Journal of
Information Systems Engineering
and Business Intelligence

Vol.10, No.3, October 2024
Available online at: http://e-journal.unair.ac.id/index.php/JISEBI

Factors Influencing Behavioral Intention to Apply Freemium Services in Islamic Lifestyle Digital Applications Using Unified Theory of Acceptance and Use of Technology (UTAUT)

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Abstract

Background: Islamic lifestyle digital applications (ILDA) are a sector in the rapidly increasing digital halal media and leisure industry. To ensure sustainable revenue for ILDA developers, freemium strategy needs to be implemented. However, there is a lack of research examining the factors that influence the adoption of freemium strategies in ILDA products.
Objective: This research aimed to explore the factors within Unified Theory of Acceptance and Use of Technology (UTAUT) framework that aid ILDA users to use freemium services. Specifically, the research focused on users trust (UT) and users satisfaction (US) as factors influencing the increase in behavioral intention (BI).
Methods: Quantitative method was adopted in this context and purposive sampling method was used to obtain 400 data from respondents. The data were then analyzed using Partial Least Square Structural Equation Model (PLS-SEM) method.
Results: The results showed that performance expectancy (PE) as well as effort expectancy (EE) positively and significantly influenced US. Similarly, facilitating conditions (FC) and social influence (SI) significantly affected UT. Both UT and US positively influenced users BI toward freemium services. Digital literacy (DL) had a positive moderating effect between PE and business expectations in US, but the effect was not statistically significant.
Conclusion: The research described that all UTAUT variables, along with UT and US, influenced the intention to adopt freemium services in ILDA. Moreover, DL did not have any moderating effect on the framework considered in this context. These results signified that users tended to be satisfied and trust the benefits enjoyed, rather than being influenced by DL level.

Keywords: Behavioral Intention, Digital Literacy, Islamic Lifestyle Digital Application, Satisfaction, Trust, UTAUT

Article history: Received 1 June 2024, first decision 2 August 2024, accepted 23 August 2024, available online 28 October 2024

I. INTRODUCTION

The development of digital technology is encouraging a new competitive climate in the business world. Therefore, companies and organizations need to improve operational efficiency [1], [2] and productivity [3]. Through the help of digital technology, companies can access new markets, increase human resources professionalism, facilitate

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ISSN 2443-2555 (online) 2598-6333 (print)
doi: http://dx.doi.org/10.20473/jisebi.10.3.340-354

management in making strategic decisions, improve service models from manufacturers, and directly influence consumer perceptions of product and companies competitiveness [4], [5].

Technology is also developing rapidly in halal industry in the world today. For example, the use of blockchain technology to increase effectiveness, transparency, and traceability in halal industry supply chain. [6], Meanwhile, in Islamic finance industry, digital technology is used as a medium to offer micro-loan products [7] and investment instruments such as Islamic sukuk [2]. Many Islamic lifestyle digital applications (ILDA) in halal media and recreation sector have facilitated public access to internet-based resources for practicing worship (Salat, Reciting Quran, Reciting Dua, and others) [8], [9].

The use of digital technology in Islamic lifestyle is quickly expanding in the halal industry. Data shows that Muslim consumer spending on digital halal media and recreation, grew by 7.2% in 2021 [10], and this spending is projected to reach $308 billion by 2025 [11]. The additional investment value in halal media and recreation industry sector also grew by $1.3 billion in 2020 and 2021 [11]. This process shows interest of investors in digital platform companies targeting Muslim consumers (Thomson Reuters, 2019). Moreover, Muslim consumer market in digital industry positively contributes to the digital economy of the world, with a predicted value of $277 million in 2022 [12].

Indonesia has become an attractive market for developers of digital applications for Islamic lifestyle [13] with the largest Muslim population globally [14]. Evidence of this phenomenon is the existence of various ILDA in Indonesia which are equipped with features such as prayer schedules and reminders, Qibla directions, prayer collections, and information about Islam serves [9], [15]. In addition, digital applications for Islamic lifestyle have the potential to increase the intensity and quality of worship through the convenience and practicality provided for Muslims [16]. Increasing the use of internet access by Indonesians to 62.10% in 2021 will also support digital lifestyle of people [17].

Advertisement and freemium services are the two most common strategies used by ILDA developers to generate revenue [18]. The freemium service strategy is widely adopted by companies that develop digital applications, and offer users a choice between free and paid services or products [19], [20]. Freemium is a business model where companies offer a basic version of a product or service for free while charging a fee when users want to receive premium features or additional functionality [21]. However, freemium revenue only provides an average of 10% of the revenue share of companies developing digital applications for Islamic lifestyle [22].

For digital start-up companies to stay sustainable, freemium service strategy is essential [23]. This scenario is because relying solely on advertising often is not enough to attract as well as retain users, and may not effectively aid users in switching brand [24], [25]. Meanwhile, a freemium service strategy can retain existing freemium users [26] and convert free users to become premium [22], [27]. The use of a freemium service still has challenges that need to be solved to succeed in its practice [28]. Moreover, the strategy should be appropriate to the market category the companies is aiming for [28]. Features and usability benefits such as those offered in constructs of performance and effort expectations in Unified Theory of Acceptance and Use of Technology (UTAUT) also encourage consumers to buy freemium services [25]. In developing countries such as Indonesia, the availability of existing resources can facilitate the use of freemium services. According to UTAUT model, simplifying conditions can aid users to buy these freemium services on a technology platform [19], [29]. Similarly, social influence (SI) in UTAUT in certain cases influences the intention of consumers to upgrade the service used to freemium [30].

