International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

ASSESSING BEHAVIOURAL INTENTIONS IN DRONE ADOPTION FOR GEOSPATIAL MAPPING: A QUANTITATIVE FOUNDATION FOR DECISION SUPPORT

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Abstract

Drones have become a pivotal advancement in the geospatial industry, offering notable improvements in efficiency, adaptability, and cost when compared to conventional surveying and mapping techniques. Despite these benefits, their successful implementation hinges on the willingness of geospatial professionals to adopt such technologies. This study investigates the intention to utilize drone-enabled geospatial tools and presents a quantitative approach to support strategic organizational decisions. Guided by the Unified Theory of Acceptance and Use of Technology (UTAUT), this study investigates the extent to which performance expectancy, effort expectancy, social influence, and facilitating conditions influence employees' behavioural intentions. Several statistical methods, including as multiple regression, reliability testing, correlation analysis, and descriptive statistics, were used to analyze the survey data. Results indicate that social influence ($\beta = 0.209$, $p < 0.001$) and facilitating conditions ($\beta = 0.382$, $p < 0.001$) significantly enhance behavioural intention, whereas performance expectancy and effort expectancy showed no statistically significant impact. These outcomes support the development of targeted implementation strategies and emphasize the need for infrastructure and social encouragement in promoting drone adoption. The study contributes to both theoretical insights regarding the UTAUT model and practical applications for advancing technology uptake in a dynamic geospatial landscape.

Keywords: Drone Adoption, Geospatial Technology, Behavioural Intention, UTAUT, Decision Support.

1. Introduction

Recent developments in drone technology have significantly transformed geospatial workflows, providing enhanced efficiency and utility in mapping and surveying operations. Drones, or unmanned aerial vehicles (UAVs), provide cost-effective, timely, and accurate data collection, making them attractive to geospatial professionals and organizations. However, despite their benefits, widespread adoption remains inconsistent, often hindered by

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

human and organizational factors such as readiness, infrastructure, training, and user acceptance.

The use of drones in geospatial industries involves integrating hardware, software, and user-centric systems. As technology evolves, the behavioural intention of users becomes a critical factor for successful implementation. In this context, understanding the drivers behind users' acceptance of drones is essential, especially in professional settings where workflows, safety regulations, and data standards are paramount.

A solid paradigm for comprehending how people embrace new technology is the Unified Theory of Usage and Acceptance of Technology (UTAUT), which was first presented by Venkatesh et al. (2003). It focuses on four main predictors: enabling conditions, social influence, expected performance, and expenditure expectancy. Because these elements influence both behavioral intention and usage habits, UTAUT is a useful lens through which to study drone adoption in geographical contexts.

This study focuses on employees working in geospatial organizations and aims to evaluate their behavioural intention to adopt drones using the UTAUT model. The research contributes by offering empirical evidence to support data-driven decisions on technology deployment and training strategies. Moreover, it situates the investigation within the context of modern geospatial practices where digital transformation is becoming increasingly necessary.

This paper's structure is set up as follows: The theoretical foundations and pertinent literature are reviewed in Section 2. The methodology, including research plans, sampling strategies, and data analysis processes, is described in Section 3. The findings are shown and their importance is explained in Section 4. Finally, Section 5 wraps up the study by highlighting the main conclusions, admitting its shortcomings, and suggesting avenues for further investigation.

2. Literature Reviews

2.1. Drone Technologies

Drone Technology in Geospatial Mapping Drones, also known as unmanned aerial vehicles (UAVs), have revolutionized geospatial data collection through improved accessibility, speed, and cost-effectiveness. They are widely used for topographic mapping, environmental monitoring, infrastructure planning, and disaster response (Colomina & Molina, 2014). Compared to traditional ground-based or manned aerial surveying techniques, drones enable high-resolution data capture over large areas within shorter timeframes and with reduced human risk (Hardin & Jensen, 2011).

Despite their benefits, drone integration into geospatial workflows requires overcoming technical and regulatory barriers. Studies highlight concerns such as data accuracy, processing complexity, airspace regulations, and user training (Zhou et al., 2020). These factors reinforce the importance of understanding the human and organizational dimensions influencing drone adoption.

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

2.2. Technology Acceptance Models (TAM)

Within information systems research, the topic of technology adoption has been extensively explored through various theoretical models. One of the foundational frameworks, the Technology Acceptance Model by Davis (1989), identified perceived usefulness and ease of use as core factors influencing adoption behaviour. Building on this, subsequent models such as Ajzen's (1991) Theory of Planned Behavior and Rogers' (2003) Innovation Diffusion Theory expanded the adoption narrative by incorporating elements of social interaction and external contextual factors.

