RESEARCH ARTICLE

Antecedents of generation Z towards digitalisation. A PLS-SEM analysis [version 1; peer review: 1 not approved]

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Abstract

Background: The Covid-19 pandemic has forced businesses in the direction of technology development. In particular, financial institutions have started the digital transformation, embracing the usage of artificial intelligence. In this respect, consumers' willingness to adopt artificial intelligence in finance, appears to have relevance to current efforts to enhance the efficiency and effectiveness of the financial system. This study aims to better comprehend the antecedents towards the intention to adopt artificial intelligence in financial services among Generation Z, with the use of the Technology Acceptance Model. Methods: In this study, questionnaires were used to collect data from 150 male and female Malaysian undergraduates. Partial Least Squares-Structural Equation Modelling was employed to analyse the data. Results: Perceived ease of use and attitude, positively influenced the adoption of artificial intelligence in financial services. Conclusion: The results have suggested the improvement in user interface, information and activities to encourage generation Z to adopt artificial intelligence in financial services.

Keywords

Technology Acceptance Model (TAM), intentions to adopt artificial intelligence in financial services (INT), perceived usefulness (PU), perceived ease of use (PEoU), attitude (ATT)

This article is included in the **Artificial Intelligence and Machine Learning** gateway.

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Any reports and responses or comments on the article can be found at the end of the article.

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Author roles: **Chan KH:** Conceptualization, Writing – Original Draft Preparation; **Ng TH:** Methodology, Writing – Review & Editing; **Tay LY** : Formal Analysis, Software; **Teh CY:** Conceptualization, Data Curation

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Introduction

Digital transformation is seen extensively across many industries worldwide, partly triggered by prolonged lockdowns in response to the Covid-19 pandemic. According to The Star (2020) stated that artificial intelligence (AI) is gaining even more traction in driving customers experience. To a certain extent, financial institutions, for example, have begun to embark on the AI journey, embracing AI chatbot into the delivery process of banking and financial services. Likewise, massive investments have been made in AI-driven predictive analytics to improve efficiency and enhance business forecasts in areas like sales, operations, risk management, etc. Specifically, it also aims to assist its customers in financial consultancy and financial needs (New Straits Times, 2018).

In a recent survey conducted by Alam (2018), 93% of respondents from the wealth management industry emphasise the need for AI in handling many and various financial services, as a sharp increase in AI adoption in the financial industry is anticipated. While these represent crucial insights from the perspective of industry players, equally significant is whether customers are ready to embrace the use of AI in the financial industry. This is an intriguing yet often overlooked question. Thus, this study appears to be essential to investigate the antecedents influencing consumers' willingness to adopt AI in financial services. Generation Z (Gen Z), aged between 18 to 25 years as of 2020, is the respondents for this survey. Their intention about AI adoption is important to this research as Gen Z is a true digital native, as claimed by Gaidhani et al. (2019). Among the antecedents, perceived usefulness (PU), perceived ease of use (PEoU), and attitude (ATT) are hypothesised to positively influence Gen Z's intention to adopt AI-based financial services (INT).

Literature review

Technology acceptance model

Davis et al. (1989) suggested that TAM determines the antecedents of technology and system acceptability. The antecedents, namely PU, PEoU and ATT from the mentioned model, are adapted for this study to examine their influence on consumers' intention to adopt AI-based financial services. Venkatesh and Davis (2000) also pointed out that these antecedents affect each other. For example, PEoU will affect PU of using a new technology. When the particular system is easy to use, it is more valuable to the users to improve their work execution. Besides, PU will also affect ATT and individual's intention to accept the system's technology.

Intention to adopt AI-based Financial Services

Behavioural intention defines the degree to which a person performs a particular behaviour after conscious planning or self-directed motivation (Mark & Paul, 2005). According to Chuang, Liu and Kao (2016) and Cham et al. (2018), TAM is used to investigate a person's behaviour and the results show that PU, PEoU and ATT may be used to predict a person's readiness to adopt new technology.

