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RESEARCH ARTICLE

Navigating the 5G Game: Understanding Adoption Factors Among Generation Z Gamers in Malaysia

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ARTICLE INFO	ABSTRACT
	This study explores the adoption of 5G technology among Generation Z gamers in Malaysia, a demographic born between 1997 and 2012. The gaming sector, significantly contributing to the economy, faces challenges like network latency and packet loss, impacting the gaming experience. 5G technology, with its enhanced connectivity and reduced latency, is seen as a solution to these issues. This research investigates the determinants shaping 5G adoption intentions among Generation Z gamers, focusing on factors such as complexity, cost, attitudes, subjective norms, and perceived behavioural control. The findings can inform the gaming industry's operational strategies, paving the way for innovative solutions like cloud gaming streaming. This study also serves as a resource for academic researchers, providing insights into the factors influencing 5G adoption among Generation Z gamers. Ultimately, it aims to enhance our understanding of 5G technology adoption in this demographic, influencing industry practices, academic research, and gaming experiences in Malaysia.
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1. INTRODUCTION

Due to its fast-streaming speeds and plethora of innovative capabilities, 5G technology is expected to be extremely strong and in great demand in the near future. Up to date features of 5G technologies include the ability to record MP3s, play videos, have a huge phone memory, call quickly, play music, and VR gaming service. A new revolution is going to start with the introduction of 5G. For everybody connected to 5G, data exchange has been simpler or more convenient with Pico Net and Bluetooth technologies (Fizza, 2015). 5G established for internet connectivity that is related with various kinds of wireless networks communication. The speed of 5G is more than 1 Gigabits per second with all real world application. 5G having the speed up to hundred times quicker than the 4G (four-generation technologies), and 5G allowing broadband to bring about the possibilities to organization and firm who had not been accessible previously (Duffy, 2020).

According to Digital News Asia (2023), Malaysia 5G is now available and the rate of availability area has increased from 17.7% to 21 %. The reported 5G technology adoption benefits include improving the download/upload speed experience, and usability of the gaming experience, which makes it possible for gamers to have more effective gaming expertise in a 5G environment (Dzof, 2023). The download and upload speeds of 5G technology network have been improved in all aspects, which is better than that of the 4G network. The download and upload speed of 5G technology network is nearly 13 times faster than that of a 4G technology network. This also means that the speed at which gamers can download and update games has been greatly improved, allowing gamers to enjoy a faster and more responsive gaming experience. This illustrates the many advantages that 5G mobile network technology will have for the gaming industry (MIDA, 2022).

Furthermore, Malaysian Investment Development Authority (MIDA) reported from 2017 until 2021, the gaming industry has risen exponentially along with the exponential growth of 5G technologies, with the game-playing craze extending from browser PCs, downloaded, and shifted to using smartphones from 36% to 49%. Gamers prefer to use mobile devices to play games because doing so is convenient, easy, and enjoyable. It also enables gamers to play games at any time and from any location, this trend has also driven the significant growth of the market share of the gaming industry (Cai et al., 2022). The gaming industry contributed a total of US$100 million to Malaysia in 2018, and the government recognised the industry as an emerging important sector for the economy (Shahril, 2020).

This can be seen with the inclusion of the Malaysian contingent the eSports team for the 2022 Hangzhou Asian Games in China. They battled in "Arena of Valor" and won the first eSports silver medal for the nation (Mail, 2023). This signalled the shifting views towards esports in Malaysia, it is now taken seriously and is no longer viewed negatively as before. Interestingly, the members of the winning Malaysian esport team were generation z gamers. The National Sports Council of Malaysia (NSC) and the National Sports Institute (NSI) also emphasized the importance of esports and expressed support. As esports grew as an important activity in Malaysia, studies on 5G technology adoption are thus essential (Peter, 2023). According to earlier work, 5G technology adoption can completely change the esports landscape; integration of edge computing and 5G networks will enable game streaming services on mobile devices to offer a quality of experience that is on par with PCs or gaming consoles. This will pave the way for the development of creative, immersive mobile games that are mobile-centric (Murphy, 2021).