Venkatesh et al. (2003) introduced the Unified Theory of Acceptance and Use of Technology (UTAUT), which integrates elements of eight primary theories of technology adoption. According to the concept, user behavior is influenced by four fundamental constructs: enabling conditions, societal impact, anticipated performance, and effort expectancy. Together, these elements affect users' intentions as well as their actual use of technology. Depending on variables including gender, years of knowledge, and willingness, and these effects may vary in intensity. UTAUT has undergone a great deal of testing and confirmed across various sectors, including education, healthcare, public administration, and mobile technology adoption (Dwivedi et al., 2019).

2.3. Application of UTAUT in Geospatial Contexts

Although UTAUT has been widely applied, studies specifically addressing drone adoption within geospatial domains are limited. Studies by Khan et al. (2022) and Alalwan et al. (2017) demonstrate the effectiveness of the UTAUT model in assessing technology acceptance within technical domains. Their results support the importance of social influence and facilitating conditions in determining user intentions, particularly in professional settings. Within geospatial applications, where tasks are often collaborative and regulated, factors such as peer encouragement, management support, and infrastructure availability are critical. Therefore, applying UTAUT to drone adoption provides a structured lens for understanding both individual and organizational readiness for digital transformation in surveying and mapping.

2.4. Research Framework and Hypotheses Development

A conceptual framework serves as a foundational structure built upon key assumptions, expectations, and guiding beliefs that inform the direction of a research study (Tamene, 2016). It helps clarify both the researcher's objectives and the study's alignment with existing knowledge. This research adopts the Unified Theory of Acceptance and Use of Technology (UTAUT) as its theoretical foundation, a model introduced by Venkatesh et al. (2003) that integrates eight well-established theories of technology acceptance. UTAUT has been validated through various empirical studies and is recognized for its adaptability across diverse technological settings. The model consolidates constructs from previous frameworks to explain the behavioural intention and usage of information technology. Venkatesh et al. (2003) developed UTAUT by synthesizing insights from earlier models to form a unified approach to understanding user acceptance. Influenced by multiple academic domains such

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

as sociology, psychology, and information systems, UTAUT draws on a blend of established conceptual models that explain user behaviour in adopting technology, including those addressing rational decision-making, motivational factors, planned actions, and the diffusion of innovations. These models were combined to provide a more comprehensive framework for understanding technology adoption behaviour. Although new theories continue to surface, few have been compared through empirical means (Wong et al., 2013). UTAUT is notable for its all-encompassing viewpoint and analytical prowess in determining the variables that affect user acceptance or resistance. This research is grounded in the Unified Theory of Acceptance and Use of Technology (UTAUT), which serves as its conceptual framework. UTAUT is widely recognized across various academic fields for its effectiveness in examining how individuals respond to and adopt emerging technologies. As shown in Figure 1, the framework highlights four key constructs. According to theory, these factors have an impact on the dependent variable, which is the behavioral intention to use drone-based geospatial technology.

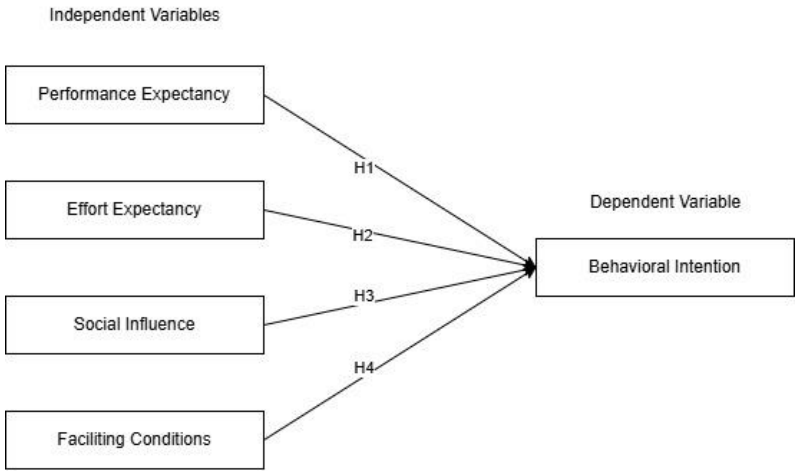

Figure 1. Conceptual Framework

Figure 2 summarizes the hypotheses based on the UTAUT framework.