Perceived usefulness on intention to adopt AI-based financial services

PU is a crucial factor to determine the acceptance of using AI-based financial services. PU means the extent to which an individual perceived a system that improves their job efficiency (Davis et al., 1989). Pai and Huang (2011) found that users' willingness to accept AI is related to the system's PU. Another study also demonstrates that a more positive attitude is related to a higher willingness to use AI products (Lunney et al., 2016). Likewise, Pillai and Sivathanu (2020) studied the impact of using AI-powered customer service technology in the tourism industry. The result shows that users are willing to use AI devices to plan for their trip due to the easy and interactive booking process and service.

Perceived ease of use on intention to adopt AI-based financial services

To master or use a system or technology without much effort is identified as perceived ease of use (Davis et al., 1989). Hamid et al. (2016) found that PEoU is positively related to the adoption of e-government system. It indicates that the respondents are keen on using the new system if the technology seemed easily understood. Furthermore, Patil and Mugdha (2019) found a significant positive relationship between PeoU and adoption of chatbot services in financial services. This is because the system is a simple drag-and-drop interface and hence respondents are more willing to use it.

Attitude on intention to adopt AI-based financial services

Azjen (1991) defined attitude as the degree of a user's assessment and expression of the behaviour's execution. Favourable or unfavourable attitude emerges from the personnel's beliefs on behavioural outcomes (Cordano & Frieze, 2000). The user's attitude toward AI will affect their willingness to accept AI in financial services (Schepman & Rodway, 2020). Previous studies discovered a positive relationship between attitudes and intentions to use the system (Chang, Vitell, & Lu, 2019; Le & Kieu, 2019; Prendergast & Tsang, 2019; Tweneboah-Koduah, Adams, & Nyarku, 2019).

Methods

Research framework

Research framework (Figure 1) is shown in the proposed research framework.

Figure 1. Proposed research framework.

Data collection

A set of self-administered questionnaires is distributed online via [Google Form](#) (See [underlying data](#)) (Chan et al., 2021). Purposive sampling is used in this study because the respondents must first be knowledgeable about the AI system so they can fully comprehend the questions in the survey ([Tongco, 2007](#)). It means that the target respondents have to be technology savvy and well versed with financial terminology.

The cover page of the questionnaire stated the disclaimers, and the respondents would have to agree to participate in the survey voluntarily before they respond to the questionnaire. They also had given the written consent to publish their responses. The sample size is determined via G*Power analysis. Since there are only three predictors in this study, the minimum acceptable sample size to surpass the sufficient statistical power of 0.8 is 74 responses. This study has collected 150 usable responses from undergraduate students with the age range of 18 to 25 years to represent Gen Z in Malaysia (See [underlying data](#)) (Chan et al., 2021). The Partial Least Squares Structural Equation Modelling (PLS-SEM) method was employed to analyse the collected data. The software used is [Smart PLS 3.0](#) and SPSS version 23.

Results

Pilot test

The Cronbach's alpha test is used to determine the questionnaire's reliability. Additionally, the SPSS software is used to evaluate the reliability analysis with 30 respondents. Results shown in [Table 1](#) indicates that Cronbach's alpha's value is greater than 0.7 for all the analysed variables, and thus, the questionnaire is reliable.

Descriptive analysis

[Table 2](#) tabulates the descriptive analysis. Among 150 respondents, 44% are male, while 56% are female respondents. According to [Dolot \(2018\)](#), individuals born after 1995 are referred to as Gen Z. As a result, respondents are between the ages of 20 and 22 (55.3%), between 23 and 25 (22.0%), under 20 (14.0%), and above 25 (8.7%) years.

Assessment of measurement model

This study performs a measuring model to evaluate the elements of a path model, which contains indicators and their relationships with the constructs. The minimum threshold of 0.708, 0.70, and 0.50 are assessed on factor loadings, composite reliability and average variance, respectively. They are evaluated on the validity and reliability of the constructs ([Hair et al., 2019](#)). Hence, PU1, PU2, PEOU1, ATT1, ATT3, INT1 and INT5 were removed because their respective loadings were less than 0.708. The factor loadings, composite reliability, and average variance extracted for the final measurement model met the minimum threshold, which the values are tabulated in [Table 3](#). The results also suggested that the measurement model was reliable and had adequate convergent validity. Subsequently, a discriminant

Table 1. Reliability test.