Given, the significance of the gaming sector, the beneficial promises of 5G technologies towards the sector and the increasing importance of Generation Z as a market segment in general as well as specifically for the gaming market. The industry players and policymakers have to know the factors that influence their adoption intention of 5G technologies. Furthermore, there are still research gaps in the area of consumer behaviours on the adoption and uptake of 5G services. Also, due to the significant economic impacts of the gaming sector and the various benefits as well as investments made in 5G technology solutions by businesses and the government, it is critical to investigate as well as understand the factors affecting the intention to embrace the technology among Generation Z gamers. Thus, using established underlying theories, this research aims to shed light on the determinants shaping the adoption intentions among Generation Z gamers towards 5G technologies in Malaysia.

Review of Literature

The 5G technologies adoption idea enables the ongoing development and upgrading of many concurrent data transmission pathways (Govil, 2008). Endpoints using 5G technologies can obtain several certain services from a range of mobile access network providers, which will ultimately be chosen. When 5G technologies adoption is widely used, consumers will be able to experience more dependable mobility (McNair & Zhu, 2004). The introduction of 5G technologies will usher in a new mobile revolution in the mobile sector. With the widespread adoption of 5G technologies, a person will be able to use his mobile phone or electronic gadget internationally at all times, and entire workplaces or businesses to be run via mobile phone or electronic device, delivering complete ease (Bhalla & Bhalla, 2010). Additionally, 5G technologies adoption has a very strong data capability. 5G technologies can combine the volume of calls and unlimited data broadcasting with the newest mobile operating system to reach an unlimited situation. This means that 5G technologies can offer its customers the best and most improved technology available, as well as the value of ongoing innovation and improvement (Alkhazaali et al., 2017). 5G technologies make it possible for the router and switch to have the most effective connectivity possible, which gives it amazing potential for software support and consulting applications (Janevski, 2009).

The deployment of 5G technologies has improved some of its distinctive qualities, including improvement on cloud-oriented devices, distributed programmable architecture, higher total data rates, the ability to provide high-speed communications end-to-end with lower round-trip latency, and rapid connection composition (Eze et al., 2018). Thus, the adoption of 5G technologies vastly enhances network signal coverage and can make online gaming more comfortable and stable, thus

enhancing the gaming experience for gamers (Khan et al., 2020). 5G technologies adoption employs subsidiary systems such as Enhance Mobile Broadband (eMBB), Ultra-Reliable and Low-Latency Communications (URLLC), and Massive Machine-Type Communications (mMTC), to enable comprehensive upgrade and development of a wide range of vertical applications such as smart grids, smart gaming, smart health, smart cities, and transportation systems, among others (Sobrinho et al., 2023).

eMBB services demand faster data transfer speeds, making throughput one of its important performance factors. URLLC service is distinguished by its emphasis on enhancing network reliability and decreasing latency, whereas the mMTC service is a superior transmission-capable device capable of connecting ultra-large volumes of reliable data, making it possible to link billions of supporting devices (Hiran et al., 2020). eMBB function in 5G technologies is anticipated to increase network traffic generation. In other words, its capabilities may be enhanced to support 8K streaming of videos, augmented and virtual reality (AR/VR), and large data processes such as online gaming and video games (Fuentes et al., 2020). To optimize user experience and bring the technology application scenarios closer to our daily lives, eMBB builds upon current mobile broadband service scenarios (Zhu et al., 2022).

5G technologies adoption will also enable URLLC (Shashin et al., 2023), which links the internet to vital applications including automated driving systems in cars, smart-communications adoption for safety, automated industrial formations and online gaming automation (Papidas & Polyzos, 2023). For instance, URLLC of 5G in gaming could allow games to reach an automated system where the game can automatically finish and switch to the next action or interface.

mMTC in 5G technologies are applications for large-scale IoT that can connect at frequencies up to 6 gigahertz, which, Bluetooth, Wi-Fi, Zigbee, and a variety of small-range home technologies are among the existing wireless transmission methods (Zhu et al., 2022). Studies suggest 5G technologies adoption has been shown to offer a considerable reduction in latency, a thorough boost in data transfer rates, enhanced and improved quality of service, and expanded grid coverage. These benefits improve grid reliability overall and lower overall service costs (Dangi & Lalwani, 2023).