The research examined the influencing factors of Muslim behavioral intention (BI) consumers when purchasing freemium services in ILDA using UTAUT method [31] since the focus of this specific research has not been studied previously. Hamari et al. [27], Hsu & Lin. [32], Lee et al. [33], Wagner et al. [34], Tsai [35], and Yang et al. [36] explored determining factors of consumer intentions and behavior when purchasing freemium services. However, the explorers were still limited to gaming application services online games, and music services. This research try to fill up the research gap by Appel et al. [37], and Fernandes & Guerra [38] where both explorations recommend future research to examine the topic of freemium in industries other than games, music services, and health industries. Based on the discussion, this research tries to further explore how consumer behavior develops when using freemium services in implementing digital Islamic lifestyle.

The findings in this research offer practical advantages for ILDA developers. The research can use this understanding to optimize the use of Islamic lifestyle technology, ensuring successful implementation and widespread acceptance among Muslim consumers sustainably. To provide a comprehensive overview, the research is organized as follows. The second section contains an extensive literature review, which includes major concepts such as ILDA, Freemium Strategy, UTAUT, UT, US, BI, and Digital literacy (DL), as well as hypothesis development. The methodology, variables, and data collection methods are explained in detail in the third section. Following this discussion, the fourth section presents the results and discussion. Finally, the fifth section concludes the exploration and offers implications for further research and practice.

II. LITERATURE REVIEW

A. Islamic Lifestyle Digital Application

Digital applications are created to assist users in accomplishing diverse tasks, such as facilitating decision-making [39], providing efficiency to save time and effort [40], and improving transparency [6]. The term ILDA refers to applications having features that facilitate Muslims as users in performing mandatory or sunnah worship [41]. From a religious perspective, ILDA provides a huge role and benefit in spreading Islam worldwide, especially in words, videos, or other digital content [42].

B. Freemium Strategy

The freemium business model is derived from two words, free and premium, which include two distinct service offerings [20]. The first is a no-cost limited service, while the second is a premium service with improved features or equipment. Consumers pay a certain fee to access the premium services [19], while free consumer access increases demand and attracts many early adopters [25]. After obtaining a large consumer base, companies convert this consumer base into premium users [25]. Moreover, when users use freemium services, trust, and satisfaction are observed to rationally create BI to use a technology [27]. There are gaps in previous research where the use of freemium strategies is still dominated by music-based digital products or online games as shown in Table 1.

TABLE 1
LITERATURE REVIEW ON FREEMIUM-RELATED RESEARCH

Article	Variable	Theory/Model	Research Aims	Main Findings
[27]	1. Enjoyment 2. Social Value 3. Quality 4. Economic Value 5. Continued Use Intention 6. Purchase Intention	Perceive Value Framework	Investigate how perceived value consumers are associated with intention to use freemium services and to purchase premium content in free-to-play games.	Increasing the perceived value of the freemium service (i.e. enjoyment) may both add to and retract from future profitability via increased retention on one hand and reduced monetization on the other
[32]	1. Hedonic Value 2. Utilitarian Value 3. Attitude 4. Satisfaction 5. Social Identification 6. Stickiness 7. Intention to in-app purchase	Affect–Behavior–Cognition model (ABC model)	Identify factors that influence in-app purchase intention for experienced users (i.e., users who have previously made in-app purchases) and potential users (who have no prior in-app purchase experience).	Stickiness and social identification significantly influence intention of users to make in-app purchases. Specifically, significant differences are found between users and potential users in terms of antecedents to forming stickiness and making in-app purchases
[33]	1. External Variables 2. Perceived Usefulness 3. Perceived Ease of Use 4. Behavioral Intention 5. Actual System Use	Kano Model and Technology Acceptance Model (TAM)	This research proposes a two-stage method that combines Kano model and TAM as a conceptual design method in analyzing private cloud service intention of users to purchase freemium services	TAM-based path analysis shows that the four functions, smart synchronization (A2), multiple account access (B4), enabling two-factor authentication (C4), file recovery, and version history (E5), had a significant effect on willingness to pay freemium services
[34]	1. Perceived Price Value 2. Perceived Premium Fit 3. Attitude Free 4. Cognition Premium 5. Attitude Premium Intention to Pay	Dual Mediation Hypothesis (DMH),	To measure whether limitations of free service affect the evaluation of free and premium versions of music service	There is a positive relationship between evaluations of free and premium versions, but only through cognitions. Variables of perceive premium fit and perceived price value as important factors in the formation of cognitions regarding premium versions
[35]	1. Perceived Convenience 2. Perceived Enjoyment 3. Perceived Intrusiveness 4. Alternative 5. Attractiveness 6. Habit 7. Switching Intention	Push-Pull-Mooring (PPM) Theory	Understand the intention of users from free platforms switching to paid subscription platforms in Over The Top (OTT) Platform services	Perceive intrusiveness (push factor) and alternative attractiveness (pull factor) have a positive influence on the switching intention of non-subscribers. Habit (mooring factor) negatively affects switching intention. Perceived convenience and enjoyment are shown to be two significant habitual antecedents.
[36]	1. Functionality 2. Reliability 3. Helpfulness 4. Perceived Validity 5. Patient Centeredness 6. Privacy Risk 7. Performance Risk 8. Trust in Platform 9. Upgrading Intention	Valence Framework	To investigate individual decision-making to upgrade from free to paid services on the Online Healthcare Consultation app.	Perceive free service quality, platform quality, and risk of free service adoption have a positive and significant influence on the intention of users to upgrade by purchasing freemium services. In the moderation test, trust in the platform partially replaces the negative effect of perceived risk but cannot help strengthen the effect of positive attitudes related to platform quality and free service quality.