	Cronbach's alpha	Number of items (N)
PU	0.753	5
PEoU	0.777	5
ATT	0.773	5
INT	0.817	5

Abbreviations: PU: perceived usefulness; PEoU: perceived ease of use; ATT: attitude; INT: intention among Gen Z to adopt AI-based financial services.

Table 2. Descriptive analysis.

		Frequency	Percent (%)
Gender	Female	84	56.0
	Male	66	44.0
Age	Below 20 years	21	14.0
	20-22 years	83	55.3
	23-25 years	33	22.0
	Above 25 years	13	8.7

Table 3. Final measurement model.

Constructs	Items	Loadings	Composite reliability (CR)	Average variance extracted (AVE)
1. PU	PU3	0.866	0.843	0.644
	PU4	0.812		
	PU5	0.722		
2. PEoU	PEOU2	0.756	0.857	0.600
	PEOU3	0.811		
	PEOU4	0.791		
	PEOU5	0.738		
3. ATT	ATT2	0.886	0.865	0.683
	ATT4	0.853		
	ATT5	0.732		
4. INT	INT2	0.898	0.866	0.763
	INT4	0.848		

Abbreviations: PU: perceived usefulness; PEoU: perceived ease of use; ATT: attitude; INT: intention among Gen Z to adopt AI-based financial services.

Table 4. Discriminant validity (HTMT Assessment).

	1.	2.	3.	4.
1. Perceived Usefulness				
2. Perceived Ease of Use	0.79			
3. Attitude	0.795	0.825		
4. Intention	0.566	0.751	0.89	

validity assessment was performed because the content and substance of the constructs had to be identified. Therefore, this study employed the Heterotrait-Monotrait Ratio (HTMT) (Henseler et al., 2015). Firstly, the construct - the intention had failed to meet the HTMT 0.9 criteria. Upon checking with the cross-loading, INT3 was removed. Table 4 shows that all the values are lower than 0.90, which is the required threshold suggested by Gold et al. (2001). Hence, the findings shows that the proposed hypotheses are accepted and verified by the value of the discriminant validity.

Assessment of structural model

Table 5 presents the hypotheses statements in this study. The structural model is presented in Figure 2. These findings revealed that the Coefficient of Determination (R^2) value of the model is 0.467, which suggested a moderate predictive model (Chin, 1998). It also means that 46.70% of the INT can be explained by PU, PEoU and ATT.

Bootstrapping was applied to determine the significant level of the constructs. The path coefficient and corresponding t-values were gathered with 5,000 resamplings. As a result, PEoU positively influenced the INT, and ATT positively

Table 5. Hypotheses statements.

Hypothesis	Statement
Hypothesis 1 (H_1)	Perceived usefulness (PU) has positively influenced the intention to adopt AI-based financial services (INT)
Hypothesis 2 (H_2)	Perceived ease of use (PEoU) has positively influenced the intention to adopt AI-based financial services (INT)
Hypothesis 3 (H_3)	Attitude (ATT) has positively influenced the intention to adopt AI-based financial services (INT).

Figure 2. Structural model.**Table 6. Summary of hypotheses testing.**

Hypothesis	Relationship	t-value	Decision
H_1	PU → INT	0.552	Not supported
H_2	PEOU → INT	2.683***	Supported
H_3	ATT → INT	5.408***	Supported

Abbreviations: PU: perceived usefulness; PEoU: perceived ease of use; ATT: attitude; INT: intention among Gen Z to adopt AI-based financial services.

influenced the INT. Hence, H_2 (t-value = 2.683) and H_3 (t-value = 5.408) were supported. Nonetheless, PU and INT were insignificant in this study. Thus, H_1 (t-value = 0.552) was not supported. Figure 2 presented the structural model, and Table 6 summarises the hypotheses testing.

