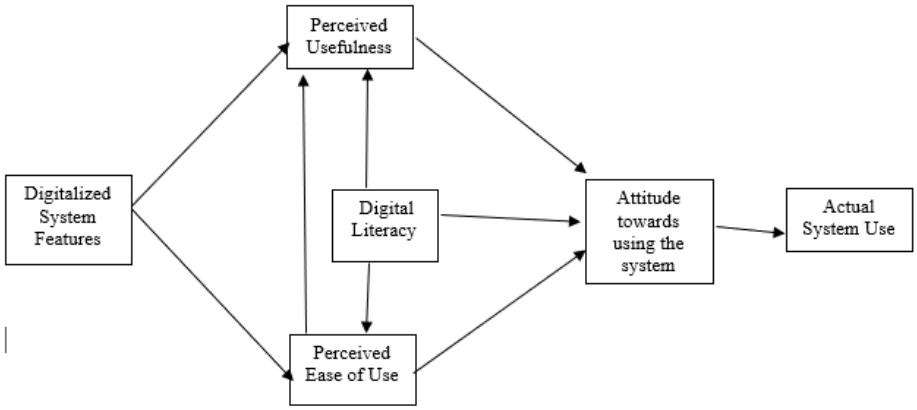
The Technology Acceptance Model (TAM), developed by Davis (1985), was designed to evaluate users' acceptance of computerized systems. According to TAM, the characteristics of computer-based systems, referred to as external variables influence Perceived Usefulness (PU) and Perceived Ease of Use (PE). There is a causal link between these two constructs, where PE affects PU. Both PU and PE influence the user's Attitude Toward Using the system (ATU), which in turn determines Actual System Use (A). In essence, if a user believes that a system is easy to use, they are more likely to perceive it as useful. When users find a system both easy to use and useful, they tend to develop a positive attitude toward it, which consequently increases their likelihood of actual usage.

The TAM remains the most widely applied framework for studying user acceptance and adoption of technology (El Archie, 2023). It is valued for its theoretical parsimony, simplicity, and efficiency, as it involves only a few independent variables and requires

minimal input data. Moreover, TAM avoids many of the statistical challenges, such as multicollinearity associated with more complex models like the UTAUT variants.

Initially, this study adopted the TAM to assess the technology readiness of tourists visiting Sri Lanka. However, a review of the literature highlighted the crucial role of digital literacy (DL) in technology acceptance (Gelter, 2017; Pencarelli, 2019; Kononova, Prokudin & Tupikina, 2020). It is reasonable to assume that tourists lacking basic digital skills may be unable to benefit from digitalized services offered by organizations, or may even perceive such technologies as barriers to enjoying their travel experiences. Therefore, this study proposes a conceptual model to examine the influence of digital literacy on technology acceptance among tourists (see Figure 3.1).

Figure 3.1: Proposed Conceptual Model of DLTAM



The proposed model, termed the Digital Literacy Technology Acceptance Model (DLTAM)**,** posits that both the characteristics of the digitalized system and an individual's Digital Literacy (DL) influence their beliefs regarding the Perceived Ease of Use (PE) and Perceived Usefulness (PU) of the system. Furthermore, PU is influenced by PE**,** indicating that users who find a system easy to use are more likely to perceive it as useful. An individual's Attitude Toward Using (ATU) the system is shaped by PE**,** PU**,** and DL**,** while the Actual System Use (A) is determined by the user's attitude. The proposed model was empirically tested using primary data collected for this study. Following are the hypotheses tested;

Hypothesis 1:
H_0: There is no association between DLT and PE.
H_1: There is an association between DLT and PE.

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Hypothesis 2:
H_0: There is no association between DL_T and PU.
H_1: There is an association between DL_T and PU.

Hypothesis 3:
H_0: There is no association between DL_T and ATU.
H_1: There is an association between DL_T and ATU.

Hypothesis 4:
H_0: There is no association between DL_T and A.
H_1: There is an association between DL_T and A.

Hypothesis 5:
H_0: There is no association between PE and PU.
H_1: There is an association between PE and PU.

Hypothesis 6:
H_0: There is no association between PE and ATU.
H_1: There is an association between PE and ATU.

Hypothesis 7:
H_0: There is no association between PU and ATU.
H_1: There is an association between PU and ATU.

Hypothesis 8:
H_0: There is no association between ATU and A.
H_1: There is an association between ATU and A.

3.2 Operationalization of the Study

The data collection of the study is focused on Sri Lanka's Hospitality and Tourism (H&T) industry. This part of the study consists of the population and sample of the study, the data collection method, and the statistical techniques used in the study.

3.2.1 Population and Sample of the Study

Tourists of Sri Lanka, including both domestic and international tourists is the population of the study. The study population is distributed across the country; therefore, a multi-stage sampling method was employed (Saunders et al., 2007, Greener, 2008). First, a table of random numbers was used to select a random sample of 5 districts from the country's 25 districts. The selected districts are: Hambantota, Kalutara, Kandy, Gampaha and Matara.

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Then, stratified sampling technique was adopted to obtain a sample of different types of accommodation establishments in these districts, capturing star hotels to guest houses. Then the cluster sampling technique was used to obtain the data from tourists staying in the selected establishments. The sample size of the study is hundred and twenty tourists.

3.2.2 Method of Data Collection

Human ethics approval was obtained from Australia to collect the data from tourists. A structured questionnaire was used for the data collection. The Sama Radial Indicator of Konarasinghe (2023) was used to obtain the item responses. The questionnaire was validated at pre-test with the help of subject matter experts and at pilot survey with the help of twenty respondents.

3.2.3. Methods of Data Analysis

The Sama Radial Indicator (Konarasinghe, 2023) converted the outcomes of the latent variables to a continuous scale; hence, the quantitative approach was used for the data analysis. The statistical software SPSS and MINITAB were used for the data analysis. Graphical representation of the data, descriptive statistics, Karl Pearson's correlation analysis, parametric hypothesis tests, confidence intervals and Multiple Regression analysis with and without interactions were used for the data analysis.

4. RESULTS

This part of the study explains the demographic variables of the study, graphical summary of the variables of proposed DLTAM, results of the correlation analysis and regression analysis.

4.1 Demographic Variables

The sample of the study consists of sixty-five domestic tourists and fifty-five international tourists from twelve destinations. Among the international tourists, 26% are from China, 20% are from Germany, and 12% are from India. The sample consists of tourists from New Zealand, Switzerland, France, the UK, Lithuania, Bangladesh, Iran, Australia and Saudi Arabia. Most of the tourists (57%) are females, and 39% are males. Tourists have various purposes for visiting, seventy per cent (70%) of tourists have made their visit for leisure, 17% of them have made the tour for education purposes and others for conference participation, business and pilgrimage. Thirty percent of tourists (30%) are in the age group 55-64, 23% of them are in the age group 18-24, 18% are in the age group 25-34, 13% are in the age group 45-54, 9% in the age group 35-44 and others are 65 years old or above.All the tourists have completed at least a secondary school qualification, majority of the tourists (44%) in the sample have postgraduate qualifications, 38% have high school qualifications, 13% have undergraduate degrees, and 5% have secondary school qualifications. All the variables of the study are qualitative random variables. Sama Radial Indicator (SRI) was used to convert the qualitative variables into continuous random variables.

Graphical summary reports, which contain descriptive statistics, boxplots and 95% confidence intervals for mean and median, were obtained for all variables.

