APTISI Transactions on Technopreneurship (ATT)
Vol. 8, No. 1, March 2026, pp. 37−50
E-ISSN: 2656-8888 | P-ISSN: 2655-8807, DOI:10.34306

A Multi-Group Structural Analysis of Digital Banking Adoption Determinants Across Generational Cohorts in Indonesia

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Article Info

Article history:

Submission December 23, 2024
Revised April 28, 2025
Accepted December 8, 2025
Published December 18, 2025

Keywords:

DBA
Generational Differences
UTAUT
Baby Boomers
Generation Z

ABSTRACT

This study investigates factors affecting Digital Banking Adoption (DBA) across generations in Indonesia, focusing on performance expectancy, effort expectancy, social influence, facilitating conditions, and trust. Employing a cross-sectional design, the study collected data through a structured questionnaire administered to 360 respondents, selected through purposive and clustering sampling, from major cities including Jakarta, Bandung, Surabaya, and others. **Structural Equation Modelling** (SEM) and Multi-Group Analysis were applied to test hypotheses and assess generational differences in DBA. **Findings reveal** that performance expectancy, facilitating conditions, and trust significantly influence DBA, with notable differences across generations: Baby Boomers prioritize facilitating conditions, Generation X emphasizes performance expectancy, and Generation Y values both performance and effort expectancy. Generation Z, despite being tech-savvy, benefits from enhanced support structures for improved banking experiences. **These results highlight** the importance of tailored, generation-specific strategies in digital banking, providing valuable insights for service providers aiming to enhance user experience and adoption across demographic groups.

DOI: https://doi.org/10.34306/att.v8i1.590

1. INTRODUCTION

Amidst the swift progress of digitalization, the banking sector persists in its pursuit of innovation to optimize efficiency and deliver superior services to clients [1]. The significance of advancements in digital banking is growing in tandem with advancements in information and communication technologies [2]. These technological developments are not only transforming financial operations but also supporting broader national and global agendas related to Sustainable Development Goal (SDG) 9 on Industry, Innovation, and Infrastructure, which emphasizes strengthening digital infrastructure and fostering technological innovation. Indonesian banks are vying to embrace innovative technology in order to provide their consumers with digital services that are both easily accessible and highly efficient. Utilization of digital banking services saw a 30% surge in 2022 as compared to the preceding year [3]. Reports confirm this pattern, observing a 45% surge in mobile banking transactions during the corresponding period. Additional investigation indicates that implementing technology in the banking sector has shown significant potential to enhance operational efficiency, thereby strengthening

banks' competitive position in an increasingly competitive market [4]. Studies have highlighted that integrating innovative FinTech solutions leads to advancements in customer experience and operational efficiency [5]. These improvements also contribute to SDG 10 on Reduced Inequalities by expanding financial access across various socio-economic and geographic segments through digital banking services.

The expansion of the Financial Technology (Fintech) industry further heightens competition in the financial sector. Fintech provides a range of cutting-edge financial services, including digital payments, online loans, and technology-driven investments, which are gaining popularity among consumers [6]. The number of fintech service providers in Indonesia has more than doubled in the past five years, with an annual growth rate of 35% [7]. This rapid growth strengthens digital ecosystems that support the objectives of SDG 9, particularly in promoting innovation and enhancing financial infrastructure. People are becoming more interested in fintech services since they are easy to use and less expensive than traditional banking services. This increasing accessibility also aligns with SDG 10, as digital platforms provide more affordable financial options that reduce economic and regional disparities. Conventional banks are compelled to adapt and incorporate new technology in order to stay relevant and competitive in the market due to this competition [8]. Several prominent banks in Indonesia have initiated partnerships with fintech businesses to foster the creation of cutting-edge goods and services [9]. Such collaborations are critical in accelerating innovation and ensuring that digital financial services reach users across diverse demographic groups, ultimately supporting inclusive and sustainable financial development.

The COVID-19 epidemic has expedited the implementation of digital technologies in diverse industries, including the banking sector [10]. The use of social distancing measures and the imperative to minimize physical interactions have prompted consumers to transition towards digital banking services. There was a surge of over 50% in the adoption of digital banking services amid the epidemic [11]. Furthermore, the surge in DBA can be attributed to various factors, including the impact of the COVID-19 pandemic, changing customer preferences, and the evolution of technology in the banking industry [12]. The pandemic has accelerated the adoption of digital banking services, with customers increasingly turning to digital channels for their banking needs. This shift not only signifies a transient alteration but also establishes novel behavioral patterns that are likely to endure in the foreseeable future. Research reveals that 70% of banks in Southeast Asia, including Indonesia, experienced a notable surge in the adoption of digital technologies by their customers within the pandemic [13].