H1	Performance expectancy has a positive effect on behavioural intention to use drones for surveying and mapping.
H2	Effort expectancy has a positive effect on behavioural intention to use drones for surveying and mapping.
H3	Social influence has a positive effect on behavioural intention to use drones for surveying and mapping.
H4	Facilitating conditions have a positive effect on behavioural intention to use drones for surveying and mapping.

Figure 2. Hypotheses

3. Methodology

This research aims to find asymmetrical linkages, working under the assumption that changes in the independent elements would have an effect on the variables that are being investigated. The structure of the study is designed in a quantitative approach which is using a convenience sampling method. The geospatial employees of Selangor state are the target respondents. A self-administered questionnaire was used as the instrument to collect

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

information from the intended respondents. IBM SPSS version 29 was used to analyse the primary data that had been gathered for analysis.

Four sections were included in the self-administered questionnaires used to gather data. Demographic information such as gender (male or female), age categories (under 25, 26–35, 46–55, and over 55), educational background (diploma to PhD), and years of job experience (less than 1 year, 1–5 years, 6–10 years, and more than 10 years) were recorded in the first part. The next sections evaluated respondents' opinions of the study's main concepts, such as behavioral intention. In light of the UTAUT model's established validity and reliability, this study used pre-validated measuring questions that had been slightly contextualized to fit the drone technological environment. A five-point Likert scale was used to evaluate each idea. The following items, which were modified from earlier studies by Venkatesh et al. (2003), Tarhini et al. (2017), and Holzmann et al. (2021), were utilized in this questionnaire: Expectations for (i) performance, (ii) affordability, (iii) social influence, (iv) enabling circumstances, and (v) behavioral intentions.

A Google Forms-distributed online survey was used to gather data for this investigation. The study relied primarily on first-hand data obtained directly from respondents. A convenience sampling method was employed to recruit participants, all of whom were professionals working in the geospatial industry within Selangor, Malaysia.

Following the sequence number, each questionnaire that was returned was appropriately marked. All of the responses from the Google Form questionnaire were downloaded. The complete dataset was subsequently imported into SPSS version 29 for analysis. The main analytical techniques used in the study were regression analysis, correlation analysis, reliability testing, and descriptive statistics. Because it evaluates the dependability and consistency of measurements or scores, the second analysis—reliability analysis—is essential. Venka Researchers can assess how well their measurements capture the foundational idea they want to test by performing reliability analysis. Thirdly is the correlation analysis. The statistical method employed in this analysis evaluates the decree and intensity of the relationship between two or more variables. For academics in a variety of disciplines, such as psychology, sociology, schooling, and economics, it is an invaluable resource. Regression analysis is the fourth type of analysis. Hair et al. (2010) have declared that it is a statistical method for figuring out how two or more variables relate to one another. It is a commonly used tool in research endeavours because it may help researchers understand how multiple factors affect a certain outcome.

The applicability and consistency with which an instrument assesses a notion without bias or mistake are referred to as the instrument's reliability. Additionally, it ensures that all of the instrument's multiple components are evaluated consistently over time. The reliability coefficient, or Cronbach's alpha, is used to demonstrate how strongly the instrument's items are positively associated with one another. The reliability of the measurements is higher if Cronbach's alpha is closer to 1. At 0.6, Cronbach's alpha is regarded as low, at 0.7 as fair, and at 0.8 as good (Hee, 2014). In such cases, Hair et al. (2016) suggested that items with loading < 0.07 should be removed to achieve a good model fit. Sekaran and Bougie (2016) and

Received: August 06, 2025

International Journal of Applied Mathematics
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ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

Nawafleh (2018) suggested that the coefficients' value should exceed 0.70. In this study, the data were thought to be reliable if Cronbach's alpha value was 0.7 or higher.

4. Result & Analysis

This section is divided into five parts. Descriptive statistics for the primary constructs—performance expectancy (PE), effort expectancy (EE), social influence (SI), facilitating conditions (FC), and behavioral intention (BI)—as well as a summary of the respondents' demographic characteristics are provided in the first section. The reliability analysis findings for each concept are presented in the second section. Inferential statistical results, such as multiple regression analysis and Pearson correlation, are covered in the third section. The results of the hypothesis test are summarized in the fourth section, and the section is concluded in the final section.