4.2 Graphical Summary of Variables

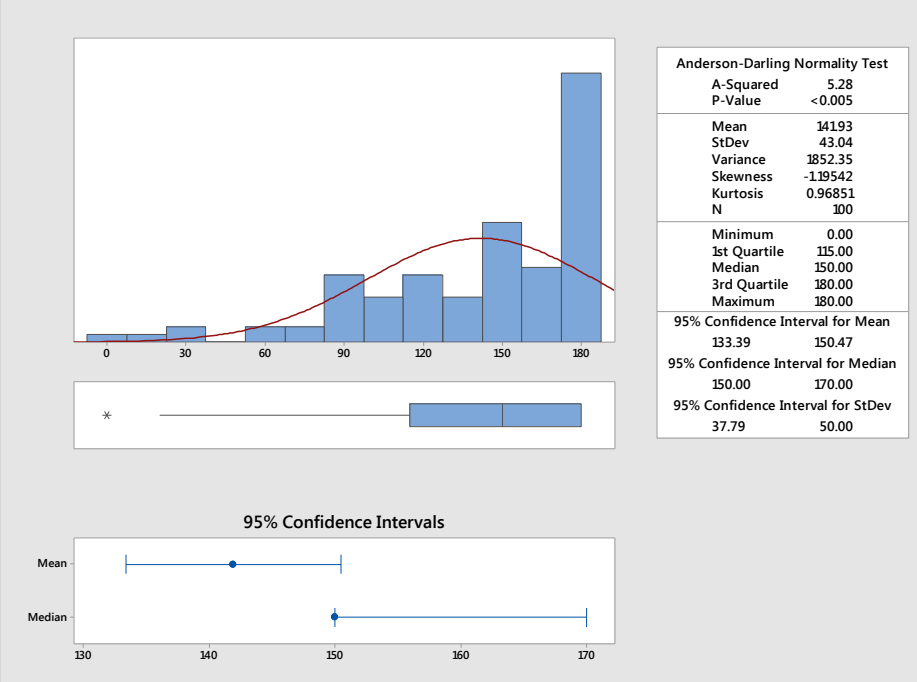
The DLTAM consists following variables.

- Perceived Ease of Use of Digitalized System (PE)
- Perceived Usefulness of Digitalized System (PU)
- DL of tourist (DL)
- Attitude Towards Using Digitalized System (ATU)
- Actual use of a digitalized system (A)

4.2.1 Perceived Ease of Use of Digitalized System (PE)

Tourist data was collected on Perceived Ease of Use (PE) of two main components of an organization's digitalized system: its online booking system and WiFi/Internet. Figure 4.1 is the Graphical Summary of the outcome of the PE of the 'online booking system'.

Figure 4.1: Graphical Summary of the PE of the Online Booking System



The histogram, boxplot, and the Anderson-Darling test evidenced that the data are not normally distributed. The mean value of the data set (141.93) lies in the interval: $135 < \theta < 180$ as such, in general, respondents strongly agree that the online booking system is easy to use. The first quartile (115) lies in the interval: $90 < \theta \leq 135$, therefore, 25% of the respondents weakly agree that the system is easy to use. The third quartile is 180, which means 25% of the respondents completely agree that the system is easy to use.

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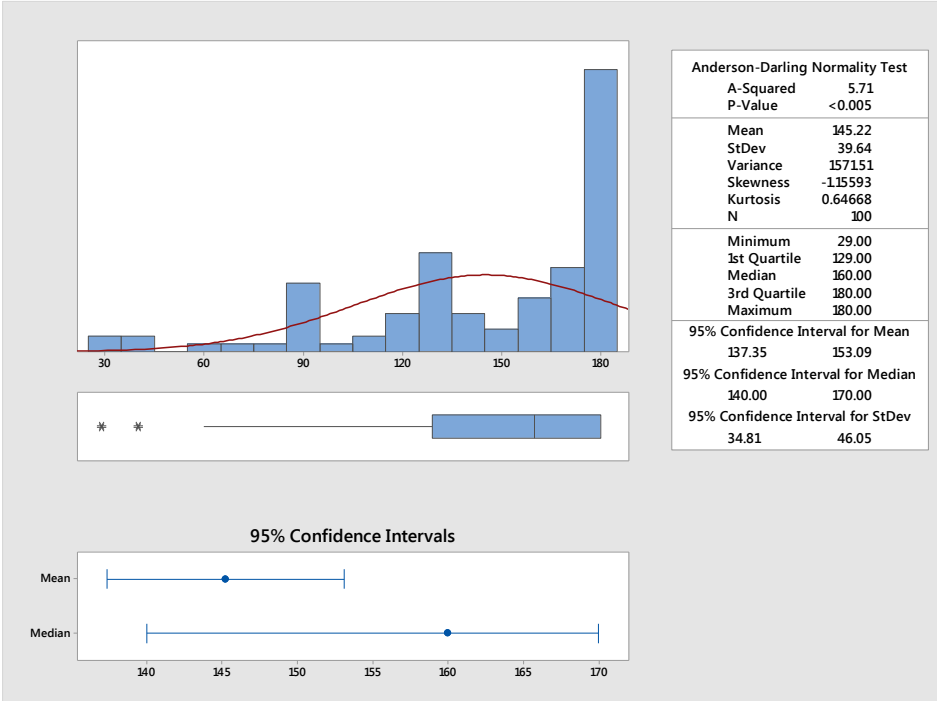
Figure 4.2 is the Graphical Summary of the PE of the Internet /Wi-Fi System. The histogram, boxplot, and the Anderson-Darling test evidenced that the data are not normally distributed. The mean value of the data set (145.25) lies in the interval: $135 < \theta < 180$ as such, in general, respondents strongly agree that the online booking system is easy to use. The first quartile (129) lies in the interval $90 < \theta \leq 135$; therefore, 25% of the respondents weakly agree that the system is easy to use. The third quartile is 180, which means 25% of the respondents completely agree that the system is easy to use.

Figure 4.2: Graphical Summary of the PE of the Internet /Wi-Fi System



Based on the results, it can be concluded that the majority of the respondents believe that the 'online booking system' and 'Internet/ Wi-Fi system' are easy to use.

4.2.2 Perceived Usefulness of Digitalized System (PU)

The PU of two systems, 'online booking' and 'Internet/Wi-Fi', were measured. Figure 4.3 is the Graphical Summary of PU of the Online Booking System. The mean value of the data set (145.23) lies in the interval: $135 < \theta < 180$, as such, in general respondents strongly agree that the online booking system is useful. The first quartile (130) lies in the interval $90 < \theta \leq 135$, therefore, 25% of the respondents weakly agree that the system is useful. The third quartile is 180, which means 25% of the respondents completely agree that the system is useful.

