

A Comprehensive Acceptance Testing of a Cordilleran-based Agro-Tourism Farm's AR Web and Android Mobile App

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Abstract. A seamlessly designed web and mobile app incorporating augmented reality is crucial for the success of the agro-tourism industry in the digital era, catering to the information needs of mobile-dependent tourists, facilitating exploration of new destinations, and fostering immersive adventures while enhancing connections to nature, culture, people, and history. This study aimed to determine the level of acceptability of the Agguimangan Explore App, an augmented reality (AR)-based web and Android mobile applications developed by the researchers for the Agguimangan Agro-Eco Tourism Farm of Pudtol, Apayao, Cordillera Administrative Region, Philippines as the subject institution by conducting 3 acceptability measures, namely: User Acceptance Test (UAT), Operational Acceptance Test (OAT), and Regulation Acceptance Test (RAT). Twenty (20) randomly selected beta testers were surveyed as part of the UAT to identify whether the developed apps conform to the usability and user experience requirements of online guest end-users while 10 randomly selected management stakeholders of the subject institution were surveyed as part of the OAT to check the readiness of the apps in terms of functional suitability, performance efficiency, reliability, security, and maintainability. Meanwhile, 2 selected I.T. and legal experts were consulted as part of the RAT to validate the compliance of the app. For each measure of acceptance test, a 7-point Likert scale survey questionnaire was employed as the research tool. Data gathered were statistically treated using Weighted Mean which numerically embodied the comprehensive level of acceptability of the developed apps. Results show a 5.66 weighted mean with a description of Acceptable for the usability test while a 5.69 weighted mean was obtained during operational acceptance test with a description also of Acceptable. In terms of regulation acceptance testing, the developed apps garnered 5.90 weighted mean, likewise, with a description of Acceptable. Overall, the Agguimangan Explore App obtained a 5.75 weighted mean with an overall description of Acceptable which is indicative that the developed apps have a significant degree of user, operational, and regulation acceptability in general. The successful system tests recommend immediate implementation and integration of the app at Agguimangan Agro-Eco Tourism Farm. This move will realize promised benefits for stakeholders, enhance agri-tourism promotion, and uphold Apayao's leadership in ICT use. The app will modernize marketing to domestic and international tourists, boost productivity and employee confidence, and ensure Data Privacy Act compliance.

Keywords: acceptance testing, user acceptability, operational acceptability, regulation acceptability, augmented reality

1. Introduction

The Philippines, as an archipelago, still has many unexplored natural treasures that attract both domestic and international tourists. As one of the agriculturally-rich nations in south east Asia, the majority its provinces boast not only of export-quality agricultural products, but also agricultural-based tours and prolific biodiversity among its people, history, gastronomy, culture, and heritage.

Agro-tourism, a globally recognized concept, integrates agriculture with tourism, inviting visitors to explore orchards, farms, plantations, agriculture-based traditional heritage villages, and organic lifestyles among natives and tribal communal dwellings (Gigliotti & Micarelli, 2022). Among the various transformative tools shaping this industry, augmented reality (AR) emerges as a standout which seamlessly bridges the gap between the physical

and digital realms, providing immersive experiences for both physical and virtual tourists, the latter preferring technological involvement through mobile and web applications in the form of 360 degrees photo-realistic panoramic viewing, navigable 3D and 2D maps, engaging virtual tours, timely tourist feedbacks, and helpful online chat support and contact us forms (Azhar, Kusumawati Hidayat, Ristya Rini, & Rifqi Novica, 2019).

According to Sokhanych (2023), as the tourism industry continues to evolve, AR will likewise remain a significant immense technological wealth while new mobile apps, through machine learning and artificial intelligence, offer navigation assistance, language translation, and interactive guides, which further enhance the travelers' overall experiences (Nascimento & Loureiro, 2023). Egger & Neuburger (2020) pointed out that while agro-tourism remains rooted in traditional practices, integrating AR can propel it into the digital age, captivating a new generation of visitors while at the same time emphasizing its role in sustainable tourism development (Hall, Sharp, & Ritchie, 2020). Thus, according to Liu and Liu (2021) a well-designed web and mobile apps integrated with AR

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can be premised as a modern requisite of to the success of the agro-tourism industry nowadays as more and more tourists use their mobile phones and the Internet to access timely information, find new destinations, and experience new adventures while at the same time connecting to nature, culture, people, and history (Kim & Kim, 2020; Liu & Lee, 2021).