4.1. Descriptive Analysis

Table 4.1. Demographic Statistics of the Respondents (N=193)

Demographic		Count	Percentage %
1. Gender	Female	69	35.8
	Male	124	64.2
2. Age	Less than 25 years	48	24.9
	26-35 years	96	49.7
	36-45 years	6	3.1
	46-55 years	41	21.2
	More than 55 years	2	1.0
3. Academic Qualification	Diploma or High School Certificate	56	29.0
	Bachelor's Degree	126	65.3
	Master's Degree	11	5.7
4. Working Experience	Less than a year	38	19.7
	1 - 5 years	59	30.6
	6 -10 years	74	38.3
	More than 10 years	22	11.4

There are four (4) demographic variables in this study. Those are gender, age, academic qualification, and working experience. About 35.8% or 69 respondents were female and 64.2% or 124 respondents were male as illustrated in Table 4.1. The respondents' age range in the survey is divided into five (5) categories: below 25, between 26 and 35, between 36 and 45, between 46 and 55, and over 55. The frequency analysis shows that respondents between the ages of 26 and 35 make up the largest percentage of survey participants (49.7%), followed by respondents under the age of 25 (24.9%). The remaining age groups—those aged 36 to 45, 46 to 55, and over 55—have 3.1%, 21.2%, and 1.0%, respectively. The degree of education is

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

separated into four (4) categories, as shown in Table 4.1: Bachelor's degree, master's degree, and high school certificate or diploma, and PhD. A larger number of respondents have a bachelor's degree which is 65.3%, followed by respondents with diplomas or high school certificates and respondents with master's degrees which are 29.0% and 5.7% respectively. Respondents who are still in the internship period and fill out the survey are categorized into diploma or high school certificates. Overall, the findings of the academic qualifications show that every respondent has a high degree of knowledge. The largest amount of respondents (38.3%) worked for 6–10 years, followed by those with 1–5 years of experience (30.6%). Those with less than a year of job experience and more than 10 years have percentages of 19.7% and 11.4% respectively.

Table 4.2. Descriptive Statistics for Questionnaire Item

Variables	Items	Mean	Std. Deviation
	PE01	4.79	.406
Performance Expectancy	PE02	4.82	.386
	PE03	4.78	.426
	PE04	4.78	.426
	EE01	4.63	.626
Effort Prospect	EE02	4.57	.682
	EE03	4.60	.639
	EE04	4.61	.621
	SI01	4.52	.662
Social Guidance	SI02	4.56	.636
	SI03	4.60	.597
	SI04	4.59	.624
	FC01	4.66	.610
Facilitating Disorders	FC02	4.62	.660
	FC03	4.63	.633
	FC04	4.64	.598
	BI01	4.68	.488
Behavioural Meaning	BI02	4.69	.475
	BI03	4.68	.500

Table 4.2 presents the descriptive statistics for questionnaire items. Performance expectancy was measured using four items, which have a mean between 4.78 and 4.82 and a range of standard deviation between 0.386 and 0.426. Effort expectancy was measured using four items with mean values falling between 4.57 to 4.63 and the standard deviation between 0.621 to 0.682. In a similar vein, social influence was measured with four items, which have mean values ranging between 4.62 to 4.66 and standard deviation values between 0.597 and 0.660. The fourth variable which is facilitating conditions was measured using four items, which have mean values between 4.62 to 4.66 and standard deviation ranging between 0.598

Received: August 06, 2025

International Journal of Applied Mathematics
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to 0.660. Lastly, behavioural intention was measured using four items, and the mean values ranged from 4.68 to 4.69 with a standard deviation of 0.475 to 0.500.

4.2. Reliability Analysis

Reliability analysis was used to assess the consistency, stability, and trustworthiness of the measurement tools. A pilot study involving 20 participants was carried out to verify that the questionnaire items were suitable and yielded internally consistent responses prior to full-scale distribution. This initial phase aids in verifying that the tool measures the required constructions accurately. Cronbach's Alpha was computed for each of the five constructs in order to evaluate internal reliability. Cronbach's Alpha scores above 0.9 are regarded as exceptional, those above 0.8 as good, and those above 0.7 as acceptable, per George and Mallery (2002). While numbers below 0.6 suggest weak internal consistency, values between 0.6 and 0.7 could be regarded as suspect. With a minimum of 0.701 and a high of 0.888, the Cronbach's Alpha values, as shown in Table 4.3, are within acceptable to outstanding levels. Based on these outcomes and supporting literature (Nawafleh, 2018; Sekaran & Bougie, 2016), the instrument is deemed reliable. Furthermore, the positive inter-item correlations suggest that the constructs are well-aligned. Since all reliability values exceed the 0.7 threshold, the data were deemed appropriate for additional statistical analysis, and no items were eliminated.