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Figure 4.3: Graphical Summary of PU of the Online Booking System

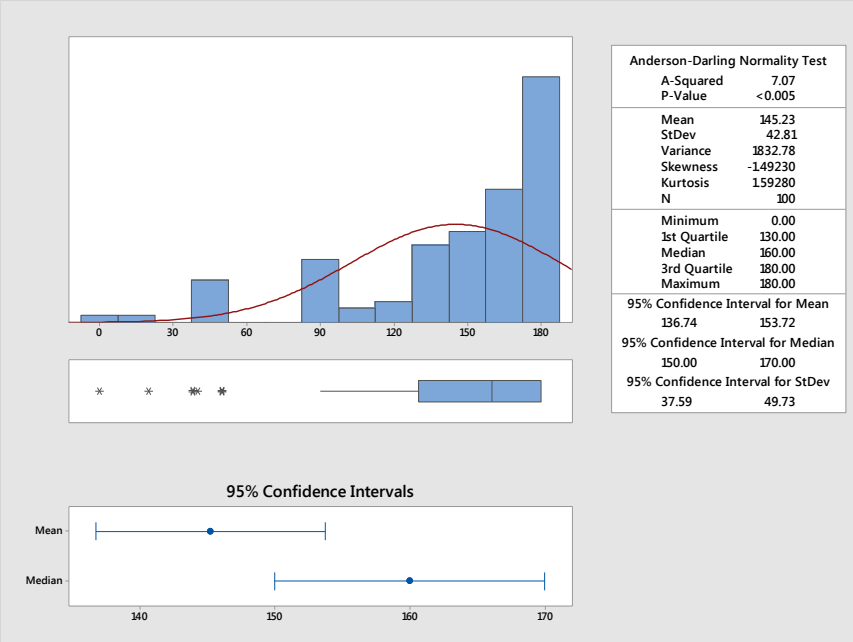
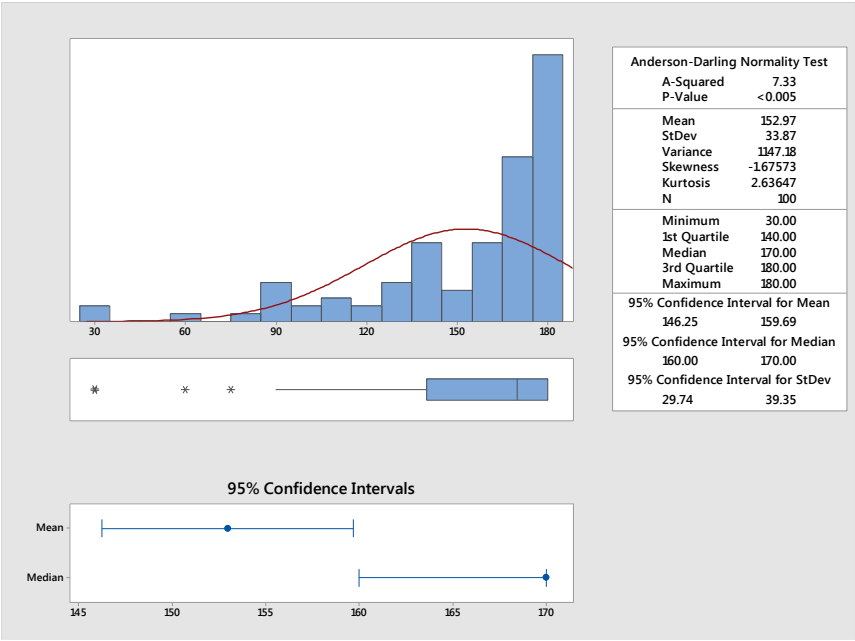


Figure 4.4 is the Graphical Summary of PU of the Internet/ Wi-Fi System. The mean value of the data set (152.97) lies in the interval: $135 < \theta < 180$. As such, in general, respondents strongly agree that the system is useful. The first quartile (140) lies in the interval: $135 \leq \theta < 180$ therefore, 75% of the respondents strongly agree that the system is useful.

Figure 4.4: Graphical Summary of PU of the Internet / Wi-Fi System



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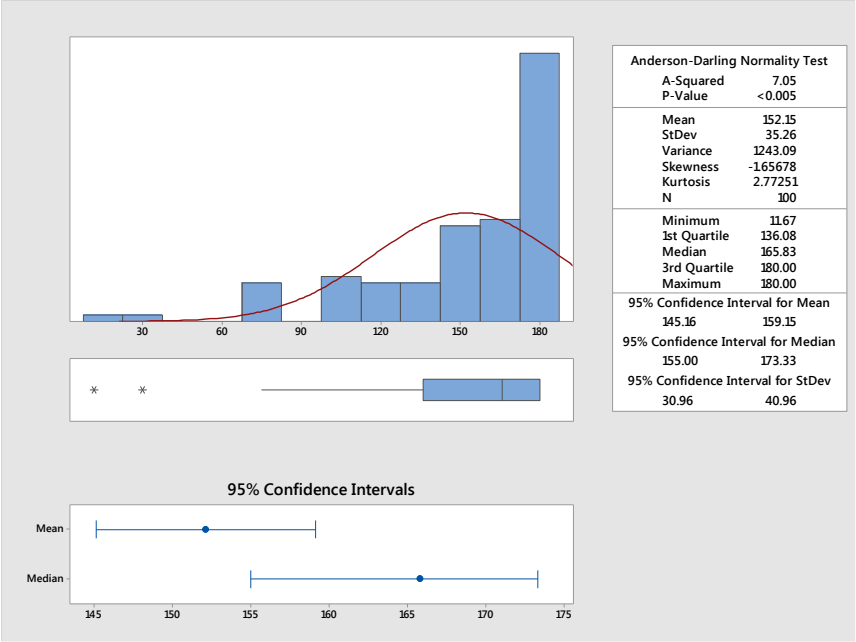
Based on the results, it was concluded that the majority of the respondents believe that the 'online booking system' and 'Internet / Wi-Fi system' are useful.

4.2.3 Digital Literacy of Tourist (DL)

Six items were used to measure the digital literacy of tourists, and the average of them is taken as the variable 'DL_T'. Figure 4.5 is the graphical summary of the DL of Tourists. Confidence limits of the mean and median of DL overlap; therefore, there is no significant difference between the mean and median. The box plot and the histogram suggest the non-normality of the variable; the Anderson-Darling test confirms the same. Indeed, the data set is negatively skewed, and the data density is more towards the higher side. The median is 165.83; as such, more than 50% of the respondents' digital literacy is higher than the mean (152.15). It is concluded that the tourists of Sri Lanka are highly digitally literate.

Figure 4.5: Graphical Summary of the DL of Tourist



4.2.4 Attitude Towards Using Digitalized System (ATU)

Respondents of the study were given the statement, 'Overall, I have a positive attitude towards using this system' to give their response regarding the online booking system and the Internet/ Wi-Fi system. Figure 4.6 is the summary report of the responses about the online booking system. The distribution of the data has outliers, showing that a few respondents completely disagree with the statement, which means they have a negative attitude towards using the system. In contrast, 25% of the respondents completely agree with the statement, which means they have a positive attitude towards using the system. The box-plot, histogram, and Anderson-Darling test confirm the non-normality of the variable.