Baby Boomers, Generation X, Millennials (Generation Y), and Generation Z have unique attributes and inclinations when it comes to embracing novel technologies [14]. Younger cohorts exhibit a greater propensity for embracing and assimilating digital technologies in comparison to their older counterparts. Generation Z and Millennials exhibit a higher propensity for regular usage of digital banking services in comparison to Generation X and Baby Boomers [15]. Nevertheless, although older generations may be more hesitant in embracing new technologies, they continue to be a significant target audience for the banking sector. Both Generation X and Baby Boomers maintain a significant degree of confidence in conventional banks, despite their gradual shift towards digital banking services [16]. Hence, it is imperative for banks to comprehend the determinants that impact the adoption of digital banking among various generations in order to formulate efficient strategies [17].

This study introduces a new approach by using multi-group analysis to discover and compare the factors that influence the adoption of digital banking among different generations in Indonesia [18]. This methodology enables a more comprehensive examination of the way different generations interact with digital banking technology, yielding more detailed observations and more accurate tactics for the banking sector to cater to the diverse requirements of clients across generations. Furthermore, this study considers the influence of the COVID-19 pandemic on the alteration of customer behavior in the use of digital banking services [19]. This research makes a substantial contribution to the existing literature by focusing on generational comparisons in the context of digital banking in Indonesia, an area that has not been widely studied in previous research. Hence, this research not only aids banks in comprehending the requirements and inclinations of clients across various age groups but also offers practical suggestions for enhancing marketing strategies and product innovation [20].

2. LITERATURE REVIEW

2.1. Adoption of Digital Banking

Digital banking has become a core component of modern financial ecosystems, offering efficiency, accessibility, and convenience to users [21]. In emerging markets like Indonesia, its rapid growth is driven by advancements in financial technology and evolving consumer expectations [22]. This phenomenon also contributes to the broader mission of SDG 9, which emphasizes strengthening innovation capacity and digital infrastructure [23]. As digital banking services expand, they enable more inclusive access to financial tools, thereby helping reduce long-standing financial disparities an essential aspect of SDG 10.

Factors influencing the adoption of digital banking include perceived ease of use, perceived usefulness, and trust in the technology. One journal stresses the importance of user-friendly interfaces and robust security measures in driving adoption [24]. Moreover, consumer trust in digital banking platforms is crucial, as it directly impacts consumers' willingness to embrace digital banking services. The rise of fintech companies has also been instrumental in promoting DBA by offering innovative solutions tailored to evolving consumer needs [25].

2.2. Unified Theory of Acceptance and Use of Technology (UTAUT)

The Unified Theory of Acceptance and Use of Technology (UTAUT) is a widely accepted model for understanding technology adoption behavior [26]. Developed as an integration of multiple theoretical models, UTAUT provides a comprehensive framework for studying technology acceptance. It posits that four core constructs performance expectancy, effort expectancy, social influence, and facilitating conditions determine the likelihood of technology adoption [27].

Performance expectancy refers to the degree to which individuals believe that using the technology will help them achieve gains in job performance. Effort expectancy is the ease associated with the use of technology [28]. Social influence is the degree to which individuals perceive that important others believe they should use the technology. Facilitating conditions refer to the extent to which individuals believe that an organizational and technical infrastructure exists to support the use of technology [29].

2.3. Performance Expectancy and Digital Banking Adoption

Performance expectancy has been consistently recognized as a crucial factor influencing the adoption of digital banking services [30]. Users are more inclined to adopt digital banking if they perceive that these services will enhance their efficiency in financial management. The perceived benefits, such as time savings and improved transaction accuracy, are key drivers that lead to higher adoption rates [31].

2.4. Effort Expectancy and Digital Banking Adoption

Effort expectancy is a crucial factor in the adoption of digital banking services, significantly influencing user behavior towards these platforms. The ease of use associated with digital banking systems plays a vital role in user adoption rates, particularly among older adults who may be less familiar with technology. Simplified interfaces and intuitive design are key elements that can reduce the perceived effort required to use digital banking services, thus promoting adoption [32].

2.5. Social Influence and Digital Banking Adoption

Social influence has been identified as a crucial factor in the adoption of digital banking services, particularly among younger generations who are more susceptible to peer influence. Recommendations and endorsements from family, friends, and social networks significantly impact individuals' decisions to adopt digital banking services. This influence is further reinforced by factors such as perceived ease of use, compatibility, observability, and trust in the technology and the bank offering digital services [33]. Additionally, the perceived attitude of bank customers towards the ease of use of digital banking plays a significant role in adoption [34].