C. UTAUT Framework for ILDA

UTAUT is a technology acceptance model developed by Venkatesh et al. [31], which measures consumer behavior in organization or companies. The model generally measures users or perceptions of consumers of BI in using technology that affects the system [40]. Moreover, UTAUT model consists of four variables including performance expectancy (PE), effort expectancy (EE), Facilitating conditions (FC), and SI. PE is the level of measurement of how much consumers benefit from the technology used [24]. Technology adoption increases when consumers perceive value and benefits of using the product [44]. In this research, PE is a level of Muslim consumers to assume that the use of freemium services in Islamic lifestyle applications is related to improving the quality of worship. EE measures how easily consumers or users can use the technology [45]. When consumers use technology easily without an obstacle, these users will have high-performance expectations for the technology product. Additionally, the variable includes aspects such as complexity level and user-friendliness associated with using technology [46]. In this research, EE measures how easy and practical Muslim consumers find a digital application, influencing the intention to use the freemium service of an ILDA.

FC refers to the perception of users that the technology is supported by an existing infrastructure [47]. This variable is influenced by external sources, which play a significant role in shaping the intention to use technology [48]. In this research, the number of external factors that support or facilitate consumers in using technology is closely related to the intention of consumers to use freemium services on Islamic lifestyle applications. The last UTAUT variable is SI, which measures how much others affect the decision of consumers to use technology [47]. Additionally, this variable reflects the influence of close users such as family, friends, or role models who encourage or recommend using certain technology [49]. SI represents the extent to which Muslim consumers perceive encouragement or recommendation from family, friends, or role models to use freemium services contained in Islamic lifestyle applications.

Several previous explorations have shown that the variables offered by UTAUT also influence users satisfaction (US) and users trust (UT). In this research, US is a feeling of pleasure experienced and felt by users for the products and services these consumers need [50]. Meanwhile, UT is a belief that consumers have in the ability of other parties to consistently meet expectations and sustain this behavior over time [51]. In PE context, users using a particular technology will be satisfied when users effectively use it and achieve desired outcomes [52]. This variable is influenced by several cognitive factors, including PE, emotional factors, and the level of enjoyment experienced by the users [53]. Similarly, EE is considered an attribute affecting US when using technology [54]. Following this discussion, technology has the potential to improve US by increasing productivity and simplifying tasks [54]. EE includes aspects such as complexity level and user-friendliness associated with using technology [46]. Therefore, the following hypotheses are included in this research.

H1: PE has a significant influence on US.

H2: EE significantly affects US.

The quality of FC and available resources in technology usage positively affect users confidence [55]. An essential factor in this context is network connectivity, which plays a crucial role for users of digital applications [56]. Similarly, SI plays a significant part in shaping users perception [57], leading to the following hypotheses.

H3: FC has a significant influence on UT.

H4: SI significantly influences UT.

BI plays a significant role in assessing consumer behavior from a cognitive standpoint, as it is strongly connected to the behavior of consumers, perceptions, and attitudes toward using a product or service [58]. In Islam, this variable is critical in influencing users to do something [59]. Moreover, BI shows whether a potential consumer will continue using a product or switch to another option [60]. A high BI is often associated with an intense desire among potential users to purchase freemium in ILDA [61]. When consumers are satisfied with a product, the desire to engage with the same product again is encouraged [62]. Additionally, the freemium model plays an important role in generating US by providing improved and superior services that meet the expectations of users who are dissatisfied with limited features offered by free services since this method aims to offer more enjoyable and high-quality users experiences [27]. US positively affects BI by becoming loyal and even recommending the product or service to others [58]. Based on this effect, the following hypothesis is deduced.

H5: US has a significant influence on BI

The commitment aspect of UT positively influences BI to use technology [63]. Users often have worries concerning data security and transaction transparency when using technology [64]. UT could eliminate the worries of technology users by providing attention and recommendations from known and trusted people [65]. Therefore, the hypothesis compiled by the authors relating to this discussion is as follows.

H6: UT has a significant influence on BI

DL is a concept found in various literature works, where users interpret its definition subjectively. Some of the most-used terms are ICT literacy, media literacy, new literacy, and digital competence [66]. However, DL refers to

practical abilities and competencies needed to effectively use digital technology. This includes skills related to operating, navigating, and engaging in creative activities within digital environments [67]. It is crucial to be aware that this capability is not static but continues to develop along with technological advancements [68]. DL comprises the technical proficiency as well as cognitive, emotional, and sociological skills necessary for effectively using digital technology [68]. Users with a high level of DL tend to quickly adapt to new application interfaces, access different options, and embrace new features in digital technology [68]. Given the importance of DL in shaping users interaction with technology, this research proposes the following hypothesis.

H7: DL obtains moderating influences between PE and US

H8: DL achieves moderating influences between EE and US

III. METHODS

Quantitative research method was used to examine the effect of PE, EE, SI, FC, US, UT, and DL variables on BI of Muslim consumers when using freemium services offered by ILDA. The data used were primary data obtained through a survey conducted among Muslim communities in Indonesia from November to December 2022. Additionally, Indonesia was selected as the respondent location because the country contained the second-largest number of users of ILDA in the world and the fastest growth trend among other countries. A purposive sampling method was adopted to collect data from 400 respondents aged 17 to 65 who had to be users of an ILDA that offered either essential or unpaid services for a minimum period of three months. The requirement that respondents be at least 17 years old was based on the prevailing payment system in Indonesia, which typically required an identification (ID). Since ID cards were generally issued only to those who are 17 or older, this age was set as the minimum obtained. Relating to this research, questionnaires were distributed online through various digital platforms such as Whatsapp, LINE, Facebook, Instagram, and LinkedIn. To ensure that respondents meet the predetermined criteria, prospective respondents were first required to fill out a pre-questionnaire containing several questions related to the criteria of the users. Moreover, responders who met the criteria filled out the main questionnaire which contained questions and statements related to variable indicators.