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Figure 4.6: Graphical Summary of ATU: Online Booking

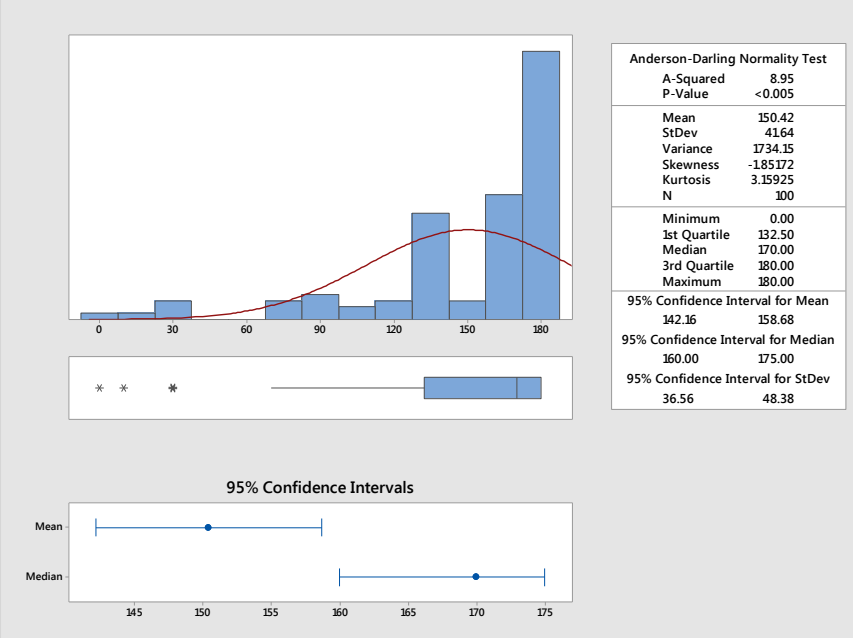
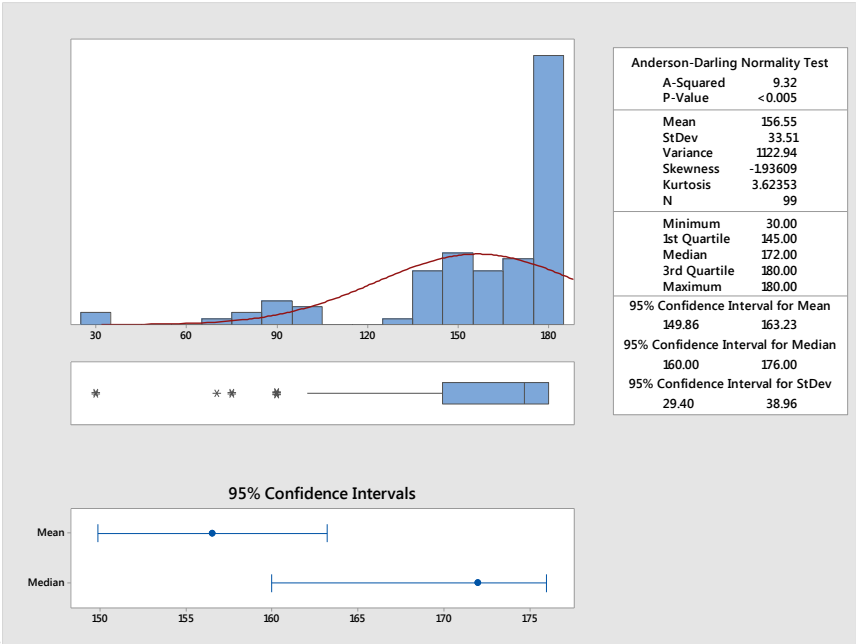


Figure 4.7 is the summary report of the responses about the Internet / Wi-Fi system. The distribution of the data has outliers, Anderson- Darling test confirms the non-normality of the variable, and the box-plot and histogram show that the data set is negatively skewed. The first quartile is 145, as such, at least 75% of the respondents strongly agree that they have a positive attitude towards using the Internet or Wi-Fi system.

Figure 4.7: Graphical Summary of ATU: Internet/ Wi-Fi



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4.2.5 Actual use of a digitalized system (*A*)

The respondents were supposed to think about the organization (hotel) they stayed at, to respond to the statement, "I frequently used this system of this organization". The graphical summary regarding the usage of the online booking system is shown in Figure 4.8. The Anderson-Darling test revealed the non-normality of the dataset. The box plot suggests a negatively skewed distribution. First quartile is 80, showing that 25% of the respondents haven't used the Online Booking system of the organization, in contrast, the third quartile showed that 25% of the respondents have frequently used the system.

Figure 4.8: Graphical Summary of *A*: Online Booking

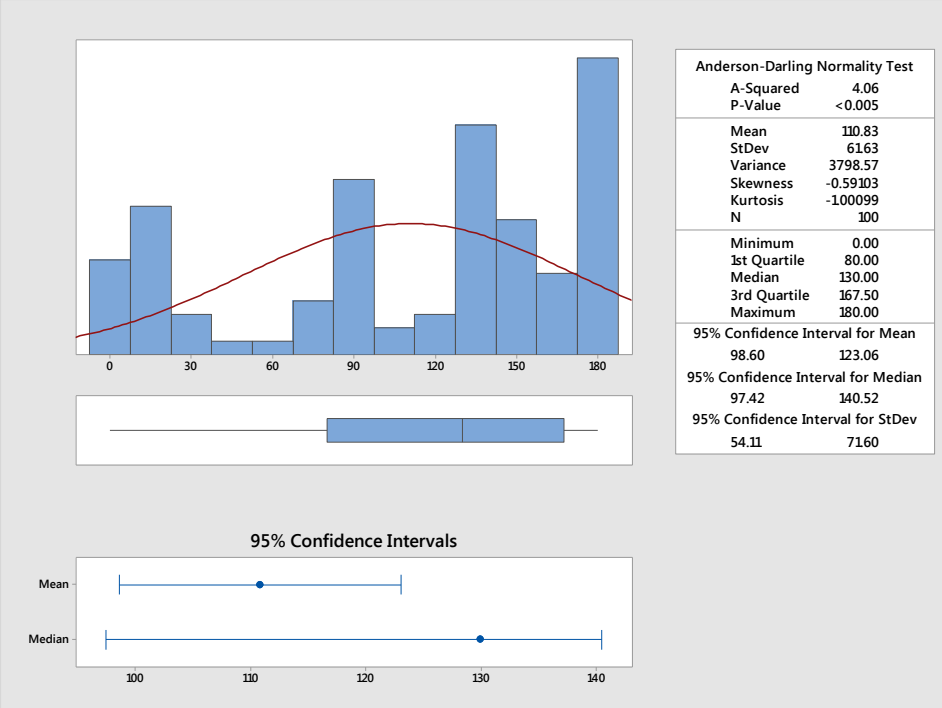

Figure 4.9 is the graphical summary regarding the actual use of the Internet/ Wi-Fi system of the organization. The Anderson-Darling test confirmed the non-normality of the dataset. The box plot suggests a negatively skewed distribution. The first quartile 90 showed that at most 25% of the respondents haven't used the Internet-Wi-Fi system of the organization. It seems some of the respondents were unsure whether the organization has such a system or not. However, the third quartile (160) showed that 25% of the respondents strongly agreed that they used the system frequently.