2.6. Facilitating Conditions and Digital Banking Adoption

Facilitating conditions are crucial in influencing the adoption of digital banking services. The availability of technical support and infrastructure, such as reliable internet access and customer service, significantly impacts individuals' decisions to adopt digital banking. Ensuring that users have the necessary resources and support to utilize digital banking platforms is essential for encouraging widespread adoption [35].

2.7. Trust and Digital Banking Adoption

Integrating UTAUT constructs with trust and security factors provides a comprehensive understanding of DBA [36]. Trust in the security of digital banking platforms is a significant concern for users. Addressing security concerns and building trust through robust security measures and transparent communication can enhance user confidence and drive adoption. Additionally, research has extended the UTAUT model by incorporating trust-based variables to explain the adoption of mobile banking [37].

3. METHODOLOGY

3.1. Research Design

This study employs a descriptive and verificative research design using quantitative techniques [38]. The approach is cross-sectional, capturing data at a single point in time to provide a snapshot of DBA across different generations. A well-structured questionnaire was developed to collect data from respondents. Comprehensive data analysis was performed to test the hypotheses and provide meaningful insights and conclusions [39].

3.2. Population and Sample

The population for this study includes digital banking users aged 18 to 74 years in major Indonesian cities, namely Jakarta, Bandung, Semarang, Surabaya, Medan, Denpasar, Makassar, and Balikpapan. The sample size is 360 respondents, distributed to represent the population's age composition as follows: 119 respondents (33%) aged 18-29, 112 respondents (31%) aged 30-44, 86 respondents (24%) aged 45-59, and 43 respondents (12%) aged 60-74. This distribution aligns with the age demographics of the Indonesian population, ensuring representativeness and reliability in the findings [40].

3.3. Measurement

The study measures several constructs based on established scales from previous research. The constructs include DBA, Performance Expectancy (PE), Effort Expectancy (EE), Social Influence (SI), Facilitating Conditions (FC), and Trust (T) [41]. Each construct was assessed using multiple items on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The questionnaire was pre-tested and validated to ensure clarity and reliability of the items.

3.4. Data Analysis

Data analysis was conducted using statistical software for descriptive statistics, reliability and validity testing, and hypothesis testing. Descriptive statistics summarized the demographic characteristics and main variables [42]. Reliability and validity were assessed using Cronbach's alpha and Confirmatory Factor Analysis (CFA). Hypothesis testing was performed using Structural Equation Modelling (SEM) and Multi-Group Analysis to examine relationships between constructs and compare results across different age groups [43].

4. RESULT AND DISCUSSION

4.1. Preliminary analysis

The researchers initially distributed 400 questionnaires, with 380 completed responses returned. Of these, 20 were excluded due to incomplete or unsuitable responses, leaving 360 valid datasets for analysis. The researchers first addressed any missing data by applying pre-replacement and embedding techniques [44]. Following this, a normality test was conducted, showing skewness and kurtosis values for all items ranged from -1 to +1, confirming the data followed a normal distribution.

4.2. Respondent demographic profiles

The demographic profile of respondents reveals diverse age, gender, city of residence, employment, and income levels. Generation Z (18-29 years) comprised 33%, Generation Y (30-44 years) 31%, Generation X (45-59 years) 24%, and Baby Boomers (60-74 years) 12% [45]. Gender distribution was balanced, with 50% male and 50% female respondents. Most respondents resided in Bandung (22%), followed by Jakarta (20%), Medan (14%), and Makassar (13%). Employment-wise, 77% were employed or self-employed, 11% were students, and the rest were homemakers or unemployed. Income ranged widely, with 18% earning over Rp10,000,000, 34% between Rp6,000,001 and Rp10,000,000, and smaller percentages in lower income brackets, illustrating the varied socioeconomic backgrounds of the respondents [46].

4.3. Measurement model

To further analyse the data, the researchers utilized Partial Least Squares Structural Equation Modelling (PLS-SEM), specifically version 4 of SmartPLS [47]. Unlike traditional regression analysis tools, SmartPLS-SEM is better suited for predictive research, as it allows researchers to focus on forecasting rather than fully testing the underlying model of UTAUT. PLS-SEM operates through two primary models: the measurement model and the structural model. The measurement model assesses data quality by examining its validity and reliability, ensuring that the constructs are well-represented and consistent. In contrast, the structural model tests the hypotheses, allowing for the evaluation of whether the study effectively addresses the research questions and achieves its intended objectives [48].