Table 4.3. Reliability Coefficients (Cronbach's Alpha) of the scales (N=20)

	N of Samples	Cronbach's Alpha	Based on Standardized Items, Cronbach's Alpha	N of Items
PE	20	.701	.720	4
EE	20	.888	.890	4
SI	20	.842	.826	4
FC	20	.841	.799	4
BI	20	.711	.714	3

4.3. Inferential Analysis

4.3.1 Data Reduction/ Outliers

A boxplot was used to detect outliers in the dataset. Seven outliers were identified and removed to enhance the accuracy and overall fit of the model. As a result, the final sample size was reduced from 193 to 186 valid responses.

4.3.2 Pearson’s Correlation Analysis

The direction and strength of the association between both dependent and independent variables were evaluated using Pearson's correlation. The outcome variable in this case was the behavioral intention to use drone technology for mapping and monitoring. Performance expectancy and effort expectancy were among the predictors, social influence, and facilitating

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
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conditions. These variables were also evaluated through multiple regression to support the hypothesis testing process. Pearson's method is recognized for its accuracy in examining linear relationships between continuous variables. It helps determine both the magnitude and polarity of associations whether they are positive or negative.

Table 4.4. Pearson's Correlations

		PE	EE	SI	FC	BI
PE	Pearson Correlation	--				
	N	186				
EE	Pearson Correlation	.350**	--			
	Sig. (2-tailed)	<.001				
	N	186	186			
SI	Pearson Correlation	.642**	.377**	--		
	Sig. (2-tailed)	<.001	<.001			
	N	186	186	186		
FC	Pearson Correlation	.701**	.337**	.696**	--	
	Sig. (2-tailed)	<.001	<.001	<.001		
	N	186	186	186	186	
BI	Pearson Correlation	.534**	.355**	.626**	.684**	--
	Sig. (2-tailed)	<.001	<.001	<.001	<.001	
	N	186	186	186	186	186

**. Correlation is significant at the 0.01 level (2-tailed).

As indicated in the table, all independent variables show a positive correlation with the dependent variable. All four predictors showed statistically meaningful relationships with BI, indicating that an increase in PE, EE, SI, or FC is likely to correspond with an increase in behavioural intention.

4.3.3 Multiple Regression Analysis

A strong statistical method for evaluating how well a collection of independent variables can predict the result of a dependent variable is multiple regression. In this research, the analysis focused on how performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) relate to the behavioural intention (BI) to use drone-based solutions for mapping and surveying tasks. Each hypothesis was tested through this method. As reported in the results, the overall correlation coefficient (R) between the predictors and BI is 0.721, indicating a strong and positive association. This means that increases in the values of the independent variables are associated with higher behavioural intention among employees. The R^2 value of 0.520 shows that 52% of the variation in behavioural intention is accounted for by these four predictors, while the remaining 48% is likely due to other factors not included in the model.

Received: August 06, 2025

International Journal of Applied Mathematics
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Table 4.5. Multiple Regression Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.721[a]	.520	.509	.27128

a. Predictors: (Constant), FC, EE, PE, SI
b. Dependent variable: BI

The F-statistic obtained from the ANOVA test, which assesses the regression model's overall fit, is shown in Table 4.6. The F-value of 48.976 shows a strong and statistically substantial relationship between the dependent and independent variables. Given this F-statistic, the corresponding p-value is well below 0.001, suggesting a very slim chance that the results were the product of chance. Consequently, it is possible to safely reject the null hypothesis, which states that there is no meaningful link between the variables. This result, with $F(4,181) = 48.976$, $p < 0.001$, validates the statistical significance of the regression strategy.

Table 4.6. ANOVA of Multiple Regression Model

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	14.417	4	3.604	48.976	<.001[b]
	Residual	13.321	181	.074		
	Total	27.738	185			

a. Dependent Variable: BI
b. Predictors: (Constant), FC, EE, PE, SI

Additional regression analysis was conducted to evaluate the extent to which each independent variable influenced the dependent variable, behavioural intention (BI). Table 4.7 presents the associations between performance expectancy (PE), effort expectancy (EE), social influence (SI), and facilitating conditions (FC) with BI. The statistical significance of these relationships was determined using p-values. Statistical significance was evaluated using the p-values shown in the significance (Sig.) column, with a threshold of $p < 0.05$ indicating a meaningful effect.

Hypothesis H1 examined whether PE had a significant and positive effect on BI. The regression output ($\beta = 0.007$, $t = 0.071$, $p = 0.943$) indicates that PE had no statistically significant influence. As the p-value exceeds the 0.05 threshold, the null hypothesis is retained, suggesting that PE did not affect employees' intention to adopt drones for mapping tasks. Hence, H1 is rejected.