To ensure that data collection adhered to applicable research ethics, respondents were required to fill out a separate consent statement, indicating their willingness to participate by providing information relevant to the objectives of this study. This voluntary consent is evidenced by their agreement to provide personal information for the research, including socio-demographic questions. To maintain anonymity, respondents' data was encrypted. The research findings were compiled into a comprehensive dataset. The management of the research information provided by respondents complies with ethical guidelines, ensuring anonymity, confidentiality, and the exclusive use of data for research purposes.

The main questionnaire was structured into two parts, focusing on the demographic information of respondents and using a statement instrument. The questionnaire responses were based on a Likert scale with five measurement scales, where respondents were asked to rate the agreement or disagreement using point values ranging from 1 to 5. In addition, the data collected through the primary research were analyzed using Partial Least Square Structural Equation Model (PLS-SEM) method by using SmartPLS 4.0 program. PLS-SEM was used due to the complicated structure of the research model and the presence of abnormal data [69]. Model complexity consisted of the integration of reflective-formative paths and included the concept of intervening influences (mediation type).

The analysis included measurement model test (outer model) and structural model test (inner model). Before the relationship between variables was tested, explorers conducted validity and reliability tests on the data to be used through factor loading values, construct reliability, Average Variance Extracted (AVE), and Fornell Lacker. Additionally, data testing continued when the validity and reliability tests met the required criteria (further explanation was shown in the results chapter). Generally, measurement items in the research were adapted from previous exploration and then modified according to the context as well as the research model. UTAUT, including PE, EE, FC, and SI, were all measured using four items, each of which was adapted from the method used by [24], [31], [70], [71]. US variable was measured using four items, adapted from the method applied by [72]–[74]. Similarly, UT variable was measured using four items adapted from previous usage research by [59], [75], [76]. The indicators for BI were measured using six items adapted from the methods by [24], [31], [70], [71]. Finally, DL variable was measured by applying four items adapted from the method used by [77], [78] as the total hypothesis model was shown in Fig. 1.

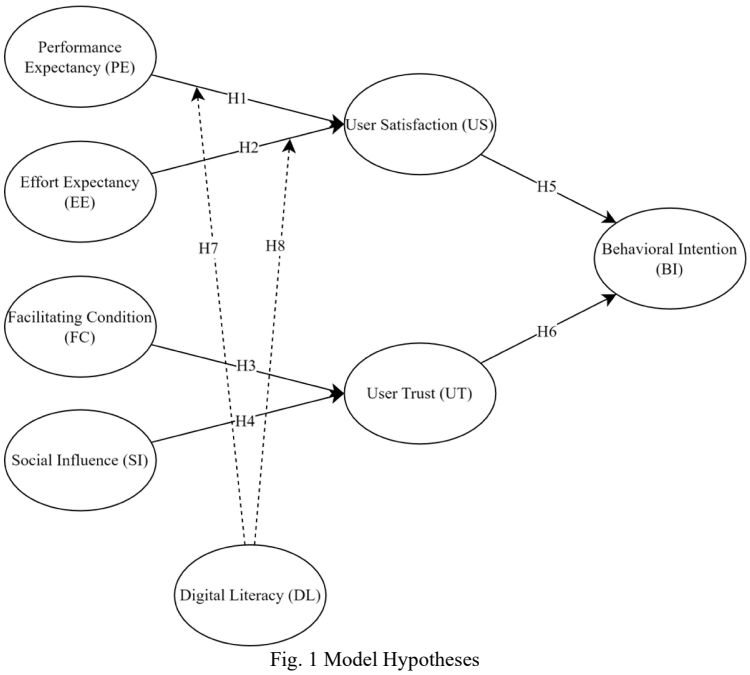

Fig. 1 Model Hypotheses

IV. RESULTS

The research results showed an overview and explained the various characteristics of the respondents in the descriptive analysis section as shown in Table 2. The majority of respondents in this research were male, with a total of 212 respondents, while 188 were female. These values showed that gender distribution among the respondents was relatively balanced, with no significant difference in numbers between male and female respondents. However, the most prominent age group among the participants was 17-25 years, followed by the age group of 26-35 years. These two age ranges belong to generations Y and Z, who were relatively familiar with technology [79].

TABLE 2
CHARACTERISTICS OF RESPONDENT

Variable	Category	Frequency
Gender	Male	212
	Female	188
Age	17-25	154
	26-35	142
	36-45	67
	46-55	32
	56-65	5
Education	Junior High School	2
	Senior High School	35
	Bachelor	305
	Master	50
	Doctoral	8
Monthly Expenses	< Rp. 2.500.000	122
	Rp. 2.501.000 – Rp. 5.000.000	144
	Rp. 5.001.000 – Rp. 7.500.000	73
	Rp. 7.501.000 – Rp. 10.000.000	39
	>Rp. 10.000.000	22
Resident	Sumatra Island	22
	Java Island	367
	Kalimantan Island	8
	Sulawesi Island	2
	NTT, NTB, Maluku & Papua	1
ILDA Usage Rate (in a day)	1 Hour/day	120
	2 Hours/day	172
	3 Hours/day	65
	4 Hours/day	31
	5 Hours/day	12

Concerning educational background, most respondents held a bachelor's degree, accounting for a total of 305 users, showing a significant portion of the respondents possessed a higher level of technological literacy and understanding. Moreover, respondents from Java Island, known for its well-developed internet infrastructure and technology facilities, constituted the majority of 367 participants. Besides this information, the level of ILDA used by participants was dominated at two hours per day, which was a moderate number for application users.