Generation Z

"Generation Z" (Usually shortened as Gen Z) is defined as the generation of individuals born in the middle of the 1990s and the beginning of the 2010s, with the precise chronology varying from different authors, but most typically 1995-2010. Some refer the group as "zoomers" is also regarded as the initial generation of genuine digital natives (Lanier, 2017), who have grown up in the digital technological environment from birth. In other words, from an early age in life, Generation Z began to learn how to use technologies with the times, interact in various social networks, and are frequently viewed as being addicted to technological innovations and developments. This generation is sometimes referred to as Generation Z, Post-Millennials, or iGen (Magano et al., 2020).

Generation Z is the first fully digital native generation. Unlike millennials, who grew up with cable television and landline phones while seeing the emergence of the Internet, Generation Z has lived their lives linked digitally. The majority of them grew up in a time when social networking and streaming media were widely accessible, and they cannot recall a time before cell phones. This cohort is becoming an increasingly important market. Their affinity for technology, social interaction, and digital entertainment, coupled with their growing influence on household spending and cultural trends, positions them as a crucial segment.

As technology development continues to evolve, video games have emerged as one of Generation Z's must-have pastimes. YPulse's gaming report, states that roughly 95% of Generation Z gamers are users of video games, with more than 70% playing them regularly every week, indicating that gaming is a very popular activity among Generation Z (ypulse.com, 2023). They prioritize issues linked to education, gaming, and entertainment (Veinberg, 2015). Generation Z gamers also more rely on technologies of mobile phones and internet-based technologies (Mason et al., 2022). Not only that, Generation Z gamers are accustomed to finding and enjoying high-quality game visuals, music, sound, and image quality, and they want these gaming effects to be provided in a high-quality way

(Shliakhovchuk et al., 2020). Thus, to get the outcomes mentioned, Generation Z gamers are also more likely to adopt, trust, and use 5G technologies (Al-Sharafi et al., 2023).

2. RESEARCH FRAMEWORK

Figure 1 presents the research framework. The dependent variable for this research is the Intention to Adopt 5G Technologies for Gaming. Independent variables are the antecedents for intention from Ajzen's Theory of Planned Behaviour (TPB), namely; Attitudes, Subjective Norms and Perceived Behavioral Control (Ajzen, 1991). Furthermore, the study explores the possible influence of Cost and Complexity towards the dependent variable.

According to Anderson and Feder (2007), the intricacy & complexity of the technologies or practices in issue have an impact on how quickly and how much it can affect the actual adoption of those technologies. A recent study suggested that a person's perceived complexity influences their continued intention and behavior to achieve something (Huang, 2023). Another reported that complexity also directly influences on how long it takes a person to try and accept new technologies and practices; the more complicated the process, the longer it takes to finish (Kaine & Wright, 2022). Next, Price is among the most significant elements affecting an individual's opinions on new technologies or products in the marketplace (Levrini & Santos, 2021). Thus, it is suggested that, in order to understand the dynamics influencing the adoption intention of 5G technology for gaming, it would be insightful to extend the TPB with these additional factors. The following figure shows the relationship between those variables.
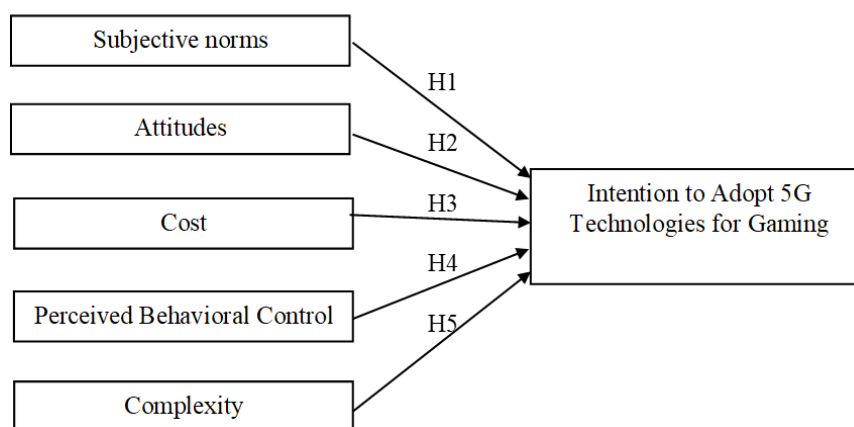