In the study of Tussyadiah & Li (2020) and Wang, Yu & He (2022), the authors explored the potential of AR in influencing tourist decision-making, examined aspects like enhancing destination marketing, facilitating decision-making, and enriching travel experiences. Meanwhile, in a previous work, the herein researchers published and emphasized the significant influence of Design Thinking in the careful development of AR-based and agrotourism-centric mobile application and the utilization of System Usability Scale (SUS) to determine the level of acceptability of the developed app in terms of user interface and experience (Duriguez & Palaoag, 2024).

Acceptance testing plays a huge role in determining the readiness of software for delivery or for production-grade utilization with focus on evaluating the compliance of the developed software with business requirements and assess its adequacy, suitability, and satisfactoriness among its stakeholders (Vijay, 2022). Author Blokdyk (2019) listed on his book that there are several common types of acceptance testing methods and that they vary on particular stage of software development and the software development life cycle model being utilized, but they all ensure that end-user requirements, business processes needs, related laws and policy requisites are all met to satisfy all the acceptance criteria.

This study centers on the comprehensive acceptance testing of the Agguimangan Explore App, an augmented reality (AR)-based web and Android mobile applications developed by the researchers for the Agguimangan Agro-Eco Tourism Farm of Pudtol, Apayao, Cordillera Administrative Region, Philippines by employing the 3 most common acceptability types: User Acceptance Test (UAT), Operational Acceptance Test (OAT), and Regulation Acceptance Test (RAT). The UAT aims to primarily ascertain whether a software is working correctly based on its end-users' needs (Alalwan & Rana, 2020). On the other hand, OAT targets to determine readiness of the software in terms of its non-functional requirements (Barker, 2024). Meanwhile, RAT, which is also known as Regulatory Compliance Testing, intends to verify whether the finished software conforms with existing relevant laws, local ordinances, rules and regulations implemented both domestically and internationally (Al-Emran & Khelifa, 2020).

Other popular software acceptance testing methodologies that were not covered include: Alpha Testing as this method has already been undertaken as part of the functional and non-functional testing phase of the core software modules during development and is required to be fully completed prior to conducting beta testing which will be covered during OAT (Hai-Jew, 2019); Business Acceptance Testing (BAT) which is the most challenging acceptance testing, due to the fact that it centers on whether the developed apps have achieved the economic benefits and profit goals of the business (Montvelisky, 2023), as this goal requires sufficient time to cover not only periodic sales but even profit trends during both peak and off-peak seasons; and Contract Acceptance Test (CAT) which is a method of determining whether all software criteria are met prior to full payment of the software development services rendered (Bestarion, 2023) since the researchers and the subject institution have not executed a service level agreement that involves monetary matters or financial gains in favor of the researcher-developers.

The researchers are motivated by the efforts and support of the staff, management, and tourists of the Agguimangan Agro-Eco Tourism Farm in performing this 3-tier comprehensive software acceptance testing as the said stakeholders not only nourish and promote rare natural landscapes and mountain sceneries in Pudlot, Apayao but also genuinely share among visitors the heritage and traditional way of living in the province of Apayao as the northernmost member of the Cordillera Administrative Region in the Philippines. As an implication, this study will highly benefit the subject institution in its continuous aspiration to provide immersive user experience, lead in utilizing modern ICT technologies in the Province of Apayao, and in strategically reaching out both domestic and international tourists.

2. Methodology

2.1 Research Design

The quantitative cross-sectional method of research was employed by the researchers for this study in order to collect relevant data from a group of population in a specific point of time based on their actual exposure or first-hand experience in using the developed web and mobile apps in the form of surveys or questionnaires (Schmidt & Brown, 2019).

To execute the comprehensive 3-tier acceptance testing, the general outline of this study was divided by the researchers into 5 phases: data gathering tool preparation, respondent selection, data gathering technique execution, data processing and statistical treatment, and output

together with its corresponding interpretation which is visually represented on Figure 1.

Figure 1 showcases the conceptual framework of the study in which during data gathering tool preparation phase, UAT, OAT, and RAT questionnaires were prepared by the researchers by incorporating specific relevant questions as to apps' usability and user experience for the UAT, non-

functional system requirements for the OAT, and data privacy compliance for RAT. Meanwhile, phase 2 involves the random selection of beta-testers from consenting end users of the developed app for the UAT, randomly selected employees and stakeholders Agguimangan Agro Eco Tourism Farm for the OAT, and selected I.T. and legal experts for the RAT.