Similarly, H2 investigated the role of EE in shaping BI. The results ($\beta = 0.073$, $t = 1.716$, $p = 0.088$) show that EE also lacked a significant impact. Since the p-value is greater than

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
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0.05, the null hypothesis is again supported, indicating that EE was not a determining factor in employees' behavioural intention. Thus, H2 is also rejected.

Hypothesis H3 assessed the impact of social influence (SI) on behavioural intention (BI). Based on the regression results in Table 4.7, SI exhibited a statistically significant positive effect on BI ($\beta = 0.209$, $t = 3.447$, $p < 0.001$). This indicates that individuals who perceive encouragement or endorsement from peers or supervisors are more inclined to adopt drone technology. As the p-value is below 0.05, the null hypothesis is rejected, and H3 is supported.

Hypothesis H4 examined whether facilitating conditions (FC) significantly affect BI. The findings in Table 4.7 show a strong positive relationship ($\beta = 0.382$, $t = 5.740$, $p < 0.001$). This suggests that access to resources, support systems, and organizational infrastructure significantly enhances employees' willingness to use drone technologies. With the p-value indicating significance, the null hypothesis is rejected, and H4 is accepted.

Table 4.7. Coefficients of Multiple Regression Model

Model		Unstandardized Coefficients		Standardized Coefficients		
		B	Std. Error	Beta	t	Sig.
1	(Constant)	1.597	.343		4.653	<.001
	PE	.007	.101	.005	.071	.943
	EE	.073	.043	.097	1.716	.088
	SI	.209	.061	.263	3.447	<.001
	FC	.382	.067	.465	5.740	<.001

a. Dependent Variable: BI

Based on the regression coefficients, the final regression equation derived from this study is presented as follows: **BI = 1.597 + 0.007PE + 0.073EE + 0.209SI + 0.382FC**. Figure 4.1 below provides a visual representation of the regression equation in a normal p-p plot graph.

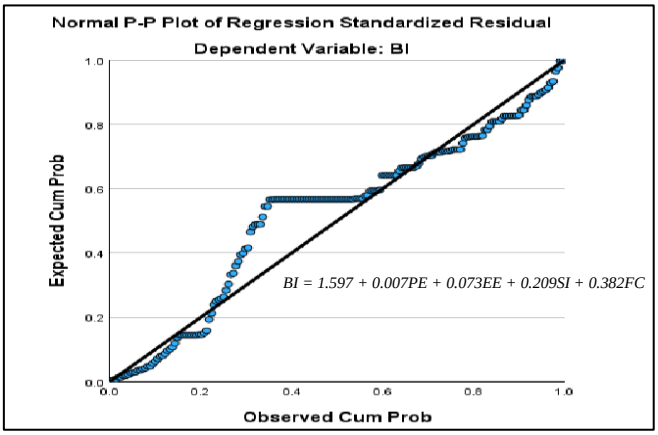

Figure 4.1. Normal Probability Plot

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
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4.4. Summary of Hypotheses Result

There were four hypotheses developed in this study. The outcomes of the data analysis revealed that only two hypotheses were accepted while another two hypotheses were rejected. The outcomes of the hypotheses are summarised in Table 4.8.

Table 4.8. Summary of Hypotheses Result

	Hypothesis	Coefficient (*β)*	p-value	Decision
H1	*Drone surveying and mapping behavior intention is positively impacted by performance expectancy*	.007	.943	Rejected
H2	*Expected performance influences behavioral intention to utilize drones for mapping and surveying in a good way*	.073	.088	Rejected
H3	*The behavioral decision to use drones for mapping and surveying is positively impacted by social influence*	.209	<.001**	Accepted
H4	*Facilitating conditions have a positive effect on behavioural intention to use drones for surveying and mapping.*	.382	<.001**	Accepted

**. The relationship is significant at p<0.00

5. Discussion on Result & Conclusion

5.1. Discussion of Findings

By analysing the variables that affect employees' intentions to use drones for work, this works sought to understand how drone adoption is developing in the fields of surveying and mapping. The UTAUT model, which is based on four factors (performance expectancy, effort expectancy, social influence, and facilitating conditions) suggests that the real use of technology is dictated by behavioural intention. Thus, it makes this theory relevant to be applied in this study. Subsequently, questionnaire surveys were developed and delivered for internet surveys, collecting data from 193 valid respondents.

Overall, the correlation results indicate that all independent variables, namely PE, EE, SI, and FC are positively related to BI. This study was conducted by taking into account the opinions of respondents who are geospatial employees who use drones and are currently working in the state of Selangor. In due course, the findings have painted a clear picture of the variables influencing employees' acceptance of using drones for mapping and surveying.