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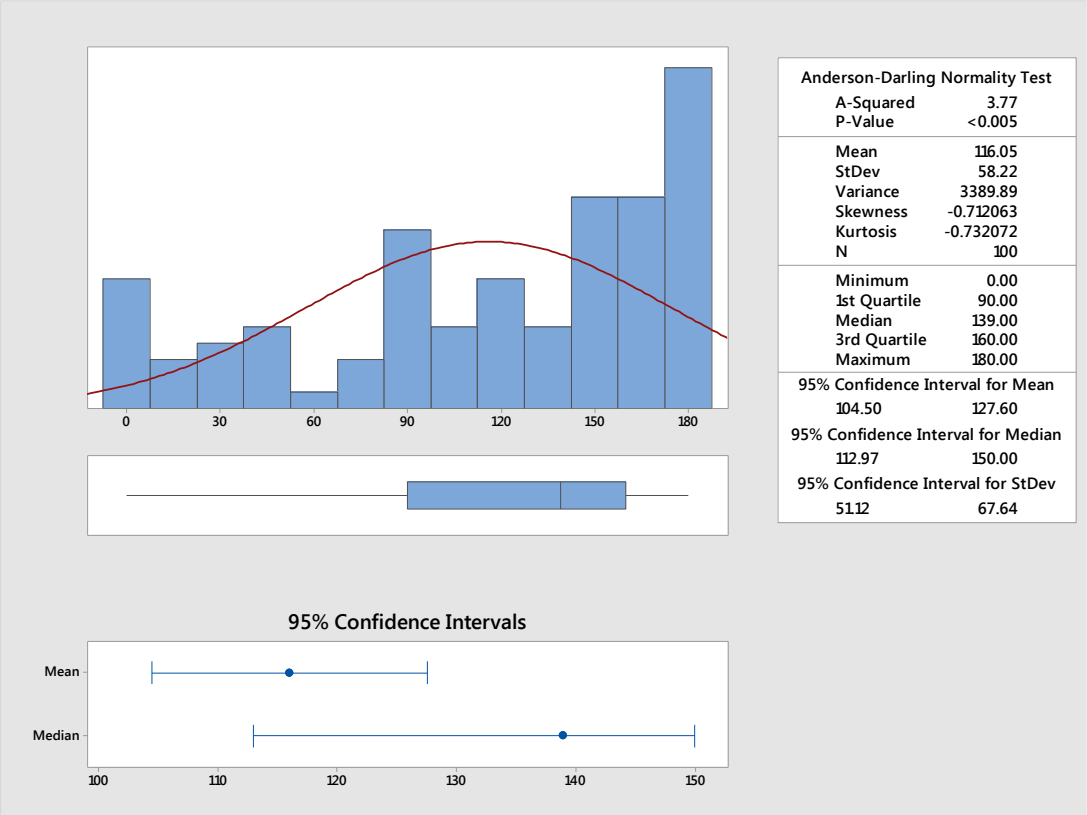
Figure 4.9: Graphical Summary of *A*: Internet/ Wi-Fi



4.3 Testing Digital Literacy Technology Acceptance Model (DLTAM)

Technology acceptance is the degree of adoption and use of information and communication technology (El Archie, 2023). The Technology Acceptance Model (TAM) of Davis (1985) is one of the well-known models for testing the technology acceptance of computerized systems. This study modified the TAM, which has been named the 'Digital Literacy Technology Acceptance Model (DLTAM)'. The model was tested in reference to two computerized systems: an online booking system and an Internet/Wi-Fi system.

4.3.1 Correlation Analysis

Correlation analysis helps to understand whether two variables move together in the same direction or opposite directions. Plotting a scatter diagram is the first step of correlation analysis, it helps us to get some idea about the direction and strength of the correlation. On a scatter diagram, the dependent variable is on the y-axis and the independent variable is on the x-axis. If the dependent variable increases as an independent variable, then there is a direct or positive correlation between the two variables, if the dependent variable decreases as the independent variable increases, then the relationship is inverse or negative.

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Calculating the correlation coefficient is the second step of correlation analysis. If the random variables are numerical, Karl Pearson's correlation coefficient is calculated for the sample data to evaluate the strength of the correlation, if the random variables are categorical, Spearman's rank correlation coefficient is calculated to evaluate the strength of the correlation (Attwood et al., 2008)

All the random variables of the study are numerical, as such Karl Pearson correlation analysis was conducted to test whether there exist significant linear correlations between: Digital Literacy (DL), Perceived Ease of Use (PE), Perceived Usefulness (PU), Attitudes Towards Using the System (ATU) and the Actual System Use (A). The correlation matrix shows bi-variate correlation coefficients for the sample and the *p*-value of the hypothesis test for population correlation:

$H_0 : \rho = 0$
$H_1 : \rho \neq 0$ where ρ is the population correlation coefficient.

The following seven hypotheses were tested at a 1% significance level (α=0.01); the null hypothesis was rejected if the *p*-value was less than the significance level.

Hypothesis 1:
H_0: There is no association between DL_T and PE.
H_1: There is an association between DL_T and PE.

Hypothesis 2:
H_0: There is no association between DL_T and PU.
H_1: There is an association between DL_T and PU.

Hypothesis 3:
H_0: There is no association between DL_T and ATU.
H_1: There is an association between DL_T and ATU.

Hypothesis 4:
H_0: There is no association between DL_T and A.
H_1: There is an association between DL_T and A.

Hypothesis 5:
H_0: There is no association between PE and PU.
H_1: There is an association between PE and PU.

Hypothesis 6:
H_0: There is no association between PE and ATU.
H_1: There is an association between PE and ATU.

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Hypothesis 7:
H_0: There is no association between PU and ATU.
H_1: There is an association between PU and ATU.

Hypothesis 8:
H_0: There is no association between ATU and A.
H_1: There is an association between ATU and A.

4.3.1.1 Testing DLTAM on Online Booking System

The scatter plot (Figure 4.10) shows that PE increases with increasing DL, it suggests a positive correlation between DL and PE, means there could be a direct correlation between digital literacy of an individual and his/ her perceived ease of use about online booking system.

Figure 4.10: Scatter Plot for DL vs PE-Online Booking (OB)

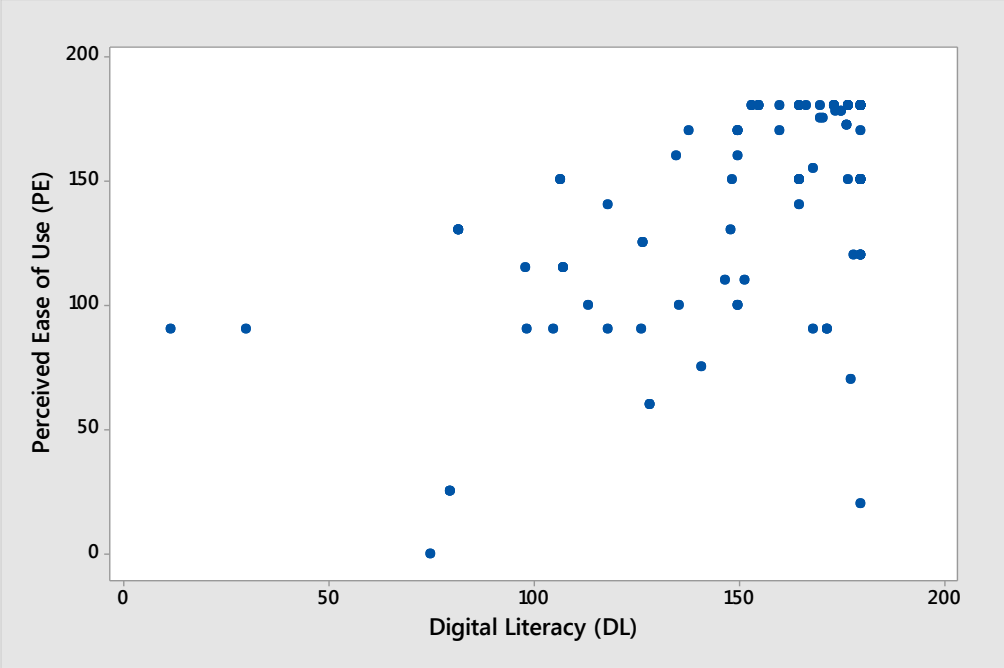

Figure 4.11 is the scatter plot of DL vs. PU, it suggests a positive correlation between DL and PU, similarly DL and ATU also suggest a positive correlation (Figure 4.12). Accordingly, the perceived use of online booking systems and his /her attitude towards using the system may correlate to the digital literacy of individuals.