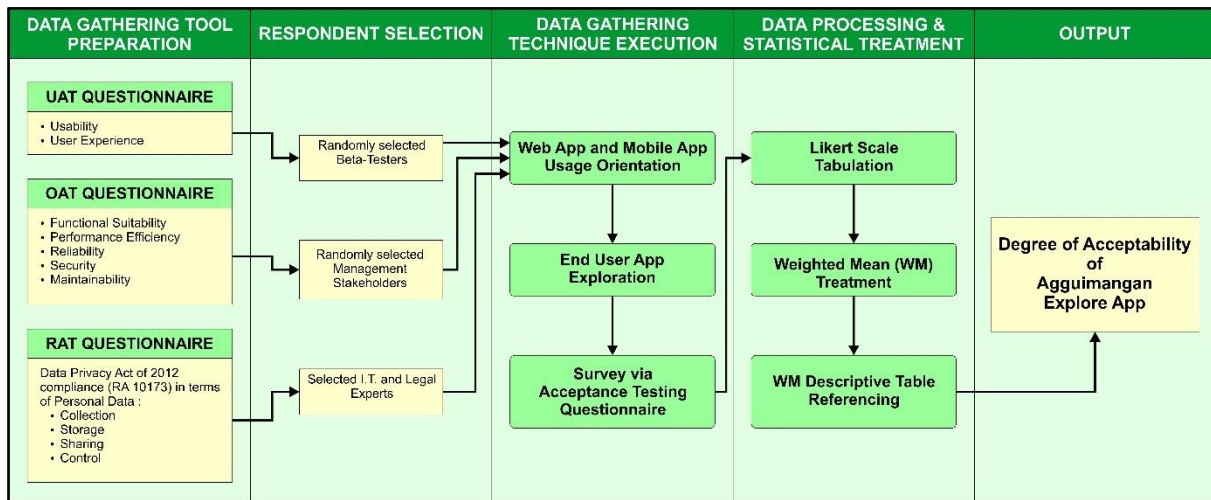


Figure 1. Conceptual Framework

The data gathering technique execution phase corresponds to the actual day of conducting the UAT, OAT, and RAT in which participants were first oriented on the functionalities, features, and usage of the Agguimangan Explore App. After which, respondents were given ample time to explore the developed app before answering their respective acceptance test questionnaire.

Once all respondents are done answering the survey questionnaires, responses were tabulated according to their Likert scale and were statistically treated using Weighted Mean and its corresponding description table. The final phase of the study refers to the output which is the overall degree of acceptability of the Agguimangan Explore App.

2.2 Data Collection

The data for this research came from the responses of the UAT, OAT, and RAT respective respondents. Twenty

(20) beta-testers or system end-users of the developed Agguimangan Explore App were randomly selected to participate during UAT. The demographic profile and distribution of UAT respondents are shown on Table 1.

Currently, Agguimangan Agro-Eco Tourism Farm encounters an average of 1,000 new visitors monthly during peak season (between months of December to May) and an average of 300 new visitors monthly during off-peak season (between months of June to November). Given these data, the average daily new visitors of the subject institution are between 10 to 30 persons, hence, the 20 randomly selected beta-testers covered majority or 66.67% of the average daily new visitors during peak season and was sufficient to provide the level of acceptability of the developed apps.

Table 1. Demographic Profile and Distribution of UAT Respondents n = 20

#	Demographic Profile	Selected Respondents		Total	
		Count	%Rate		
1	Sex	Male	10	50%	100%
		Female	10	50%	
2	Age Group	14 years old and below	4	20%	100%
		15 to 29 years old	4	20%	
		30 to 44 years old	4	20%	
		45 to 59 years old	4	20%	
		60 years old and up	4	20%	

3	Tourist Type	Domestic	10	50%	100%
		Foreign	10	50%	

As for the OAT, 10 management employees and stakeholders of the Agguimangan Eco-Tourism Farm were selected using convenience sampling to participate which included regular employees, on-call tour guides and

farm staff, farm supervisors, and managers. Table 2 presents the demographic profile and distribution of OAT participants.