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
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To satisfy the previously mentioned research purpose, additional analysis is carried out using multiple regression analysis to assess how each aspect effects the behavioral intention of geospatial personnel to use drones for mapping and surveying. Regression analysis results show that, of all four variables that were put forth, two (PE and EE) were found to be insignificant and had no influence on employees' BI to use drones for mapping and surveying. The results for the other two variables, SI and FC, on the other hand, showed a strong association and significantly impacted the BI geospatial employees using drones for mapping and surveying.

PE refers to the extent to which a person believes that using a particular technology will assist them in reaching their ectives and perform more effectively. It captures their perception of the utility and effectiveness of the technology within a specific context. PE is hypothesised to have a relationship with the BI. However, according to the result revealed in Table 4.7, it was found to have an insignificant impact on the BI of the employee in adopting drones in their work. The finding was inconsistent with the previous research by Kapser & Abdelrahman (2020), and Holzmann et al. (2020). However, the finding was in line with Jairak et al. (2009), Thomas et al. (2013), Siswanto et al. (2018) and Mhina et al. (2018) where the findings showed that PE had an insignificant impact on BI to use technology. The significance of PE depends on the specific context of use. For instance, for experienced surveyors, the perceived benefits of drones (PE) might be well-established, minimizing the impact on their intention to use them. However, for someone new to the technology, PE might hold more weight in their decision-making.

EE was not significant, suggesting that even while using drones requires less work, it is not relevant for the BI of geospatial personnel. This discovery runs counter to the theoretical considerations (Venkatesh et al., 2003) along with previous studies (Tosuntas et al., 2015; Kabra et al., 2017). However, some studies proved that there are results supporting this finding (Kapser & Abdelrahman, 2020; Kervick et al. 2015; Afonso et al., 2012). One may argue that the simplicity or difficulty of using drones is the reason geospatial employees are reluctant to use them for mapping and surveying. Employees may find it challenging to operate the UAV's integrated system as a result. Employees might be given an interface that is straightforward and easy to utilise to get past obstacles. Drone technology can be perceived as complex and requires specific skills, potentially making effort expectancy (ease of use) a bigger factor compared to other contexts. Conversely, the potential benefits of using drones for faster, safer, and more accurate data collection could outweigh concerns about complexity, leading to less impact of EE. In addition, a key element contributing to a technology's success is its user-friendliness. Therefore, the ease of use and effortlessness of this technology will determine whether or not geospatial employees accept drones.

However, it has also been found that the BI to use of drones is significantly impacted by the SI factor. This conclusion is further corroborated by a few earlier studies (Ayaz & Yanartas, 2020; Kapser & Abdelrahman, 2020; Tosuntas et al., 2015), which show that the effective use of drones by senior executive/management personnel within the organisation will lead to an increase in the desire of geospatial employees to use drones. To ensure that

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

employees use this geospatial technology more, senior executives/management have had to be encouraged to use it. Management as well as employees who will use the drones need to be aware of their advantages, convenience, and cost savings. In this sense, enabling project managers with the support they need, educating drone users about all procedures through an all-encompassing communication network, and offering the required training will all help to increase the acceptability and use of drones.

The results reveal that FC positively influences BI, indicating there is a strong intention to adopt drones by geospatial employees who perceive their organisation support team as supportive of introducing drones. In their studies on drone adoption, Holzmann et al. (2020) and Kapser & Abdelrahman (2020) also support this conclusion. It is easier to develop one's own capacities when one has access to the required information, resources, training, and assistance. Only when drones are deployed properly can operational performance benefits be realised, as controlling them is a complex process. Drones may not improve performance or may even be dangerous without extensive training. According to Venkatesh et al. (2012), the study's findings highlight the critical role that supportive environments have in helping people develop the behavioural intention to adopt new technology. Thus, demonstrating that the adoption of drones for mapping and surveying by employees is influenced by external resources such as peer support.

5.2. Theoretical Implications of Research Findings

Social influence, which reflects the views and behaviours of individuals and groups within a person's environment, significantly impacts how perceptions and actions are formed. When individuals within a professional network observe colleagues and superiors utilizing drones effectively, it can normalize the technology and generate confidence in its potential. This positive social reinforcement breaks down initial barriers and encourages wider adoption. Furthermore, industry leaders and organizations advocating for drone use can significantly influence the overall perception of the technology, fostering a sense of legitimacy and driving its acceptance.