In the measurement model, the constructs used to gauge the acceptance of digital banking include PE, EE, SI, FC, T, and DBA. The analysis of these constructs, along with their respective items, factor loadings, Average Variance Extracted (AVE), and Composite Reliability (CR) values, is summarized in Table 1 [49]. The factor loadings for all items range from 0.772 to 0.921, exceeding the recommended threshold of 0.50, confirming the adequacy of each item in measuring its intended construct. The CR values for each construct surpass the minimum threshold of 0.7, ranging between 0.732 and 0.910, indicating strong internal consistency. Additionally, AVE values range from 0.650 to 0.847, all above the required minimum of 0.5, demonstrating that each construct explains over half of the variance in its indicators. Thus, all values meet the necessary criteria for validity and reliability [50].

Table 1. Measurement Model

Construct	Item	Loading	AVE	CR
Performance expectancy	I believe that using digital banking will increase efficiency in managing my finances.	0.804	0.650	0.732
	I feel that digital banking makes it easier for me to conduct banking transactions.	0.821		
	Digital banking helps me complete financial tasks more quickly.	0.793		
Effort expectancy	I find digital banking easy to use.	0.786	0.665	0.749
	I don't need much effort to learn how to use digital banking services.	0.821		
	The instructions and navigation in the digital banking app are very clear and easy to understand.	0.838		
Social influence	My family and friends encourage me to use digital banking services.	0.920	0.847	0.910
	I use digital banking because many people around me also use it.	0.921		
	Other people's opinions influence my decision to use digital banking.	0.920		
Facilitating conditions	I have adequate access to devices that support digital banking (e.g., smartphone, computer).	0.772	0.656	0.737
	I feel there is sufficient technical support when I experience problems with digital banking.	0.830		
	The internet infrastructure in my area supports the use of digital banking services.	0.826		
Trust	I feel safe when using digital banking services.	0.823	0.664	0.747
	I believe that my personal information is well protected by the digital banking service provider.	0.800		
	I am confident that my transactions through digital banking proceed smoothly without security issues.	0.821		

Digital Banking Adoption	I use digital banking services regularly for banking transactions.	0.854	0.717	0.803
	I feel comfortable using digital banking services to manage my finances.	0.852		
	I prefer using digital banking over going to a bank branch.	0.835		

4.4. Discriminant validity

Discriminant validity was assessed after confirming that the data met the requirements for convergent validity. This was done using the Heterotrait-Monotrait (HTMT) ratio of correlations, a preferred method for evaluating discriminant validity in structural equation modelling. According to the HTMT criterion, the stricter threshold is 0.85, and a more lenient threshold is 0.90. If the HTMT values between constructs are below these thresholds, it suggests that the constructs are distinct and measure different theoretical concepts. This distinction is essential to ensure that each construct uniquely contributes to explaining the variance in the model without significant overlap with other constructs [51]. The HTMT values presented in Table 2 show that all constructs fall within the acceptable range, thus supporting discriminant validity.

For instance, the HTMT values between DBA and EE are 0.757, and between DBA and SI are 0.622, both of which are below the threshold. Similarly, the values between T and FC are 0.756, while between T and PE are 0.749, reinforcing that the constructs are distinct. The low HTMT values indicate that each construct measures a separate aspect of DBA and related factors, reducing the risk of redundancy. Thus, the results support the discriminant validity of the measurement model, affirming that constructs such as Performance Expectancy, Effort Expectancy, Social Influence, Facilitating Conditions, Trust, and DBA are adequately distinct from one another. Table 2 provides a comprehensive summary of the HTMT discriminant validity values for each pair of constructs.

Table 2. Discriminant Validity

Construct	**DB**	**EE**	**FC**	**PE**	**SI**	**T**
Digital Banking Adoption (DBA)	**0.757**					
Effort Expectancy (EE)	0.715	**0.757**				
Facilitating Conditions (FC)	0.715	0.636	**0.636**			
Performance Expectancy (PE)	0.771	0.711	0.603	**0.771**		
Social Influence (SI)	0.622	0.682	0.438	0.510	**0.682**	
Trust (T)	0.785	0.813	0.756	0.749	0.669	**0.813**

4.5. Structural model

The structural model analysis further examines the hypotheses to confirm the relationships among the constructs using PLS path modeling with bootstrapping. This technique ensures that the empirical sampling distributions and standard errors are accurately assessed. In PLS-SEM, standard measures to evaluate the structural model include path coefficient significance, R-squared (R^2) values, effect size (f^2), and predictive relevance (Q^2). All Variance Inflation Factor (VIF) values were below the threshold of 5.0, indicating minimal multicollinearity among predictors and reinforcing the model's robustness.