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Figure 4.11: Scatter Plot-DL vs PU (OB)

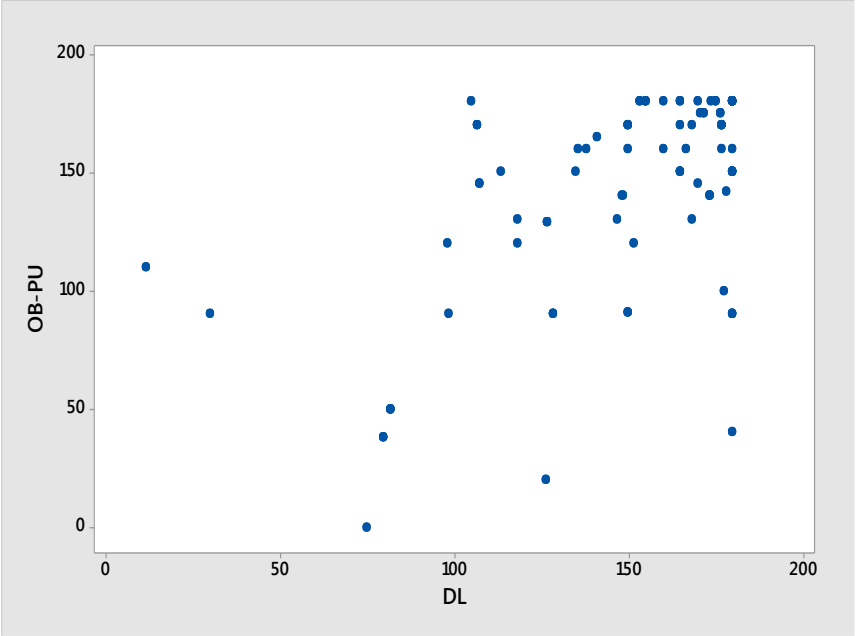

Figure 4.12: Scatter Plot-DL vs ATU (OB)

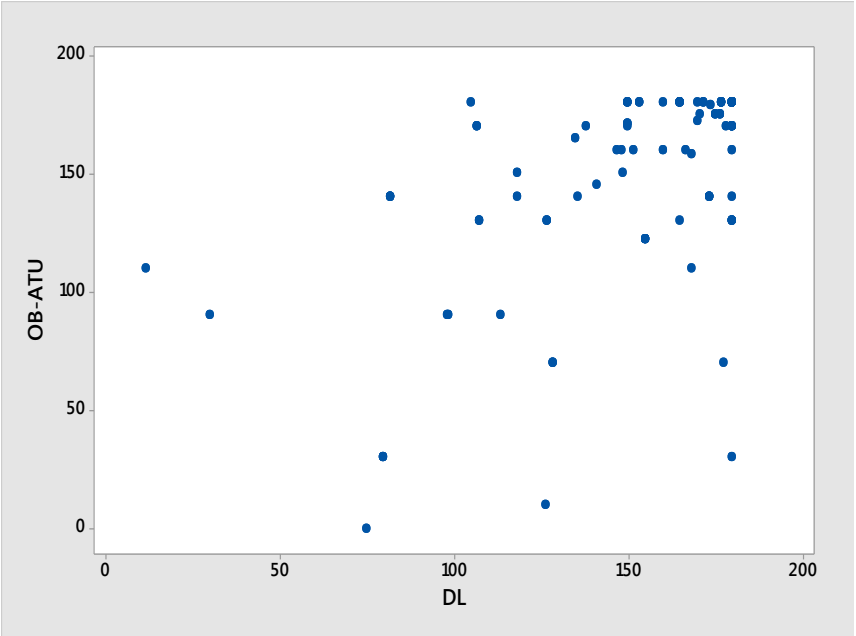

Figure 4.13 is the scatter plot of PE vs. ATU, it suggests a positive correlation between the perceived ease of using the online booking system and attitude towards using the system.

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Figure 4.13: Scatter Plot-PE vs ATU (OB)

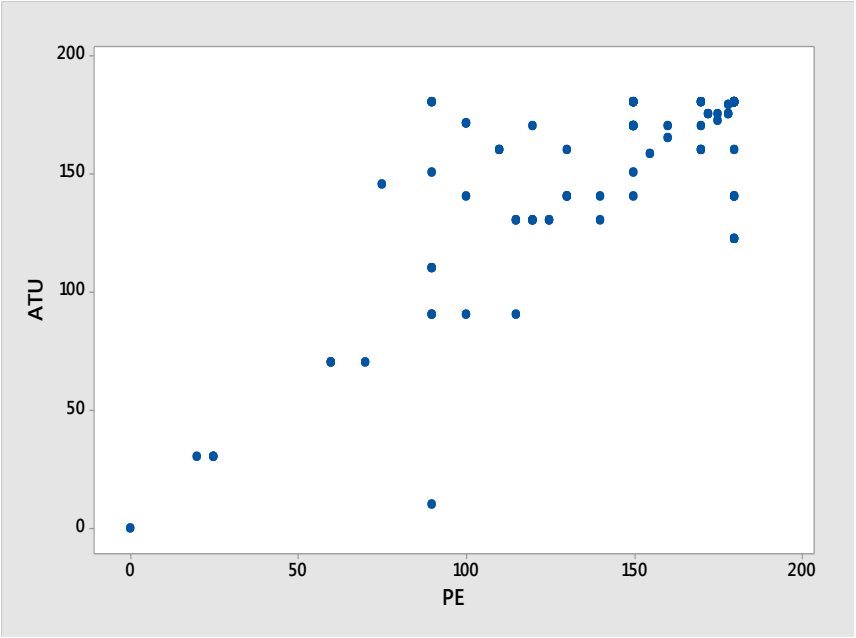

Figure 4.14 is the scatter plot of PU vs. ATU, it suggests a positive correlation between perceived usefulness of the system and individual's attitude towards using the system.

Figure 4.14: Scatter Plot-PU vs ATU (OB)

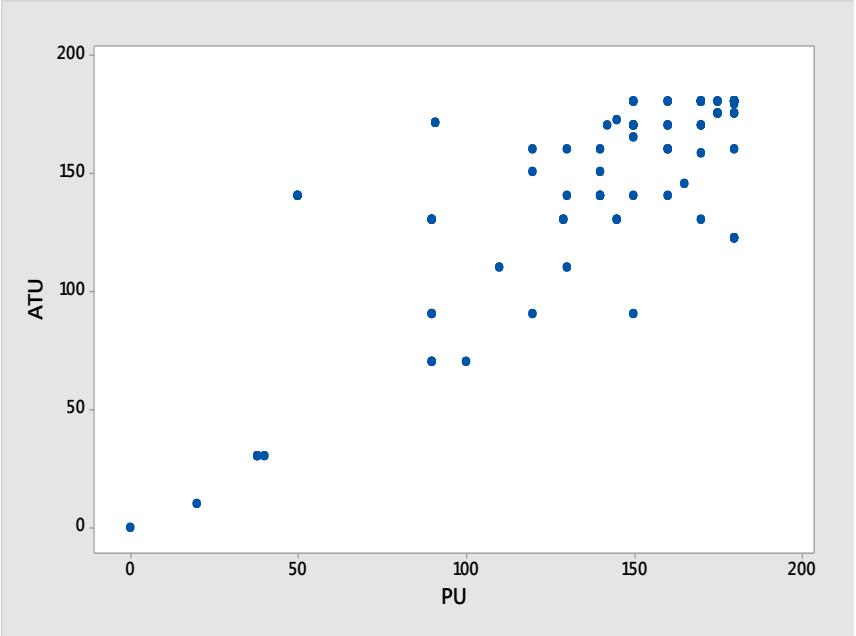

Figure 4.15 is the scatter plot of ATU vs. A. It suggests a positive correlation between attitude towards using the system and actual system use.