A. Measurement Model Assessment (Outer Model)

The primary objective of the outer model test was to assess the accuracy and consistency of the collected data as shown in Table 3. The authors evaluated the data validity by examining the outer loading value, while Cronbach Alpha (α), composite reliability (CR), and AVE values were used to measure data reliability. When the outer loading value of the data exceeded 0.7, valid and suitable for subsequent testing was considered [80]. Consequently, when the value was higher than the threshold, lack of validity was shown [69]. The acceptable Cronbach's Alpha value or scale was 0.80, while the value for a good scale was 0.70, and the acceptable scale value was 0.60. The value obtained in CR test was usually between 0 and 1. For analysis, CR value should be equal to or greater than 0.6. Similarly, AVE value was considered valid when it surpassed 0.5 and was greater than cross-loading value [80].

TABLE 3
CONSTRUCT VALIDITY AND RELIABILITY TEST

Constructs	Items	Items	Outer Loading
Performance Expectancy (α = 0.941, CR = 0.944, AVE = 0.850)	PE1	Freemium services in ILDA are very useful for my worship activities	0.895
	PE2	By using freemium services in ILDA, the intensity of my worship can increase.	0.931
	PE3	By using freemium services in ILDA, I can do and complete more other activities.	0.936
	PE4	By using freemium services on ILDA, the quality of my worship has improved.	0.924
Effort Expectancy (α = 0.970, CR = 0.971, AVE = 0.918)	EE1	It is easy for me to learn about all freemium services in ILDA	0.948
	EE2	Freemium services on the ILDA are easy to use	0.968
	EE3	I am skilled in using all freemium services in ILDA	0.969
	EE4	I can use all freemium services in the ILDA without any obstacles.	0.948
Facilitating Condition (α = 0.918, CR = 0.971, AVE = 0.802)	FC1	I have the necessary resources to use freemium services on ILDA.	0.888
	FC2	I have the necessary knowledge to use freemium services on ILDA	0.905
	FC3	The freemium service on ILDA is compatible with other technologies I use.	0.908
	FC4	I can get help from others when I experience difficulties in using freemium services on ILDA.	0.882
Social Influence (α = 0.958, CR = 0.959, AVE = 0.922)	SI1	My friends and significant others think that I should use freemium services on ILDA.	0.962
	SI2	My family influences my behaviour and I may use freemium services on ILDA.	0.961
	SI3	People I trust prefer that I use freemium services on ILDA.	0.958
Users Satisfaction (α = 0.932, CR = 0.933, AVE = 0.832)	US1	My choice to use freemium services on ILDA is very wise.	0.864
	US2	I feel I am doing the right thing when I use freemium services on ILDA.	0.948
	US3	The experience I feel when using freemium services on ILDA is what I needed all along.	0.942
	US4	I feel very happy with my decision to use freemium services on ILDA.	0.891
Users Trust (α = 0.954, CR = 0.954, AVE = 0.878)	UT1	I think freemium services on ILDA are very reliable in supporting my worship activities.	0.929
	UT2	I think the freemium service on ILDA has high integrity.	0.947
	UT3	I think the freemium service on ILDA can meet my expectations.	0.940
	UT4	I think the freemium service on ILDA provides secure privacy for its users.	0.933
Behavioral Intention (α = 0.925, CR = 0.949, AVE = 0.724)	BI1	I intend to continue using freemium services on ILDA in the future to support my worship activities.	0.860
	BI2	I plan to frequently use freemium services on ILDA in my worship activities.	0.894
	BI3	I intend to recommend freemium services on ILDA to people around me.	0.883
	BI4	I intend to say positive things (word of mouth) about freemium services on ILDA to others.	0.853
	BI5	I intend to upgrade the freemium service on ILDA that I use.	0.853
	BI6	I intend to pay the subscription fee for freemium services on ILDA that I use regularly.	0.839
Digital Literacy (α = 0.952, CR = 0.986, AVE = 0.873)	DL1	I can learn new technologies in digital applications easily	0.936
	DL2	I know how to activate and deactivate functions and features found in digital apps	0.947
	DL3	I can recognize which online information is reliable	0.919
	DL4	I know what and how to fix the problem when there is a problem with the digital application that I use	0.934

Based on testing the outer model using SmartPLS 4.0, all outer model values in the data exceeded 0.7 [69]. As a result, the data used in this research was valid and suitable for subsequent testing as shown in Table 3. Furthermore, the outcomes of CR and AVE tests met the necessary criteria, showing the data was reliable and could be further processed in subsequent tests. The outcomes of the outer model test conducted with SmartPLS 4.0 showed that all

outer model values in the used data surpassed 0.7. This result led to the conclusion that the data used in this research was valid and could be included in the subsequent test. The accepted values were in the range of 0 to 1 in CR test. For exploratory purposes, CR value should be equal to or greater than 0.6. Similarly, AVE value was considered valid when it exceeded 0.5 and was greater than cross-loading value. The findings from CR and AVE tests validated that the test results met the necessary criteria, showing the data was reliable for further analysis in subsequent tests.

The research incorporated a discriminant validity test to assess the distinctions between different constructs. Two methods were used to test discriminant validity which included cross-loading value test and Fornell-Lacker criterion. First, this research used cross-loading value test where each construct was evaluated to ensure the construct correlation with the measurement item was greater than the other constructs. Following the discussion, the expected cross-loading value was greater than 0.7 [81]. In testing discriminant validity, each construct was evaluated to ensure the correlation of constructs with measurement items was greater compared to other constructs. Moreover, the Table showed that all outer loading indicators (italicized values in Table 4) on the construct had a value greater than cross-loading value. An example was indicator PE1 where the loading value was 0.895, which was greater than its cross-loading to other constructs, namely 0.295 to EE1, 0.257 to FC1, and 0.308 to SI1. These values were similar to all other indicators where the outer loading value was greater compared to other constructs. Since all indicators of the outer loading value were greater than cross-loading value, this model had met the discriminant validity requirements.