The analysis revealed an R^2 value of 0.554, indicating that 55.4% of the variance in DBA is explained by the predictors in the model. Additionally, each hypothesis was supported with statistically significant path coefficients: PE had a positive impact on DBA ($\beta = 0.260$, T = 5.049, $p < 0.001$, VIF = 1.616, $f^2 = 0.094$), as did EE ($\beta = 0.162$, T = 3.009, p = 0.003, VIF = 1.978, $f^2 = 0.030$), SI ($\beta = 0.173$, T = 2.443, p = 0.015, VIF = 1.641, $f^2 = 0.041$), FC ($\beta = 0.216$, T = 4.564, $p < 0.001$, VIF = 1.548, $f^2 = 0.067$), and trust (T) ($\beta = 0.151$, T = 2.634, p = 0.008, VIF = 2.188, $f^2 = 0.023$).

These results confirm that all hypothesized relationships H1, H2, H3, H4, and H5 are statistically significant, supporting the positive effects of performance expectancy, effort expectancy, social influence, facilitating conditions, and trust on DBA. Table 3 summarizes the hypothesis testing outcomes, demonstrating the importance of each construct in explaining users' adoption of digital banking.

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Table 3. Hypotheses testing

Hypothesis	Estimate	S.E.	T	*p*-value	VIF	f^2	Relationship
H1 PE → DBA	0.260	0.052	5.049	0.000	1.616	0.094	Significant
H2 EE → DBA	0.162	0.054	3.009	0.003	1.978	0.030	Significant
H3 SI → DBA	0.173	0.071	2.443	0.015	1.641	0.041	Significant
H4 FC → DBA	0.216	0.047	4.564	0.000	1.548	0.067	Significant
H5 T → DBA	0.151	0.057	2.634	0.008	2.188	0.023	Significant

These results confirm that all hypothesized relationships H1, H2, H3, H4, and H5 are statistically significant, supporting the positive effects of performance expectancy, effort expectancy, social influence, facilitating conditions, and trust on DBA. Table 3 summarizes the hypothesis testing outcomes, while Figure 1 illustrates the structural model resulting from the algorithm analysis, visually mapping the magnitude and direction of each relationship among the constructs.

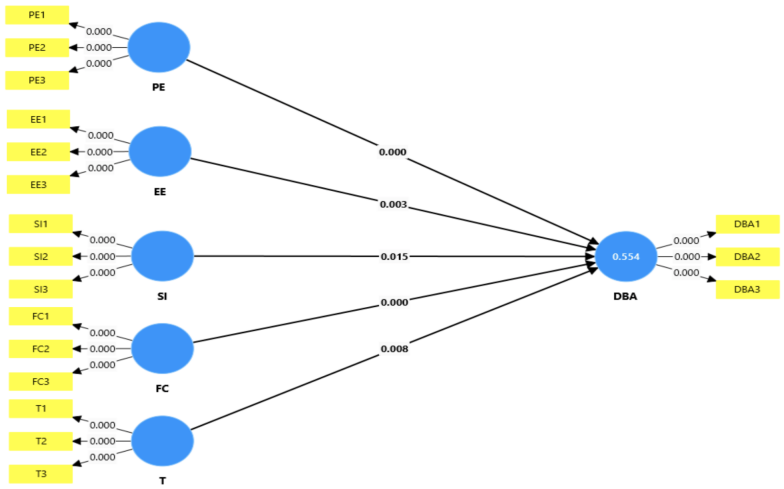

Figure 1. Structural Model-Based on Algorithm Analysis

4.6. Multi Group Analysis

The Multigroup Analysis (MGA) was conducted to examine how the relationships between PE, EE, SI, FC, and T with DBA differ across generations (Baby Boomers, Gen X, Gen Y, and Gen Z). This analysis provides insights into whether these relationships are influenced by generational characteristics.

4.7. Baby Boomers

The results show an R^2 of 0.712, indicating that 71.2% of the variance in DBA for Baby Boomers is explained by the model. For this group, only FC had a significant positive effect on DBA (Estimate = 0.504, T = 3.170, p = 0.002, VIF = 3.733, f^2 = 0.237), suggesting that support and resources are crucial for Baby Boomers in adopting digital banking. Other hypotheses, including those involving PE, EE, SI, and T, were not significant, indicating these factors may have limited influence on DBA within this generation.

4.8. Generation X

Generation X exhibited an R^2 of 0.574, showing that 57.4% of the variance in DBA is explained by the model. For this group, PE significantly influenced DBA (Estimate = 0.284, T = 2.083, p = 0.037, VIF = 3.033, f^2 = 0.062). This suggests that the perceived usefulness of digital banking plays a key role in adoption for Generation X. Other factors, such as EE, SI, FC, and T, did not show significant effects, suggesting a limited impact of these variables on DBA in this generation.