Table 2. Demographic Profile and Distribution of OAT Respondents n = 10

#	Demographic Profile	Selected Respondents		Total	
		Count	%Rate		
1	Sex	Male	5	50%	100%
		Female	5	50%	
2	Position Type	Supervisory and Managerial	2	20%	100%
		Front Office Staff	2	20%	
		Accommodation Staff	3	30%	
		Farm & Amenities Staff	3	30%	
3	Job Tenure	Regular	7	70%	100%
		On-call/Temporary	3	30%	

This study was conducted during the peak season of the Agguimangan Eco-Tourism Farm in which the subject institution employs 3 to 5 additional on-call or temporary-based workers aside from the seven regular employees. Thus, the size of sample corresponds to the majority of the total population of the study accounting to 83.33%. Employees and workers of the subject institution were chosen to be part of the OAT since they possess first-hand information about the actual day-to-day business processes and operations of the eco-tourism farm, thus, can provide significant inputs as to the operational acceptability of the developed apps.

Meanwhile, 1 I.T. expert and 1 legal expert were selected using convenience sampling also by the researchers to participate in the RAT to provide a substantial assessment and consultative inputs on the data privacy compliance of the developed app, particularly in terms of personal data collection, storage, sharing, and control. They were selected because they possess legal expertise and technical experience in the subject matter and are available within the accessibility sphere of the researchers.

The data gathering tools used in this study followed a 7-point Likert scale survey questionnaire in which every question can be answered by a corresponding score that relates to the degree of acceptability such that 1 would be equivalent to Totally Unacceptable, 2=Unacceptable, 3=Slightly Unacceptable, 4=Neither Unacceptable nor

Acceptable, 5=Slightly Acceptable, 6=Acceptable, and 7=Totally Acceptable.

For the UAT questionnaire, the researchers categorized questions into two: namely, usability and user experience, to measure efficiency, effectiveness, and satisfaction. Each category is composed of 20 questions – 10 non-functional questions each for the web and mobile apps. On the other hand, for the OAT questionnaire, 5 questions for each non-functional categories were designed to gather key operational requirements of the apps in terms of functional suitability, performance efficiency, reliability, security, and maintainability. Meanwhile, for the RAT questionnaire, 10 questions for each data privacy category were prepared by the researchers to cover personal data in terms of collection, storage, sharing, and control.

2.3 Data Processing and Interpretation

The researchers utilized Weighted Mean to statistically treat the data gathered and determine the acceptability of the newly developed app for each category and the totality of the system, respectively. The following is the formula for Weighted Mean:

$$Weighted\ Mean = \frac{w_1x_1 + w_2x_2 + \dots + w_nx_n}{w_1 + w_2 + \dots + w_n} \times 100\% \quad (1)$$

where w refers to the weights or equivalent to the specified Likert score and x represents the set of mean values. Table 3 exhibits the scale in interpreting the Weighted Mean.

Table 3. Scale in Interpreting the Acceptability Test Weighted Mean

Range	Interpretation
6.16 – 7.00	Totally Acceptable (TA)
5.30 – 6.15	Acceptable (A)

4.44 – 5.29	Slightly Acceptable (SA)
3.58 – 4.43	Neither Unacceptable Nor Acceptable (NUNA)
2.72 – 3.57	Slightly Unacceptable (SU)
1.86 – 2.71	Unacceptable (U)
1.00 – 1.85	Totally Unacceptable (TU)

The researchers targeted to obtain a final Weighted Mean value between 5.30 to 7.00 to have a significant degree of overall acceptability of the developed apps considering that such level of acceptability is tantamount to the degree of quality that the software has and that lower final weighted mean ranging from 1.00 to 4.43 means that the finished system is less acceptable due to low degree of quality (Bestarion, 2023).

3. Results and Discussion

Table 4 presents the tabulation of the 20 randomly selected UAT respondents who participated as beta-testers during a moderated usability testing via a questionnaire composed of 40 items equivalently grouped as either usability or user experience category and as either part of the web or mobile app.