TABLE 4
CROSS-LOADING VALUE

Construct	Items	PE	EE	FC	SI	US	UT	BI	DL
Performance Expectancy	PE1	*0.895*	0.295	0.257	0.308	0.329	0.366	0.651	0.056
	PE2	*0.931*	0.356	0.325	0.381	0.387	0.421	0.637	0.047
	PE3	*0.936*	0.330	0.296	0.360	0.366	0.380	0.606	0.125
	PE4	*0.924*	0.330	0.308	0.360	0.354	0.375	0.623	0.086
Effort Expectancy	EE1	0.339	*0.948*	0.774	0.710	0.688	0.654	0.500	0.174
	EE2	0.345	*0.968*	0.806	0.731	0.708	0.683	0.529	0.172
	EE3	0.363	*0.969*	0.818	0.768	0.723	0.696	0.580	0.148
	EE4	0.321	*0.948*	0.841	0.769	0.733	0.668	0.549	0.090
Facilitating Condition	FC1	0.287	0.789	*0.888*	0.740	0.716	0.636	0.476	0.120
	FC2	0.275	0.750	*0.905*	0.740	0.737	0.624	0.465	0.073
	FC3	0.321	0.776	*0.908*	0.719	0.759	0.675	0.535	0.128
	FC4	0.269	0.714	*0.882*	0.682	0.747	0.628	0.479	0.077
Social Influence	SI1	0.390	0.758	0.780	*0.962*	0.723	0.641	0.587	0.070
	SI2	0.360	0.737	0.757	*0.961*	0.682	0.595	0.556	0.074
	SI3	0.354	0.744	0.778	*0.958*	0.716	0.625	0.579	0.059
Users Satisfaction	US1	0.336	0.733	0.811	0.691	*0.864*	0.676	0.538	0.060
	US2	0.350	0.652	0.753	0.676	*0.948*	0.768	0.590	0.023
	US3	0.363	0.643	0.750	0.667	*0.942*	0.784	0.627	0.010
	US4	0.372	0.683	0.699	0.651	*0.891*	0.897	0.694	0.020
Users Trust	UT1	0.374	0.659	0.660	0.601	0.836	*0.929*	0.674	0.013
	UT2	0.394	0.685	0.695	0.595	0.825	*0.947*	0.694	0.088
	UT3	0.414	0.653	0.658	0.611	0.779	*0.940*	0.694	0.087
	UT4	0.390	0.645	0.672	0.617	0.786	*0.933*	0.700	0.104
Behavioral Intention	BI1	0.397	0.633	0.653	0.620	0.772	0.872	*0.772*	0.069
	BI2	0.561	0.410	0.396	0.436	0.538	0.601	*0.860*	0.048
	BI3	0.652	0.428	0.417	0.462	0.502	0.572	*0.894*	0.061
	BI4	0.629	0.427	0.403	0.451	0.503	0.550	*0.883*	0.041
	BI5	0.645	0.440	0.399	0.510	0.502	0.486	*0.853*	0.018
	BI6	0.689	0.421	0.379	0.489	0.467	0.479	*0.839*	0.005
Digital Literacy	DL1	0.105	0.140	0.111	0.062	0.030	0.065	0.052	*0.936*
	DL2	0.058	0.151	0.107	0.080	0.035	0.072	0.052	*0.947*
	DL3	0.075	0.125	0.080	0.052	0.022	0.086	0.047	*0.919*
	DL4	0.085	0.147	0.113	0.063	0.024	0.074	0.041	*0.934*

*Italicized numeric values represent the outer loading, while the loose diagonal describes the correlation between constructs

The second discriminant validity test was to compare the root value of AVE (Fornell-Larcker Criterion) with the correlation value between latent variables. The results confirmed that all variables established discriminant validity, as the cross-loading items in each construct showed higher values compared to those shown in Table 5. Additionally, the conclusion was based on all values of AVE (Fornell-Larcker Criterion) of each construct (italicized values in Table 5) greater than the correlation with other variables. For example, in BI construct which had an AVE value of 0.724,

AVE root of BI construct was 0.851. Relating this result, the value of 0.852 was greater compared to its correlation with other constructs, namely with DL (0.052), EE (0.564), and FC (0.546).

TABLE 5
THE DISCRIMINANT VALIDITY CHECK (FORNELL-LACKER CRITERION)

Construct	BI	DL	EE	FC	PE	SI	US	UT
BI	*0.851*							
DL	0.052	*0.934*						
EE	0.564	0.152	*0.958*					
FC	0.546	0.112	0.846	*0.896*				
PE	0.682	0.085	0.357	0.323	*0.922*			
SI	0.598	0.071	0.777	0.804	0.384	*0.960*		
US	0.674	0.031	0.744	0.826	0.390	0.736	*0.912*	
UT	0.737	0.078	0.705	0.716	0.419	0.647	0.860	*0.937*

*Italicized numeric values represent the root value of AVE, while the loose diagonal describes the correlation between constructs.

B. Measurement Model Assessment (Inner Model)

The authors conducted a Goodness of Fit Index (GoF Index) test to evaluate the total measurement and structural models as shown in Table 5). The calculated value for GoF Index was 0.648, implying a high degree of fit according to the classification provided by [82]. Additionally, GoF test results shown in Table 6 confirmed that both measurement and structural models in this research implied a strong level of fit.

The hypothesis test results showed that PE variable positively and significantly affected US with ILDA. In H1, the data processing results showed a coefficient value of 0.149, while the p-value was 0.000 or <0.05. Similarly, EE variable positively and significantly affected US with ILDA. The relationship between these variables had a coefficient value of 0.712, while the p-value was 0.000 or <0.05. FC variable implied an effect value of 0.555 on US, with a p-value of 0.000 or <0.05. The influence of SI variable on UT was 0.200 with p-values of 0.002 or <0.05. Based on these findings, H4 was accepted, showing that SI positively and significantly affected UT.