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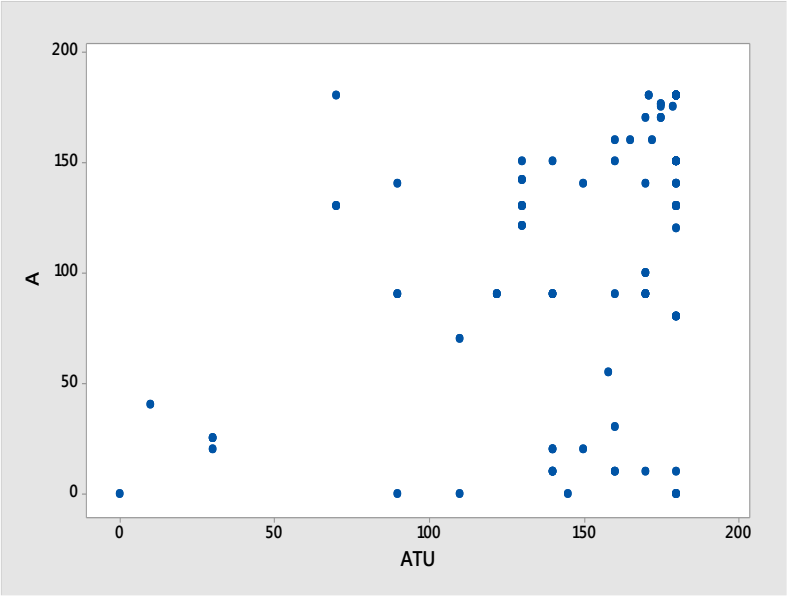
Figure 4.15: Scatter Plot-ATU vs A (OB)



As the second step of correlation analysis, Karl Pearson's correlation coefficients were obtained for bi-variables, and hypothesis tests for population correlations were conducted at a 1% significance level. Table 4.1 is the correlation matrix of the bi-variables of the online booking system. Results show that p-values of the significance tests between DL and PE, DL and PU, DL and ATU and DL and A are less than the significance level (0.000<0.01), therefore null hypotheses were rejected and concluded that there exist significant positive linear relationships between DL and: PE, PU, ATU, A. Similarly, P-values of the correlation tests between PE and ATU, PU and ATU, ATU and A also significant, therefore it is concluded that there are significant positive linear correlations between: PE and ATU, PU and ATU, ATU and A.

Table 4.1: Correlation Matrix for Online Booking System

	DL	OB-PE	OB-PU	OB-ATU
OB-PE	0.565 *(0.000)*			
OB-PU	0.577 *(0.000)*	0.768 *(0.000)*		
OB-ATU	0.546 *(0.000)*	0.775 *(0.000)*	0.798 *(0.000)*	
OB-A	0.502 *(0.000)*	0.537 *(0.000)*	0.470 *(0.000)*	0.412 *(0.000)*

Cell Contents: Pearson correlation *(p*-Value)

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4.3.1.2 Testing DLTAM on Internet/ Wi-Fi System

Scatter plots were obtained for the Internet/ Wi-Fi system and found results similar to the online booking system.Karl Pearson's correlation coefficients were obtained for bi-variables, and hypothesis tests for population correlations were conducted at a 1% significance level. Table 4.2 is the correlation matrix of the bi-variables of the online booking system.

Table 4.2: Correlation Matrix for Internet/ Wi-Fi System

	DL	WiFi-PE	WiFi-PU	WiFi-ATU
WiFi-PE	0.545 *(0.000)*			
WiFi-PU	0.527 *(0.000)*	0.844 *(0.000)*		
WiFi-ATU	0.499 *(0.000)*	0.770 *(0.000)*	0.735 *(0.000)*	
WiFi-A	0.434 *(0.000)*	0.377 *(0.000)*	0.302 *(0.002)*	0.297 *(0.003)*

Results show that P-values of the significance tests between DL and PE, DL and PU, DL and ATU and DL and A are less than the significance level (0.000<0.01), therefore null hypotheses were rejected and concluded that there exist significant relationships between DL and: PE, PU, ATU, A. Similarly, P-values of the correlation tests between PE and ATU, PU and ATU, ATU and A also significant, therefore it is concluded that there are significant correlations between: PE and ATU, PU and ATU, ATU and A.

4.4 Testing Regression Models on DL, PE, PU, ATU, and A

Simple Linear Regression analysis was conducted to see whether there exists a linear relationship between variables. A sample of hundred respondents including fifty domestic tourists and fifty international tourists was used for regression analysis. The random variables of the study were not normally distributed, but they are numerical variables and the sample size is larger than thirty, hence by the Central Limit Theorem, sampling distributions of the means of random variables are approximately normally distributed, hence regression analysis is appropriate (Saunders et al., 2007, Greener 2008).

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The following model was tested on DL and PE:

$$PE = \beta_0 + \beta_1 DL + \varepsilon$$

Analysis of Variance (ANOVA) was used to conduct the hypothesis tests for the overall model and model parameters.

Hypothesis test: $H_0 : \beta_i = 0$
$H_1 : \text{At least one } \beta_i \neq 0$

Table 4.3 ANOVA Output for Regression Analysis for PE and DL

Source	DF	Adj SS	Adj MS	F-value	P-value
Regression	1	58596	58596.3	46.02	0.000
DL	1	58596	58596.3	46.02	0.000
Error	98	124786	1273.3		
Lack of Fit	40	84313	2107.8	3.02	0.000
Pure Error	58	40473	697.8		
Total	99	183383			
Term	Coef	SE of Coef	T value	P-value	VIF
Constant	36.9	15.9	2.33	0.222	
DL	0.690	0.102	6.78	0.000	1.00

A *p*-value of the overall model is less than the significance level (0.000< 0.01); as such, the null hypothesis is rejected, hence it is concluded that DL and PE are linearly related, and the fitted model is:

$PE = 0.69\,DL$. Accordingly, if DL is increased by one unit, PE will increase by 0.69 units. In other words, the perceived ease of use of a system depends on the digital literacy of the individual.

The interaction effect of DL and PE was tested by using the model $ATU = \beta_0 + \beta_1 PE + \beta_2 PE.DL + \varepsilon$ and the ANOVA output is in Table 4.4.

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Table 4.4: ANOVA Output for Regression Analysis for ATU, PE and PE.DL

Source	DF	Adj SS	Adj MS	F-value	P-value
Regression	2	103798	51898.9	74.16	0.000
PE	1	10086	10085.7	14.41	0.000
DL.PE	1	594	594.1	0.85	0.359
Error	97	67883	699.8		
Lack of Fit	51	66683	1307.5	50.12	0.000
Pure Error	46	1200	26.1		
Total	99	171680			
Term	Coef	SE of Coef	T value	P-value	VIF
Constant	48.0	10.1	4.73	0.000	
PE	0.613	0.161	3.80	0.000	6.83
DL.PE	0.000690	0.000749	0.92	0.359	6.83

ANOVA results revealed that the overall model is significant (p=0.000<0.01), but the interaction effect is not as significant as the p-value of DL.PE is greater than the significance level (0.359>0.01). Similar results were obtained when testing the interaction effect between DL and PU; as such, variable DL is not a mediating variable, it is an independent variable related to PE, PU, and ATU.