Figure 1: Research framework

3. RESEARCH METHODOLOGY

The main objective is to explore several elements that influence Generation Z gamer's intention to adopt 5G technologies for gaming. Specifically, the scope of the research would be confined to Generation Z gamers, who are Malaysian citizens born between 1997 and 2012.

To achieve the research aim, the study utilized an online survey deemed an efficient method to quickly reach the target respondents speedily and cost-effectively. The intended respondents for this research must meet the following qualifications and criteria, which is the respondents must be Generation Z gamers in Malaysia ranging in age from 10 to 25 years; respondents must be Malaysian and respondents must be technology savvy, and own at least one electronic smart device that playing game; such like mobile phone, tablet, or electronic device, etc., and have at least some experience playing games themselves (some of them could be a professional gamer). Thus, the sampling technique used was Purposive Sampling.

In this study, G*Power software was used to calculate the minimum number of respondents that is required for a statistically valid survey analysis. The results from the G*Power analysis indicated that a minimum of 138 respondents would be needed.

A pilot test was conducted to verify the reliability and validity of the measurement instruments. Pilot tests are perhaps the most significant phases of a study because they reveal potential difficulties and shortcomings in research equipment and processes before the full-scale investigation begins

(Hassan, 2006). Data collected was analyzed using SPSS version 29, a comprehensive tool for statistical analysis. The following table 1 presents the results.

Table 1: Instrument reliability and validity

Constructs	Total Items	Source	Cronbach's Alpha (α)	Sample (n)
Intention to Adopt 5G Technologies for Gaming (DV)	5	(Mohd Yamin et al., 2023)	0.900	35
Subjective Norms (SN)	5	Mohd Yamin et al., 2023	0.861	
Attitude (AT)	5	(Mohd Yamin et al., 2023)	0.902	
Cost (CS)	5	(Hair et al., 1998) (Ali, 2019) (Afendi, 2023)	0.888	
Perceived Behavioural Control (PBC)	5	(Mohd Yamin et al., 2023)	0.845	
Complexity (CP)	5	(Almaiah et al., 2022) (Mikkelsen, 2020)	0.900	

4. RESULTS

The main data collection phase of this study managed to gather 220 responses. However, after data cleaning, the final sample size used for the main analysis was 200. The data was analyzed through Partial Least Squares-Structural Equation Modelling (PLS-SEM). There are 2 stages involved in PLS-SEM, the first stage is the measurement model, in which the outside of the model is assessed and second stage is the structural model, in which the inside of the model is assessed (Hair et al., 2019). In the measurement model, composite reliability (CR), item loadings, average variance extracted (AVE) are used to measure the convergent validity, and the Heterotrait-Monotrait (HTMT) criterion to measure discriminant validity (Hair et al., 2017; Memon et al., 2020; Ramayah et al., 2017). In the structural model, the variance inflation factor (VIF) measured the collinearity or the common method bias, and the hypothesis testing will be analysed including the coefficient of determination (R2), effect size (f2) and predictive relevancy (Q2).