4.9. Generation Y

For Generation Y, the R^2 was 0.448, indicating that 44.8% of the variance in DBA was explained by the model. Both PE and EE had significant positive impacts on DBA, with PE showing a stronger effect (Estimate = 0.348, T = 3.928, $p < 0.001$, VIF = 1.346, $f^2 = 0.163$) compared to EE (Estimate = 0.244, T = 2.637, p = 0.008, VIF = 1.505, $f^2 = 0.072$). This suggests that both the usefulness and ease of use of digital banking are crucial for Generation Y. Other factors, including SI, FC, and T, were not significant for DBA in this generation.

4.10. Generation Z

Generation Z had an R^2 of 0.269, meaning that 26.9% of the variance in DBA was explained by the model. Among the predictors, only FC significantly influenced DBA (Estimate = 0.272, T = 2.828, p = 0.005, VIF = 1.116, $f^2 = 0.091$). This suggests that, similar to Baby Boomers, the availability of resources and support is a critical factor for Generation Z in adopting digital banking. Other factors, such as PE, EE, SI, and T, were not significant, indicating that these do not strongly impact DBA for this generation.

Table 4. Multi Group Analysis

Generation	R Square	Hypothesis	Estimate	S.E.	T	p-value	VIF	f^2	Relationship
Baby Boomers	0.712	H1 PE → DBA	0.192	0.183	1.050	0.294	3.016	0.040	Not Significant
		H2 EE → DBA	0.062	0.148	0.420	0.669	1.501	0.000	Not Significant
		H3 SI → DBA	0.173	0.127	1.360	0.172	1.430	0.070	Not Significant
		H4 FC → DBA	0.504	0.159	3.170	0.002	2.903	0.230	Significant
		H5 T → DBA	0.042	0.204	0.207	0.807	2.002	0.000	Not Significant
Gen X	0.574	H1 PE → DBA	0.284	0.264	3.030	0.037	3.036	0.060	Significant
		H2 EE → DBA	0.099	0.102	0.970	0.330	2.368	0.010	Not Significant
		H3 SI → DBA	0.148	0.123	1.200	0.227	1.492	0.030	Not Significant
		H4 FC → DBA	0.154	0.135	1.150	0.248	2.441	0.020	Not Significant
		H5 T → DBA	0.222	0.120	1.850	0.064	3.079	0.030	Not Significant
Gen Y	0.448	H1 PE → DBA	0.348	0.089	3.920	0.000	1.340	0.160	Significant
		H2 EE → DBA	0.244	0.093	2.630	0.008	1.503	0.070	Significant
		H3 SI → DBA	0.148	0.098	1.500	0.131	1.342	0.020	Not Significant
		H4 FC → DBA	0.040	0.107	0.420	0.670	1.389	0.020	Not Significant
		H5 T → DBA	0.125	0.131	1.060	0.289	2.002	0.020	Not Significant
Gen Z	0.269	H1 PE → DBA	0.161	0.173	1.030	0.241	2.722	0.020	Not Significant
		H2 EE → DBA	0.234	0.234	1.000	0.311	1.061	0.010	Not Significant
		H3 SI → DBA	0.289	0.178	1.620	0.105	1.065	0.070	Not Significant
		H4 FC → DBA	0.272	0.096	2.820	0.005	1.106	0.090	Significant
		H5 T → DBA	0.039	0.157	0.240	0.804	1.193	0.000	Not Significant

In Table 4, the multigroup analysis shows generational differences in the factors influencing DBA. Baby Boomers and Gen Z are primarily influenced by facilitating conditions, while Gen X and Gen Y are more affected by performance expectancy. Effort expectancy is additionally important for Gen Y. This highlights the need for digital banking services to be tailored to the preferences of each generation.

4.11. Discussion

The results of this study reveal that PE, EE, SI, FC, and trust (T) significantly influence DBA. These findings align with previous research on technology acceptance, reinforcing the strength of these constructs in explaining digital adoption behavior. People are more likely to adopt technology when they perceive it as improving their performance. The significance of effort expectancy also reflects that ease of use remains a key factor, especially when users perceive low complexity and minimal learning effort.

Social influence plays an important role as well, reinforcing the idea that adoption behaviors are often shaped by peer, family, and societal expectations. As digital banking becomes more normalized in social settings, its adoption is increasingly influenced by cultural and community norms. Facilitating conditions emerged as a critical determinant, showing that technical support and system compatibility are essential to ongoing platform usage. Trust also proved to be a vital predictor, indicating that strong security and transparent communication can boost user confidence and encourage adoption.

The structural model explains 55.4% of the variance in DBA ($R^2 = 0.554$), suggesting strong explanatory power. This supports the theoretical foundation of the model and confirms the relevance of the selected constructs in understanding DBA, particularly in the Indonesian context.