Discussion

These findings suggest that both PEoU and ATT are positively related to INT. In other words, H_2 and H_3 are supported in this study which is consistent with previous studies (Schepman & Rodway, 2020; Patil & Mugdha, 2019; Hamid et al., 2016).

Individuals will intend to use the AI-based financial services when they believe that it would eliminate obstacles such as making the right investment decision or process the handling of their financial matters much faster. (Hong et al., 2021). The Edge Markets (2017) further elaborated that AI technology allows financial service providers to engage customers more intuitively and offers real-time support, thereby transforming complicated banking processes into more simple tasks. Additionally, ATT also plays a vital role in influencing an individual's intention to use AI-based financial services. TAM model states that PEoU is one of the motivators of consumer attitude towards using new technology (Venkatesh & Davis, 2000). Individuals will develop a positive attitude when they perceive that using AI is effortless in the AI-based financial service context.

Meanwhile, PU is not significant in this study. Thus, H_1 is not supported. Jahangir and Begum (2008) mentioned that it would not be enough by just offering AI-based financial services to the general public and expect it to be utilised. Financial service providers must establish the conviction that AI technology can improve the efficiency, security, and ease of use in financial services.

Conclusion

The main purpose of this study was to identify the factors influencing Gen Z's intention to use AI-based financial services. The results confirm that PEOU and ATT positively influenced the INT among Gen Z in Malaysia. This indicates that Gen Z is ready for the digital transformation, and they are willing to accept and use AI-based financial services.

This study draws a few implications for financial institutions/financial service providers: Financial institutions are suggested to focus on designing a user-friendly interface that provides quick access to the standard features. The AI-based financial services would be an easy tool for the consumers to use, and the system would not require much training and technical skills.

Additionally, financial service providers should make sure that their websites portray clear, concise, and intelligible information. This helps customers understand that AI-based financial services are always simple to use.

Finally, financial institutions are encouraged to get involved in campaigning and frequent collaboration with the universities to create awareness among the Gen z community regarding the importance and ease of using AI tools in financial services. This will help Gen Z build a positive attitude towards AI-based financial services.

Ethical approval

This study is in accordance with the university's ethical standard, and ethical approval (number EA0432021) was obtained.

Data availability

Underlying data

Data archiving and networked services (DANS): Survey of Malaysian view on the roles of artificial intelligence for the future changes in the financial services industries

DOI: <https://doi.org/10.17026/dans-2xr-x6wm> (Chan et al., 2021).

This project contains the following underlying data:

File 1: The blank questionnaire used in this study.

File 2: Responses to the survey of the Malaysians' view on the roles of artificial intelligence for the future changes in the financial services industry.

Data are available under the terms of the Creative Commons Zero "No rights reserved" data waiver (CC0 1.0 Public domain dedication).

Author contributions

Kar Hoong Chan and Chiu Yu Teh presented the idea and background of this manuscript. Tuan Hock Ng developed the framework and the adapted theory. Chiu Yu Teh also collected the data for this study. Lee Ying Tay performed the data analysis and discussion of the study. All authors discussed and contributed to the final manuscript.

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Some recommendations:

1. The problem of this research was not clear. What is the matter with Gen Z? If they are true digital natives, they should not have a problem with adopting technology, including AI. Besides, the TAM (Technology Acceptance Model) model has been applied in various studies. What is the significant of this study? The contribution of this study was also not clear.
2. This study lacks the literature to build the hypothesis. The author should add and discuss other theories of technology acceptance or adoption such as UTAUT (Unified Theory of Acceptance and Use of Technology), TPB (Theory of Planned Behavior), Delon IS Success Model, etc. Why did the author use the TAM model more than others?
3. The data collection and data analysis method were not explained. For example: Did the author use an online or offline questionnaire? How did they do it? Why did the author use Smart PLS?
4. PU (Perceived Usefulness) was not significant and there is a lack of explanation of what the possible reason could be to best understand this result?
5. The conclusion should restate the hypothesis, the contribution, the limitations and any further research needed.

Is the work clearly and accurately presented and does it cite the current literature?

No

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Partly

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Information System, Information Technology, Technology Adoption, Technology Acceptance, e-Government

I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

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