Table 4. User Acceptance Test Tabulated Data

Category	App	Q	Respondent Score																				WM DESC	
			1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20		
Usability	Mobile	1	7	7	5	3	6	4	7	6	6	6	7	5	7	5	7	6	4	5	4	6	5.65	A
		2	6	6	6	3	4	5	6	6	7	4	7	7	4	7	4	6	5	6	6	6	5.55	A
		3	4	6	4	3	5	7	5	6	5	4	7	5	5	6	6	3	6	5	6	5	5.15	SA
		4	6	7	6	7	7	7	5	6	7	7	6	5	7	7	7	6	7	6	5	5	6.40	TA
		5	6	7	5	6	7	6	5	6	6	7	6	5	5	7	5	7	7	6	6	7	6.10	A
		6	5	7	5	7	7	5	3	7	6	6	6	5	7	5	6	4	6	5	7	6	5.75	A
		7	6	6	7	6	6	5	7	7	7	5	7	6	6	5	7	7	7	6	5	6	6.20	TA
		8	7	6	6	7	7	4	6	7	6	3	7	6	3	5	5	3	7	7	7	4	5.65	A
		9	5	4	3	3	6	4	5	6	7	7	3	4	3	5	7	5	5	6	4	4	4.80	SA
		10	7	6	7	6	5	5	5	6	5	5	6	4	7	6	4	7	5	7	4	7	5.70	A
	Web	11	6	4	7	5	4	6	7	5	6	5	4	4	6	5	7	6	6	7	4	4	5.40	A
		12	7	7	7	5	7	6	5	6	6	6	6	7	7	6	6	6	5	7	5	7	6.20	TA
		13	7	5	4	3	6	7	5	6	7	7	5	6	3	6	5	6	7	7	6	7	5.75	A
		14	4	7	6	3	6	4	7	7	5	4	5	5	5	4	4	6	7	5	5	4	5.15	SA
		15	6	7	7	6	6	5	3	7	7	7	7	5	3	5	5	6	6	6	6	5	5.75	A
		16	5	7	5	6	7	7	3	6	6	3	5	5	6	6	6	3	6	7	6	5	5.50	A
		17	4	5	4	7	7	4	3	5	5	7	5	4	7	4	5	5	7	6	6	4	5.20	SA
		18	6	7	5	7	5	7	4	5	6	6	5	7	7	6	7	6	5	5	6	7	5.95	A
		19	7	4	3	3	4	5	6	7	6	7	6	7	5	7	6	5	5	6	4	5	5.40	A
		20	6	7	7	4	4	5	4	4	6	6	3	5	3	4	6	3	6	6	5	6	5.00	SA
User Experience	Mobile	21	7	6	5	7	7	5	3	5	6	3	6	6	6	6	5	3	5	5	6	6	5.40	A
		22	7	5	6	6	7	6	5	7	6	4	6	6	4	6	6	3	7	5	5	7	5.70	A
		23	6	5	7	7	7	5	6	7	5	7	3	5	4	4	6	3	4	7	5	4	5.35	A
		24	6	4	5	7	4	6	3	5	6	6	7	5	7	6	4	7	7	7	4	7	5.65	A
		25	7	7	6	5	5	5	7	7	6	6	6	7	6	6	6	6	6	7	7	7	6.25	TA
		26	5	6	4	4	5	5	3	6	7	7	4	6	3	7	4	7	5	5	5	7	5.25	SA
		27	7	5	6	6	6	7	7	7	7	6	7	5	7	6	6	6	6	7	7	6	6.35	TA
		28	4	6	6	7	7	7	4	5	5	4	5	7	4	5	5	7	4	6	4	7	5.45	A
	Web	29	6	4	4	5	7	6	6	5	5	7	6	7	4	5	7	6	5	4	7	7	5.65	A
		30	5	5	7	5	6	5	6	6	6	5	6	5	5	6	5	7	6	5	5	6	5.60	A
		31	7	5	6	5	6	7	7	7	5	6	6	6	7	5	6	5	7	5	6	7	6.05	A
		33	7	4	3	4	5	6	5	5	6	3	3	7	3	4	6	3	6	6	6	7	4.95	SA
		34	7	6	6	5	7	6	7	5	5	5	7	7	5	7	7	5	6	7	7	7	6.20	TA
		35	7	7	5	6	4	4	7	5	5	6	5	6	3	7	7	6	5	7	7	6	5.75	A
		36	7	7	4	4	6	6	5	4	5	6	7	5	7	6	4	7	4	7	6	6	5.65	A

	37	6	7	5	5	4	7	5	6	5	3	7	6	4	5	7	7	5	5	6	7	5.60	A
	38	5	6	3	5	6	7	5	7	7	7	7	5	4	7	5	5	4	6	7	4	5.60	A
	39	5	6	7	6	7	6	6	5	6	6	7	6	7	6	5	7	7	6	5	7	6.15	A
	40	7	7	5	7	7	6	6	5	5	5	5	7	5	5	6	6	6	6	7	7	6.00	A
Overall Weighted Mean and Description																						5.66	A