Furthermore, the results from the Multi-Group Analysis (MGA) provide valuable insight into how generational differences moderate the relationships between these determinants and digital banking usage. Facilitating conditions were significantly more influential for both Baby Boomers and Generation Z, highlighting the importance of infrastructure and support systems for these cohorts. Among Baby Boomers, this reliance stems from generally lower digital literacy and a higher dependence on external support. They tend to prefer environments with clear guidance, dependable support, and minimal complexity. Their preference for stability and security further emphasizes the need for trust-building features and user-friendly digital systems.

In contrast, Generation X places more importance on performance expectancy. Having experienced the evolution of technology throughout their lives, they value efficiency, time-saving capabilities, and the practical benefits of digital solutions. They are pragmatic and results-oriented, adopting digital banking tools that demonstrably improve task performance.

Generation Y (Millennials) shows a dual emphasis on both performance and effort expectancy. As early adopters of digital and mobile technology, they look for services that are both functional and easy to use. They are highly comparative in evaluating choices and prefer platforms that are fast, customizable, and user-focused. Digital banking services must therefore provide both high utility and user-friendliness to attract this generation effectively.

Interestingly, Generation Z, despite being digital natives, also relies heavily on facilitating conditions. The vast number of digital options can lead to cognitive overload, causing them to favor platforms that offer clear onboarding processes, responsive support, and guided experiences. Though tech-savvy, they still need structured environments that reduce ambiguity and provide reassurance when navigating digital interfaces. This reflects their preference for ”guided autonomy” the freedom to explore within the safety of reliable support.

Taken together, these generational differences demonstrate that DBA is influenced not only by access to technology but also by cognitive readiness, behavioral preferences, and contextual needs. For example, Baby Boomers and Generation Z require strong infrastructure and support, while Generations X and Y are more focused on perceived usefulness and usability. These nuances show that a one-size-fits-all approach to digital service design is insufficient.

Therefore, banks and fintech companies must implement generation-specific strategies tailored to the unique needs of each group. This includes designing differentiated user interfaces, customizing onboarding experiences, segmenting marketing messages, and launching digital literacy initiatives appropriate for each generation. These efforts will not only increase user engagement and satisfaction but also promote more widespread and inclusive DBA across all age groups.

4.12. Practical Implications for Banks and Fintechs

The findings of this study provide valuable practical insights for banks and fintech companies aiming to increase DBA across generational groups in Indonesia. Facilitating conditions were shown to be especially critical for Baby Boomers and Generation Z, indicating that financial institutions must strengthen digital infrastructure and user support systems. Baby Boomers benefit from simplified interfaces, strong technical assistance, and digital literacy initiatives such as onboarding guides and personalized tutorials, while Generation Z though digitally adept requires structured guidance to reduce cognitive overload, supported by intuitive app design, seamless onboarding, and responsive AI-driven assistance. At the same time, performance expectancy strongly influences Generation X and Generation Y, requiring banks to emphasize the functional value of digital banking through efficiency improvements, real-time analytics, automated tools, and business-support features. These practical enhancements should be paired with marketing strategies that highlight concrete performance benefits for users managing financial and entrepreneurial activities.

Trust emerged as a universal factor across all generations, underscoring the need for robust cybersecurity, transparent privacy policies, and strong authentication mechanisms to build confidence, particularly among cautious Baby Boomers and Generation X. Social influence also plays an important role, suggesting that banks should incorporate peer testimonials, community endorsements, and influencer driven narratives to encourage adoption across younger cohorts. Ultimately, a uniform approach is insufficient for Indonesia’s diverse demographic landscape. Instead, banks and fintech companies must adopt differentiated, generation-specific strategies that respect cognitive, behavioral, and contextual differences. This tailored approach will enhance user satisfaction, strengthen financial inclusion, and support broader entrepreneurial participation, contributing to Indonesia’s digital economic transformation.

4.13. Policy and Industry Best Practices

The findings of this study underscore the critical need for policymakers to actively foster digital inclusion across generational lines. Regulatory bodies and financial authorities should implement age-sensitive digital literacy policies, particularly targeting older demographics who may exhibit lower levels of digital confidence. Integrating targeted digital education initiatives into national financial literacy programs can enhance trust, comprehension, and engagement with digital banking platforms across all age groups.

Moreover, establishing robust data protection regulations and transparent privacy frameworks is essential to strengthening users' trust and ensuring equitable access to digital financial services. A regulatory emphasis on cybersecurity, consumer rights, and accessible digital infrastructures will play a vital role in supporting the broader adoption of digital banking. From an industry perspective, stakeholders such as banks and fintech companies are encouraged to adopt generation-based segmentation strategies to optimize user experience and engagement. Best practices include designing intuitive and accessible user interfaces tailored to different levels of digital proficiency, deploying marketing campaigns aligned with generational communication preferences, and offering customized support and digital education programs to bridge digital skill gaps.