Before presenting the results from the PLS-SEM analysis, the following are the descriptive analysis outlining the respondents' profile and inclusion criteria details of the sample. The respondent were 101 males and 99 females with a total 200 people (100%) and met the survey criteria. Most of the respondents belonged to the age group of 23 – 27 years old (44%), followed by 18 – 22 years old (35.5%) and 13 – 17 years old (20.5%). 100% of respondents were born between 1997 - 2012, which also known as Generation Z. Majority of respondents were Chinese, followed by Malays and then Indians (Malays (26%), Chinese (53.5%) and Indians (20.5%)). Out of the 200 respondents, more of the respondents were employed which are 74 people, student 70 people and entrepreneur 56 people. The majority of the respondents (42 people) has a monthly income of RM1500 and below, RM1501 – RM2000 (18.5%), RM2001 – RM3000 (17.5%), RM3001 – RM4000 (16.5%), RM4001 – RM5000 (14%) and RM5000 and above (12.5%). The data suggests that all respondents met the study's basic requirements of 100% of respondents are gamer and having game experiences. In the preferences types of games (4 types), all result are in good, which exceed 80% of respondents preferences on it. Action Games and Multiplayer Online Battle Arena (MOBA) are the type of games that majority of respondents preferences and like, which are 175 peoples (87.5%) and 174 peoples (87%). Next is the Adventure Games, which have 172 (86%)of peoples preferences on it. The last is Role-Playing Games (RPGs) account 165 peoples (82.5%).

1st aspect of the measurement model is the composite reliability (CR) which to be reliable must be at least 0.7 (Wong, 2013). Table 2 shows the results of the reliability CR values. Next in measurement model is convergent validity (Hair et al., 2017). To evaluate the convergent validity is the AVE and the item loadings on the construct (Sarstedt & Cheah, 2019). The AVE of the measurement models

should be greater than 0.5 (Hair et al., 2017) and the item loadings must be higher than 0.708 (Hair et al., 2019). Table 3 shows the AVE and item loadings for this study.

Lastly in the measurement model is the discriminant validity which assessed that each construct is different from another construct (Hair et al., 2019). Discriminant validity has been assessed through the HTMT criterion (Henseler et al., 2015). If the HTMT ratio of one construct with other construct is less than 0.90, the discriminant validity has been achieved. However, according to Sarstedt, et. al. (2023), HTMT threshold nearer to 1 is also acceptable. Table 4 shows the HTMT ratio of this study. As seen from Table 2, 3 and 4 the measurement model for this study met the recommended values, thus, the following segments will present the structural model.

Table 2: CR values

Constructs	CR
SN	0.918
AT	0.947
CS	0.948
PBC	0.943
CP	0.942
DV	0.932

In the structural model, the cause-and-effect relationships within the model are investigated (Almehairbi et al., 2022; Hair et al., 2019). For the structural model assessment, we investigate the multi-collinearity for each construct, path coefficients and their significance, the R2 for endogenous constructs, f2 for the exogenous constructs, Q2 for predictive relevance and model fit (Hair et al., 2021; Memon et al., 2020; Almehairbi et al., 2022). To assess the multicollinearity of the model is analysed through VIF (see Table 5).

Next, the coefficients of the model paths and their significance were obtained from the bootstrapping process in Smart PLS 4 to obtained the results of the t-values and p-values and provide the necessary information for testing the stated research hypothesis. Table 6 shows the full results of the hypothesis tested including the R2, f2 and Q2. From Table 6, the results show that 3 of the 5 hypotheses are supported in this study. Specifically, H1: SN=>DV, H4: PBC=>DV and H5: CP=>DV were found to be supported. Meanwhile, the other 2 hypotheses; H2: AT=>DV and H3: CS=>DV were not supported.

Table 6 also report results of f2 from the Table 5, shows that the 3 supported hypothesis, the variables had medium effect sizes. Next in the Table 6 is the coefficient of determination, R2; the proportion of variance in the dependent variable that can be explained by the independent variable. The R2 value, 0.711, indicates the variables explained 71.1% of the Generation Z gamers' intention to adopt 5G technologies for gaming.

The table also reports the predictive relevancy, Q2, of the model. The value is 0.631 which is above the threshold value of Q2 of 0. This confirms that the model has a predictive relevance. Finally, the table 7 also report Standardized Root Mean Square Residuals (SRMR) by the test of Goodness of Fit (GoF) from the estimated model and saturated model. The saturated model and estimated model are less than 0.08 and indicate as a good fit. This implies that the model is supported by the observed variables employed in this research.