Legend: **Q** = Question No.; **WM** = Weighted Mean; **DESC** = Description; **TA** = Totally Acceptable; **A** = Acceptable; **SA** = Slightly Acceptable; **NUNA** = Neither Unacceptable Nor Acceptable; **SU** = Slightly Unacceptable; **U** = Unacceptable; **TU** = Totally Unacceptable;

Results revealed an overall weighted mean of 5.66 with a description of Acceptable which means that UAT respondents found both the mobile and web app versions of the Agguimangan Explore app to be acceptable in terms

of usability and user experience. Out of 40 item questions corresponding to usability and user experience, UAT respondents found 6 items to be Totally Acceptable, majority or 6 items to be Acceptable, and only 7 items were found to be Slightly Acceptable. This is indicative that the developed web and mobile app versions of the Agguimangan Explore app possess an overall acceptable usability and user experience.

Table 5 highlights the overall UAT score per category and per app as a summarized tabulation of data from Table 4.

Table 5. Summary of User Acceptance Test by Category

Category	App	Weighted Mean	Description	Category Weighted Mean	Category Description
Usability	Mobile	5.70	Acceptable	5.61	Acceptable
	Web	5.53	Acceptable		
User Experience	Mobile	5.67	Acceptable	5.67	Acceptable
	Web	5.67	Acceptable		
Overall Weighted Mean and Description				5.66	Acceptable

Weighted Mean Scale: 1.00 – 1.85 = Totally Unacceptable; 1.86 – 2.71 = Unacceptable; 2.72 – 3.57 = Slightly Unacceptable; 3.58 – 4.43 Neither Unacceptable Nor Acceptable; 4.44 – 5.29 = Slightly Acceptable; 5.30 – 6.15 = Acceptable; 6.16 – 7.00 = Totally Acceptable.

Data in Table 5 unveiled that UAT respondents found out that both mobile and web app versions of the Agguimangan Explore app have close degree of acceptability in terms of usability and user experience and that at each category and app version, UAT respondents are in unison in providing an overall weighted mean of 5.66 with a description of Acceptable which indicates that the developed Agguimangan Explore App has an

acceptable degree of acceptability in terms of usability and user experience.

Table 6 shows the tabulation scores of the 10 conveniently selected respondents who participated in the operational acceptability testing through a 25-item questionnaire which are clustered into 5 categories, namely: functional suitability, performance efficiency, reliability, security, and maintainability.

Table 6. Operational Acceptance Test Tabulated Data

Category	Question	Respondent Score										WM	DESC
		1	2	3	4	5	6	7	8	9	10		
Functional Suitability	1	6	7	7	7	5	7	4	7	7	6	6.30	TA
	2	6	5	6	6	7	5	6	6	6	6		
	3	6	5	4	5	6	7	5	6	4	5		
	4	5	6	5	5	6	4	7	4	6	3		
	5	7	7	7	6	6	7	5	6	7	7		
Performance Efficiency	6	7	5	4	5	7	7	7	5	6	7	6.00	A

7	4	6	7	5	6	7	6	5	6	7	5.90	A
8	7	6	4	5	6	7	6	7	5	5	5.80	A
9	7	7	6	7	5	7	5	5	3	5	5.70	A
10	7	3	6	4	6	5	7	5	7	5	5.50	A

Table 6. Operational Acceptance Test Tabulated Data, continued

Category	Question	Respondent Score										WM	DESC
		1	2	3	4	5	6	7	8	9	10		
Reliability	11	5	4	5	6	6	4	7	6	7	6	5.60	A
	12	6	5	7	7	6	7	6	5	4	7	6.00	A
	13	6	6	7	5	7	7	6	7	7	4	6.20	TA
	14	6	6	4	6	5	4	5	3	3	7	4.90	SA
	15	3	3	5	5	4	5	6	7	6	5	4.90	SA
Security	16	4	3	7	4	7	5	7	7	6	5	5.50	A
	17	4	6	7	3	6	3	7	7	6	7	5.60	A
	18	6	4	5	6	6	5	7	6	5	4	5.40	A
	19	5	3	7	6	7	5	7	5	4	7	5.60	A
	20	6	7	7	7	6	4	7	6	6	7	6.30	TA
Maintainability	21	4	6	7	4	6	6	4	7	6	5	5.50	A
	22	6	7	6	6	5	7	7	5	7	4	6.00	A
	23	5	3	5	5	5	7	4	4	7	6	5.10	SA
	24	6	7	5	4	5	7	5	6	5	7	5.70	A
	25	6	7	7	7	3	5	7	5	5	7	5.90	A
Overall Weighted Mean and Description											5.69	A	