The general rule of fitting the regression model is that at least two-thirds of the dataset should be used for model fitting, and the rest of the dataset should be used for model verification. It is a must to confirm the normality and independence of residuals, and also necessary to calculate the measurement of forecasting errors in model fitting and verification. The study followed the standard procedure in model fitting. The Table 4.5 summarizes the regression analysis conducted for two systems.

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Table 4.5: Summary of Regression Analysis for Testing DLTAM

System	Tested Model	Fitted Model
Online Booking	$PE = \beta_0 + \beta_1 DL + \varepsilon$	$PE = 0.69\,DL$ (1)
	$PU = \beta_0 + \beta_1 DL + \varepsilon$	$PU = 38.7 + 0.70DL$ (2)
	$ATU = \beta_0 + \beta_1 DL + \varepsilon$	$ATU = 52.3 + 0.645DL$ (3)
	$ATU = \beta_0 + \beta_1 PE + \varepsilon$	$ATU = 43.95 + 0.75PE$ (4)
	$ATU = \beta_0 + \beta_1 PU + \varepsilon$	$ATU = 37.74 + 0.78PU$ (5)
	$ATU = \beta_0 + \beta_1 PE + \beta_1 PE.DL + \varepsilon$	The model does not fit.
	$ATU = \beta_0 + \beta_1 PU + \beta_1 PU.DL + \varepsilon$	The model does not fit.
	$A = \beta_0 + \beta_1 ATU + \varepsilon$	$A = 43.95 + 0{,}75ATU$ (6)
Internet/ Wi-Fi	$PE = \beta_0 + \beta_1 DL + \varepsilon$	$PE = 52 + 0.61DL$ (7)
	$PU = \beta_0 + \beta_1 DL + \varepsilon$	$PU = 76 + 0.51DL$ (8)
	$ATU = \beta_0 + \beta_1 DL + \varepsilon$	$ATU = 79.3 + 0.5DL$ (9)
	$ATU = \beta_0 + \beta_1 PE + \varepsilon$	$ATU = 61.23 + 0.65PE$ (10)
	$ATU = \beta_0 + \beta_1 PU + \varepsilon$	$ATU = 43.3 + 0.74PU$ (11)
	$ATU = \beta_0 + \beta_1 PE + \beta_1 PE.DL + \varepsilon$	The model does not fit.
	$ATU = \beta_0 + \beta_1 PU + \beta_1 PU.DL + \varepsilon$	The model does not fit.
	$A = \beta_0 + \beta_1 ATU + \varepsilon$	$A = 35.2 + 0.52ATU$ (12)

The models: (1), (2), (3), (7), (8), and (9) in Table 4.5 confirm that there exist linear relationships between DL and PE, DL and PU, and DL and ATU. Models with interaction effects were not fitted; as such, there are no interaction effects. Equations (4) and (10) confirm that there exists a linear relationship between PE and ATU. Equations (5) and (11) confirm that there exists a causal relationship between PU and ATU. Equation (6) confirms that there exists a linear relationship between ATU and A. The residuals of all the fitted models were normally distributed and independent.

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Mean Absolute percentage error (MAPE), Mean Absolute Deviation (MAD) and Mean Square Error (MSE) were satisfactorily small at model fitting and verification. Hence, it is concluded that DL has linear relationships with PE, PU, and ATU. The relationships between PE and ATU, PU and ATU, and ATU and A align with the TAM of Davis (1985). The results of the Correlation analysis and Regression results confirm hypotheses 1 to 8. It was concluded that the proposed DLTAM model is valid and suitable for assessing technology acceptance. Also it is concluded that the fitted models are suitable for forecasting

5. DISCUSSION AND CONCLUSION

Technology can be defined as the application of scientific knowledge, tools, techniques, and processes to solve problems or enhance human life. It includes both tangible artefacts, such as machines, computers, and tools and intangible systems, including software, algorithms, and methodologies designed to meet human needs. Measuring or assessing the degree of technology acceptance among individuals is essential for determining the success of implementing digital systems in organizations (Davis, 1989). Understanding technology acceptance provides insight into whether and how users will adopt, utilize, and benefit from a given technology.

Assessing user acceptance allows organizations to predict adoption behavior, identify barriers, and highlight valuable or problematic features prior to system deployment. For example, before introducing new software, an organization can evaluate user acceptance to detect areas of concern. If users perceive a mobile banking app as insecure, developers can enhance authentication measures accordingly. Moreover, acceptance assessments enable organizations to design training programs or change management strategies that address user concerns. Since many IT projects fail due to low user acceptance, measuring acceptance helps reduce resistance**,** mitigate project risks**,** and maximize return on investment (Venkatesh et al., 2003). Beyond organizational benefits, such assessments also assist governments and institutions in formulating policy**,** budgeting, and digital transformation strategies.

Several theoretical models have been proposed to assess technology acceptance, including the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), the Technology Acceptance Model (TAM), the Unified Theory of Acceptance and Use of Technology (UTAUT) and its extensions**,** UTAUT2 and UTAUT3. This study provided a comprehensive literature review and identified the TAM of Davis (1985) as the most suitable model among these frameworks. The TAM stands out due to its simplicity**,** strong empirical foundation**,** flexibility**,** practicality**,** and predictive power (King, 2006). It focuses on only two core constructs, Perceived Usefulness (PU) and Perceived Ease of Use (PE), making it both concise and effective. Numerous studies have confirmed TAM's reliability and applicability across diverse contexts (Venkatesh &

Davis, 2000). Organizations favor TAM because it is easy to implement in surveys, cost-effective, and provides actionable insights for system design, training, and deployment. Compared to complex frameworks such as UTAUT, TAM is less resource-intensive and enables managers to identify acceptance barriers early in the system design phase (Legris, Ingham & Collerette, 2003).

However, despite its strengths, this study recognizes that digital literacy (DL) plays a pivotal role in shaping technology acceptance, adoption, and effective usage. Individuals with higher digital literacy tend to find new technologies less intimidating and more intuitive (Park, 2013). Digital literacy enhances computer self-efficacy and lowers technology-related anxiety, thereby fostering more positive attitudes toward adopting new technologies (Teo, 2009). Moreover, digitally literate users are more capable of troubleshooting**,** adapting to updates, and exploring system features independently (Ng, 2012).

Accordingly, this study introduced a modified version of the TAM, incorporating digital literacy, the Digital Literacy Technology Acceptance Model (DLTAM)**.** This model was empirically tested using data collected in the study. The results supported the core relationships proposed by Davis (1985), confirming linear associations between PE and PU**,** PE and Attitude Toward Use (ATU)**,** PU and ATU**,** and ATU and Actual Use (A). Additionally, the findings revealed that DL has significant direct relationships with PE**,** PU, and ATU, thereby validating the proposed DLTAM. Regression analysis further confirmed linear relationships between DL and PE**,** DL and PU**,** and DL and ATU, establishing DLTAM as a robust model for evaluating technology acceptance. While this study applied DLTAM within the hospitality and tourism (H&T) industry**,** its applicability likely extends to other sectors as well.

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