Additionally, reinforcing trust through advanced cybersecurity measures and clear communication about data protection practices is fundamental. These strategies not only encourage adoption but also contribute to building inclusive, user-centered digital ecosystems that resonate across all generational cohorts. By implementing these best practices, the financial industry can ensure that digital banking services are both accessible and appealing to a diverse customer base.

5. MANAGERIAL IMPLICATIONS

The findings of this study offer actionable insights for managers in the banking and Fintech sectors, especially in designing generation-specific strategies to enhance DBA in Indonesia. Recognizing that different generations prioritize different factors when adopting digital banking services, service providers must align their operational, marketing, and technological approaches accordingly.

First, Baby Boomers and Generation Z, despite differing in digital familiarity, both emphasize the importance of FC. This suggests that managers should invest in strengthening technical support systems, such as live assistance, user training modules, accessible help centers, and reliable infrastructure. For Baby Boomers, features like simplified interfaces, offline support, and guided tutorials are crucial to improve confidence and usability. For Generation Z, seamless app functionality, intuitive onboarding, and responsive in-app guidance help reduce digital fatigue and cognitive overload.

Second, Generation X values PE, indicating a focus on practical outcomes. Managers should highlight features that improve financial efficiency, such as transaction automation, budgeting tools, and real-time analytics. Promotions and communication should be results-driven, showcasing how digital services enhance control, accuracy, and speed in financial management.

Third, Generation Y (Millennials) considers both Performance Expectancy and EE as key drivers. For this segment, user experience is critical. Managers must prioritize UI/UX design, responsive interfaces, and fast system performance. In addition, offering personalized financial solutions (e.g., investment options, lifestyle-linked rewards) will increase engagement from this segment.

Moreover, T is a significant factor across all generations. This implies that cybersecurity, data privacy, and transparency must be central to managerial strategies. Regularly updating security protocols, communicating these measures clearly to users, and enabling features like biometric authentication or two-factor verification can help strengthen user confidence.

Finally, since SI also impacts DBA, especially among younger generations, banks and fintechs should leverage peer testimonials, influencer partnerships, and social proof in their campaigns. Engaging content from relatable voices can encourage new users to adopt services based on community validation.

In summary, the managerial approach should not be uniform across demographics. Instead, adopting a multi-generational service strategy which considers behavioral patterns, cognitive readiness, and contextual needs will enable digital banking providers to increase adoption rates, customer satisfaction, and long-term loyalty across Indonesia's diverse user base.

6. CONCLUSION

This study confirms that DBA in Indonesia is significantly influenced by performance expectancy, effort expectancy, social influence, facilitating conditions, and trust. The generational analysis reveals clear differences in adoption drivers: Baby Boomers and Generation X prioritize facilitating conditions and tangible performance benefits, while Generations Y and Z place greater emphasis on ease of use, intuitive interfaces, and adaptable support mechanisms. These findings highlight the need for digital banking providers to design generation-specific strategies that align with the unique expectations, technological familiarity, and behavioral patterns of each demographic group.

Trust also emerged as a universal determinant across all generations, reinforcing the importance of secure, reliable, and transparent digital financial platforms. Based on these insights, this study presents practical implications for banks and fintech companies, including the necessity for tailored product design, strengthened user support systems, and targeted communication strategies. From a policy perspective, collaborative efforts among financial institutions, regulators, and technology providers are essential to establish an inclusive and innovative digital banking ecosystem that promotes financial accessibility and long-term digital adoption.

Overall, this study contributes meaningful insights to the literature by integrating a generational perspective into DBA within the Indonesian context. The findings also support broader national initiatives connected to SDG 9 (Industry, Innovation, and Infrastructure) and SDG 10 (Reduced Inequalities), emphasizing the role of digital banking in enhancing equitable access and sustainable financial development. Future research is encouraged to examine moderating factors such as income, education, and digital literacy, as well as to employ longitudinal approaches to capture evolving adoption behaviors over time, thereby strengthening the understanding of digital financial ecosystems.

7. DECLARATIONS

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7.3. Data Availability Statement

The data presented in this study are available on request from the corresponding author.

7.4. Funding

The authors received no financial support for the research, authorship, and/or publication of this article.

7.5. Declaration of Conflicting Interest

The authors declare that they have no conflicts of interest, known competing financial interests, or personal relationships that could have influenced the work reported in this paper.

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