Legend: **WM** = Weighted Mean; **DESC** = Description; **TA** = Totally Acceptable; **A** = Acceptable; **SA** = Slightly Acceptable; **NUNA** = Not Unacceptable and Not Acceptable; **SU** = Slightly Unacceptable; **U** = Unacceptable; **TU** = Totally Unacceptable;

Results shown on Table 6 uncovered an overall weighted mean of 5.69 with a description of Acceptable which means that regular employees, on-call tour guides and farm staff, farm supervisors, and managers who participated in the OAT scored the Agguimangan Explore app to be acceptable in terms of functional suitability, performance efficiency, reliability, security, and

maintainability. Out of the 25 questions corresponding to the non-functional operation aspect of the developed app, OAT respondents found four equal items to be Totally Acceptable and Slightly Acceptable while majority or 17 items to be Acceptable. This is indicative that the developed Agguimangan Explore app embodies an overall degree of operational acceptability.

Table 7 features the summarized OAT score per category of tabulated data from Table 6.

Table 7. Summary of Operational Acceptance Test by Category

Category	Weighted Mean	Description
Functional Suitability	5.82	Acceptable
Performance Efficiency	5.78	Acceptable
Reliability	5.52	Acceptable
Security	5.68	Acceptable
Maintainability	5.64	Acceptable
Overall Weighted Mean	5.69	Acceptable

Weighted Mean Scale: 1.00 – 1.85 = Totally Unacceptable; 1.86 – 2.71 = Unacceptable; 2.72 – 3.57 = Slightly Unacceptable; 3.58 – 4.43 Neither Unacceptable Nor Acceptable; 4.44 – 5.29 = Slightly Acceptable; 5.30 – 6.15 = Acceptable; 6.16 – 7.00 = Totally Acceptable.

Data featured in Table 7 bared that employees of Agguimangan Agri-Tourism Farm provided almost a close score of acceptability in terms of each category of

the OAT which all garnered a category score description of Acceptable and an overall weighted mean of 5.69 across all categories with a description of Acceptable.

This is indicative that the developed Agguimangan Explore App has an acceptable degree of acceptability in terms of the operational aspect of the system. The Functional Suitability category obtained the highest score with a weighted mean of 5.82 which signifies that OAT respondents found the developed app to be, indeed, fits within the functional system requirements of the farm.

Table 8 displays the tabulated scores of the legal and I.T. expert who participated in the Regulation Acceptability Testing (RAT) of the developed Agguimangan Explore app in order to measure the degree of acceptability of the system in terms of complying with Republic Act No. 10173 or the Data Privacy Act of 2012 of the Philippines.

Table 8. Regulation Acceptance Test Tabulated Data, continued

Category	Question	Respondent Score		WM	DESC
		Expert 1	Expert 2		
Data Collection	1	5	7	6.00	A
	2	4	5	4.50	SA
	3	7	4	5.50	A
	4	6	5	5.50	A
	5	5	3	4.00	NUNA
Storage	6	7	7	7.00	TA
	7	6	5	5.50	A
	8	7	7	7.00	TA
	9	7	7	7.00	TA
	10	6	3	4.50	SA
Sharing	11	7	4	5.50	A
	12	5	7	6.00	A
	13	7	7	7.00	TA
	14	4	6	5.00	SA
Control	15	6	7	6.50	TA
	16	6	7	6.50	TA
	17	7	7	7.00	TA
	18	6	5	5.50	A
	19	4	7	5.50	A
	20	7	7	7.00	TA
Overall Weighted Mean and Description				5.90	A

Legend: **WM** = Weighted Mean; **DESC** = Description; **TA** = Totally Acceptable; **A** = Acceptable; **SA** = Slightly Acceptable; **NUNA** = Not Unacceptable and Not Acceptable; **SU** = Slightly Unacceptable; **U** = Unacceptable; **TU** = Totally Unacceptable;

Data displayed on Table 8 revealed an overall weighted mean of 5.90 with a description of Acceptable which means that both the legal and I.T. experts who participated in the regulation acceptance testing assessed the Agguimangan Explore app to be acceptable in terms of complying with the Data Privacy Act of the Philippines as to personal data collection, storage, sharing, and control.