Facilitating conditions, encompassing factors that enable and simplify drone use is equally critical. This includes aspects like regulatory clarity, training programs, and readily available resources. Clear and consistent regulations provide a framework for responsible drone operation, alleviating anxieties and ensuring safe integration. Additionally, comprehensive training programmes also provide users with the skills they need to safely and competently operate drones. Finally, accessibility to resources such as drone platforms, software, and maintenance support removes practical hurdles, allowing individuals and organizations to seamlessly integrate drones into their workflows.

The combined impact of these factors creates a positive feedback loop that accelerates drone adoption. Individuals influenced by their peers and colleagues are more likely to embrace new technology, especially when practical barriers are minimized through facilitating conditions. This fosters a culture of innovation within the industry, leading to

Received: August 06, 2025

International Journal of Applied Mathematics
Volume 38 No. 4s, 2025
ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

further exploration and refinement of drone applications. Therefore, research findings suggest several actionable strategies for promoting drone use in surveying and mapping:

1) Industry leaders and organizations can champion drone technology through public advocacy and educational initiatives.
2) Training programs and certification courses should be readily available to equip individuals with the necessary skills for safe and effective drone operation.
3) Technology providers and industry stakeholders can collaborate to develop and promote user-friendly drone platforms, software solutions, and accessible maintenance facilities.
4) Governments and regulatory bodies can create clear and consistent regulations that facilitate responsible drone use while protecting the public and ensuring safety.

Stakeholders can accelerate the integration of drones in surveying and mapping by prioritizing both social influence and facilitating conditions. Thus, unlocking the technology's full potential for efficient, accurate, and cost-effective data collection. This not only benefits individual organizations in terms of improved workflow and productivity but also contributes to the overall advancement and innovation within the surveying and mapping industry.

5.3. Limitations of Study

Several limitations are associated with this study, as suggested by the results. One major constraint was time. Due to a restricted data collection window, the researchers were unable to gather the full number of ideal responses. Nevertheless, literature indicates that a sample size between 20 and 500 is acceptable for most research contexts (Sekaran & Bougie, 2016). Additionally, Hair et al. (2016) recommend a sample size at least ten times the number of structural paths or variables in the research model. Given that this study involved five variables—including both independent and dependent constructs—the minimum sample size required was 50. Ultimately, the study successfully gathered data from 193 participants, exceeding this threshold.

Secondly, the challenges involved in obtaining feedback from the appropriate responders. The study used a straightforward random sample approach to collect data. Meaning that the group under research was limited to people employed in the geospatial field who had direct contact with drones. Because the questionnaire was distributed using WhatsApp, which cannot be monitored, it is possible that the responses do not correctly represent the situation as a whole when it comes to the second-hand, third-hand, and fourth-hand respondents.

The last factor to consider is the fact that the research topic was quantitative. The number of responses that the respondents may choose from was limited. They were not permitted to offer any suggestions or thoughts of their own. There is a possibility that their perspectives will affect the findings.

5.4. Recommendation

For professionals and researchers looking to encourage a wider usage of drone technologies in geospatial operations like mapping and surveying, the study's conclusions

ISSN: 1311-1728 (printed version); ISSN: 1314-8060 (on-line version)

offer a number of useful insights and suggestions. The scope of drone usage considered in this study may be too limited, and relying solely on a quantitative approach could reduce the precision of insights especially when responses come indirectly from individuals who are not primary users of drone technology. The study recommends that future researchers consider adopting a mixed-methods approach that integrates both quantitative and qualitative techniques. Incorporating interviews can provide participants with the opportunity to express their perspectives more freely, beyond the limitations imposed by predefined survey options. As a result, it might contribute to increasing the findings' solidity.

This study only used the target respondents from the private sector so the study might not be able to look at different working cultures and facilitating environments. For future recommendations, researchers should consider expanding the target respondents by involving Malaysian government sectors to examine the behavioural aspect of using drones between private and government sectors since these two sectors have different kinds of training and facilitating environment in terms of standardization and customization according to employees needs or by specific roles. While we believe that these factors are not exclusive to the private sector, we cannot totally rule out the possibility of future study opportunities arising from working environments or cultural influences.

In closing, this research finding also prompts further exploration beyond existing theories. This indicates that social influence and facilitating conditions may interact in meaningful ways for example, the effect of social influence could be amplified when users have access to adequate training and support resources. Moreover, future research could investigate how social influence and facilitating conditions interact to shape decisions related to drone adoption. This could involve exploring the role of trust, perceived expertise, and individual learning styles in shaping technology acceptance.

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Received: August 06, 2025