The hypothesis test results showed that US significantly and positively affected BI, with a coefficient value of 0.157 and a p-value of 0.018 or less than 0.05. Similarly, the relationship between UT and BI variables had a coefficient value of 0.602 with a p-value of 0.000 or less than 0.05. These findings confirmed the acceptance of H6, implying that UT positively and significantly affected BI.

In H7 hypothesis, the moderation test outcomes showed a coefficient value of 0.008 and a p-value of 0.860 or more than 0.05. Consequently, H7 was rejected, implying that DL had a positive moderating effect but was not significant toward PE and US. In H8 hypothesis, the moderation test outcomes showed a coefficient value of 0.052 and a p-value of 0.214 or more than 0.05. Based on this result, H8 was rejected, implying that DL had a positive moderating effect but was not significant toward EE and US. Generally, the results of the bootstrapping test could be shown in Table 7. Furthermore, the results of the bootstrapping analysis are visualized in Fig. 2, which displays the relationships between each construct based on their P-values.

TABLE 6
STRUCTURAL MODEL ASSESSMENT AND GOODNESS-OF-FIT (GOF) INDEX

Variable	R2	Predictive Accuracy	Q2	Predictive Relevance
US	0.584	Moderate	0.566	Yes
UT	0.527	Moderate	0.520	Yes
BI	0.549	Moderate	0.367	Yes
GoF $\sqrt{AVE} * R2$	0.648			

TABLE 7
PATH COEFFICIENT AND HYPOTHESES TESTING

Hypotheses Label	Path	Coefficient Value	SD	P-Value	t-statistics	Result	VIF	Collinearity Result
H1	PE→US	0.149	0.041	0.000	3.540	Supported	1.164	No Collinearity
H2	EE→US	0.712	0.036	0.000	18.987	Supported	1.177	No Collinearity
H3	FC→UT	0.555	0.064	0.000	8.465	Supported	2.829	No Collinearity
H4	SI →UT	0.200	0.061	0.002	3.048	Supported	2.829	No Collinearity
H5	US→BI	0.157	0.068	0.018	2.373	Supported	3.847	No Collinearity
H6	UT→BI	0.602	0.062	0.000	9.716	Supported	3.847	No Collinearity
H7	X1 * Z	0.008	0.047	0.860	0.177	Not Supported	1.316	No Collinearity
H8	X2 * Z	0.052	0.042	0.214	1.242	Not Supported	1.363	No Collinearity

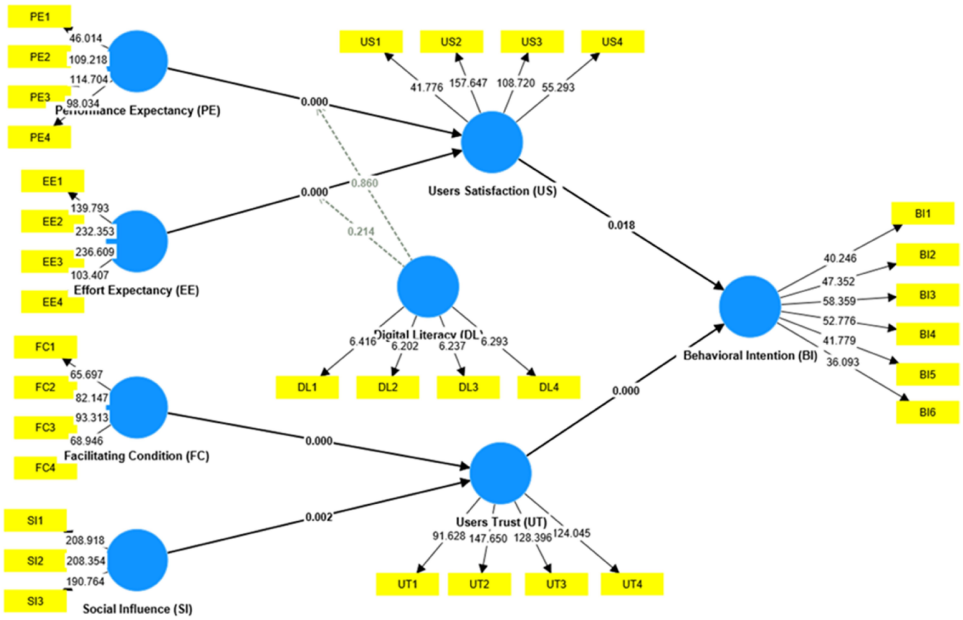

Fig. 2 Bootstrapping Result

V. DISCUSSION

The results showed that when users experienced increased benefits from using freemium services in ILDA, the level of US also increased. Users were satisfied when freemium services of ILDA offered comprehensive features to increase the quality of worship of users [83]. In addition, worship became crucial for humans to relieve anxiety caused by unfavorable circumstances such as natural disasters, illness, and similar challenges [75]. Users of ILDA had the convenience of performing prayers from home, especially by using additional features offered by freemium services [84]. Moreover, US with technology was influenced by cognitive factors such as PE and other factors including the emotions of users and the level of enjoyment experienced when using the technology [85]. These results were related to previous research concerning the significant relationship between PE and US [52], [53], despite different subjects.

Users were satisfied when freemium services in ILDA were user-friendly and easy to learn as well as navigate. Convenience led to happiness and satisfaction, improving the desire among users to use more comprehensive services [86]. Moreover, users experience maximum benefits from technology when easily used. The demographic data of this research showed that most respondents were aged 17-25 and 26-35 years, corresponding to generations Y and Z. These generations had a higher level of familiarity with technology compared to other age groups [79]. Despite familiarity with new technology, the groups still considered the ease of operating technology as a factor that influenced US. Concerning different research subjects, the result was related to the previous outcome, which also found a significant relationship between EE and US [54], [46].