Out of the 20 questions relating to data privacy aspects of the developed app, the conveniently selected experts rated 8 items to be Totally Acceptable, 9 items to be Acceptable, 3 items to be Slightly Acceptable, and 1 item to be Not Unacceptable Nor Acceptable signifying that the developed app exemplifies an acceptable degree of regulatory acceptability.

Table 9 exhibits the summary of RAT scores per category based on tabulated data from Table 8.

Table 9. Summary of Regulation Acceptance Test by Category

Category	Weighted Mean	Description
Data Collection	5.10	Slightly Acceptable
Storage	6.20	Totally Acceptable
Sharing	6.00	Acceptable
Control	6.30	Totally Acceptable
Overall Weighted Mean	5.90	Acceptable

Weighted Mean Scale: 1.00 – 1.85 = Totally Unacceptable; 1.86 – 2.71 = Unacceptable; 2.72 – 3.57 = Slightly Unacceptable; 3.58 – 4.43 Neither Unacceptable Nor Acceptable; 4.44 – 5.29 = Slightly Acceptable; 5.30 – 6.15 = Acceptable; 6.16 – 7.00 = Totally Acceptable.

Results exhibited on Table 9 have shown that the developed Agguimangan App has a Totally Acceptable degree of regulation acceptability in terms of personal data control and storage with category weighted means of 6.30 and 6.20, respectively, as assessed by the legal and I.T. experts selected by the researchers. Meanwhile, personal data sharing and data collection functionalities of the developed app garnered 6.00 and 5.10 weighted means which are described as Acceptable and Slightly

Acceptable, respectively. Overall, the assessed scores of the legal and I.T. experts obtained an overall weighted mean of 5.90 with a description of Acceptable which means that the developed app has an acceptable degree of compliance to the Data Privacy Act of the Philippines.

Finally, Table 10 emphasizes the summary of weighted means obtained by the developed Agguimangan Explore app during the UAT, OAT, and RAT.

Table 10. Summary of System Acceptability Tests

Acceptance Test	Weighted Mean	Description
User Acceptance Test (UAT)	5.66	Acceptable
Operational Acceptance Test (OAT)	5.69	Acceptable
Regulation Acceptance Test (RAT)	5.90	Acceptable
Overall Weighted Mean	5.75	Acceptable

Weighted Mean Scale: 1.00 – 1.85 = Totally Unacceptable; 1.86 – 2.71 = Unacceptable; 2.72 – 3.57 = Slightly Unacceptable; 3.58 – 4.43 Neither Unacceptable Nor Acceptable; 4.44 – 5.29 = Slightly Acceptable; 5.30 – 6.15 = Acceptable; 6.16 – 7.00 = Totally Acceptable.

Data presented on Table 10 showed that the developed Agguimangan Explore App has an overall weighted mean of 5.75 with a description of Acceptable which is indicative that the app possesses a significant level acceptability in terms of its overall of usability, operationality, and regulatory aspects as an augmented reality (AR)-based web and Android mobile applications for the Agguimangan Agro-Eco Tourism Farm of Pudtol, Apayao, Cordillera Administrative Region, Philippines as evaluated by randomly selected beta-testers, conveniently selected employees of the farm, and legal and I.T. experts, respectively, during the 3-tier system acceptance testing.

4. Conclusion

This research conducted a comprehensive 3-tier system acceptance testing of the app developed by the researchers dubbed as Agguimangan Explore App which is an augmented reality-based web and Android mobile applications for the Agguimangan Agro-Eco Tourism Farm of Pudtol, Apayao, Cordillera Administrative Region, Philippines. Acceptance testing results have revealed that both mobile and web versions of the developed app embodied a significant degree of system acceptability with an overall weighted mean of 5.75 and an overall description of Acceptable in terms of its overall usability, operationality, and regulatory aspects based on the results of the User Acceptance Test, Operational Acceptance Test, and Regulation Acceptance Test participated by the randomly selected tourists of the agro-eco farm, selected employees, and data privacy experts.

The implications of the successful thorough system acceptability tests performed in this study would generate a high degree of recommendatory status of the developed

app for its immediate total implementation and integration with the manual system of Agguimangan Agro-Eco Tourism Farm and reap its promised benefits among the farm’s stakeholders, better promote agri-tourism, and continue the lead of utilizing modern ICT mechanisms in the province of Apayao as it would have a modern Internet-based system to market its products and services among domestic and international tourists, boost productivity and confidence among employees, while at the same time being assured of high degree of compliance in terms of the Data Privacy Act of the Philippines.

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