The results of the research showed that FC had a significant influence on UT. This outcome implied that ILDA users were confident in reliable resources and adequate knowledge, enabling users to use the services provided efficiently. In the context of this research, the supporting mechanism referred to external factors such as information, assistance, proficiency, or guidance provided by users outside the immediate circle of users. The use of ILDA has just become known in the last decade. Consequently, new users of these applications required external assistance in the form of information and knowledge. Besides these values, considering the characteristics of respondents based on place of residence, the findings showed that 92% of respondents from Java Island possessed a reliable internet network infrastructure [28]. This implied that these participants could effectively leverage the internet network condition to fully use the services offered by ILDA, thereby improving a higher level of UT. Previous research with different subjects also reported significant results concerning the relationship between FC and UT [55], [56], [57].

Greater UT could also be improved through SI, while signals and positive perceptions from close associates or respected users could inspire confidence in the endorsed choices, thereby influencing perception and decision-making. The users tend to find additional information and knowledge about technology products by relying on the perception of others [87]. In the context of ILDA, users tend to build trust based on personal experiences, recommendations, and knowledge from trusted referrals, instead of potentially harmful content from other sources. Research showed that as SI consumers receive from friends, relatives, or trusted users their trust in the recommended product tended to increase.

Previous research focusing on different subjects had reported significant relationship between FC and UT [55], [56], [57].

The research showed that US was crucial in determining the probability of users using freemium services in ILDA. BI using freemium services increased as users acquired a better understanding of the features and services offered. In addition, users continued using freemium services in ILDA when users perceived the services as suitable, wise, and essential [52]. By offering freemium services to users, all parties included received the expected value and benefits, eventually contributing to the long-term sustainability of the business [88]. Moreover, BI of Muslim consumers to use freemium services in ILDA positively correlated with the level of UT in using the services [59]. Users often had fears concerning data security and transaction transparency, particularly when using technology [64]. UT could ease these concerns by providing attention and recommendations from familiar and trusted users. This result was consistent with previous research, on the relationship between US, UT, and BI [27], [58], [63], [64], [65], [89], and [90].

The results showed that DL had a positive and insignificant moderating effect between PE and US variables. Meanwhile, DL variable had a positive moderating effect, but the effect was weak and lacked significance. This showed that DL level of respondents did not have a strengthening or weakening effect between PE and US variables. Users tend to be satisfied with the benefits experienced when using ILDA, and DL level of users did not influence this US. Despite some users of ILDA having limited DL, satisfaction remained high due to the significant benefits users achieved from using these applications. The users continued to use the applications despite the lower DL skills. The results of this research were not related to previous research which showed that DL was able to have a positive moderating effect on PE and BI as well as EE and BI [68]. Moreover, a major reason for the results was that other factors strongly encouraged users to use freemium services on ILDA, causing the moderating effect of DL to appear insignificant.

VI. Conclusions

In conclusion, freemium was an essential development strategy, particularly in ILDA business, as it offered sustainable income for application development companies. The results showed that PE and EE positively and significantly affected US, FC, SI, and UT. Moreover, US and UT affected BI of customers using freemium services in ILDA. In this research, DL positively affected PE and EE in US, although insignificantly.

Based on the research results, ILDA development companies should focus on developing the four aspects of UTAUT framework. To develop PE aspect, companies could identify what services consumers need. The results of the identification process were then executed into new features and services that met the consumer needs. To develop EE aspect, companies could collect demographic information of users when companies create users profiles for the first time, thereby helping in assessing the level of effort expected by users. This data could be used to customize the interface and users experience according to consumer preferences. In addition, companies could advocate for the government to massively develop fast and reliable internet network infrastructure to improve FC aspect, ensuring equal access for all app users across Indonesia from Sabang to Merauke. FC refers to the level of knowledge and understanding of technology of users, thereby increasing literacy about the use of ILDA should be highly recommended. Finally, development companies could develop promotions to encourage existing users to recommend freemium services to relatives.

The research has some limitations in the scope of the respondents, which are limited to Muslim communities living in Indonesia. Future exploration could investigate a more comprehensive sample by taking respondents from developed countries with more ILDA users, such as United Kingdom and United States. Moreover, the results would further improve the body of knowledge, particularly concerning BI to use of freemium services in Muslim communities in developing countries. Future explorers could also redevelop this research by using Multi Group Analysis and PLS-SEM methods to compare two groups of respondents. For example, comparing two groups of data from developed and developing countries to show the similarities and differences between the data. In addition, the characteristics of respondents could vary based on age and place of residence. For instance, different age groups, such as Millenials and Generation Z, are typically more tech-savvy than Generation X and Baby Boomers, who may take longer to adapt and use new technologies.

Author Contributions: *Yan Putra Timur*: Conceptualization, Methodology, Writing - Original Draft, Writing - Review & Editing, Supervision. *Ririn Tri Ratnasari*: Software, Investigation, Data Curation, Writing - Original Draft. *Anwar Allah Pitchay*: Investigation, Data Curation. *Dyah Permata Sari*: Investigation, Data Curation. *Muhammad Rifqi*: Data Curation, Translate, Profreeding.

All authors have read and agreed to the published version of the manuscript.

Funding: This research received no specific grant from any funding agency.

Acknowledgments: The authors would like to thank all the participants for their responses to the questionnaire.

Conflicts of Interest: The authors declare no conflict of interest.

Data Availability: The data that support the findings of this study is confidential. The data will be made available for sharing upon request.

Institutional Review Board Statement: Not applicable.

Informed Consent: Informed Consent was obtained, and a detailed explanation was presented in the Methods section.

Animal Subjects: There were no animal subjects.

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