Table 3: AVE and item loadings

Cons.	SN	AT	CS	PBC	CP	DV
AVE	0.693	0.781	0.785	0.768	0.764	0.732
SN1	0.870					
SN2	0.811					

SN3	0.837				
SN4	0.836				
SN5	0.806				
AT1		0.912			
AT2		0.916			
AT3		0.823			
AT4		0.885			
AT5		0.879			
CS1			0.867		
CS2			0.903		
CS3			0.899		
CS4			0.868		
CS5			0.894		
PBC1				0.862	
PBC2				0.89	
PBC3				0.884	
PBC4				0.876	
PBC5				0.872	
CP1					0.899
CP2					0.793
CP3					0.892
CP4					0.904
CP5					0.878
DV1					0.868
DV2					0.865
DV3					0.830
DV4					0.868
DV5					0.844

5. DISCUSSIONS

The study's findings have various implications for both researchers and the gaming industry. Firstly, the results pointed to the significant influence of important social circle or network (Subjective Norms) to the Generation Z gamers. The findings illustrate that the views of those within their subjective norms have a substantial impact on Generation Z gamers' intentions to adopt 5G technology for gaming. This is consistent with previous studies. According to Ajzen (2006), essential influencers' suggestions or recommendations will determine on incentive to conform to certain referents. Plus, beliefs that particular referent persons or groups find acceptable in the action of belief strength (Yean et al., 2015). Furthermore, according to Garg and Joshi (2018), Generation Z gamers will be influenced by the opinions of some persons who are close and important to them. Thus, marketers and gaming developers should incorporate references from peers and key personalities identified as common important references or icons for Generation Z gamers.

Table 4: HTMT ratio

Constructs	SN	AT	CS	PBC	CP	DV
SN						
AT	0.874					
CS	0.853	0.923				
PBC	0.891	0.995	0.950			
CP	0.734	0.763	0.776	0.830		
DV	0.905	0.800	0.742	0.807	0.571	

Table 5: VIF

Constructs	VIF
SN	3.162
AT	7.367
CS	5.265
PBC	9.848
CP	2.515

Secondly, the findings also suggest that Generation Z gamers' intention to adopt 5G technologies for gaming is subject to their belief in having control in making the decisions i.e. they are closely affected by perceived behavioural control. Research has shown that through a sense of control over something or self-efficacy, it is possible to strengthen their influence and make Generation Z gamers more receptive to adopting 5G technologies. Not only that but perceived behaviour control is also influenced by the presence of capability and adequate resources to remove obstacles to activity, both affect how well behaviour is performed (Hardin-Fanning & Ricks, 2016). According to Ajzen and Madden (1986), people feel more in control of their conduct and are more inclined to carry out actions when they perceive more resources and fewer barriers. Developers and businesses may take advantage of PBC's influence on the intention to adopt 5G technologies for gaming by ensuring ample accessible information informing the gamers on the benefits of 5G technologies and the ease of adopting them. Demonstrations can be provided at various gaming events along with tutorials and free trial promotions.

Table 6: Hypothesis testing

Constructs	Hypothesis	T values	P values	f²	R²	Q²	Decision
SN -> DV	H1	5.354	0.000	0.320			Supported
AT -> DV	H2	1.288	0.099	0.302	0.711	0.631	Not Supported
CS -> DV	H3	0.298	0.383	0.481			Not Supported

| PBC -> DV | H4 | 1.667 | 0.048 | 0.227 | | | Supported |
| CP -> DV | H5 | 1.950 | 0.026 | 0.157 | | | Supported |

Table 7: SRMR model fit

	Original Sample (O)	Sample Mean (M)
Saturated Model	0.049	0.04
Estimated Model	0.049	0.04

Beside that, the complexity of 5G technologies is also an effective driver for the adoption of 5G technologies. The study shows that complexity of 5G technologies is a predictor for the intention of Generation Z gamers to adopt 5G technologies in gaming. While understanding the complexity may help people perceive technology more clearly, it may also make people less likely to think of it as easily to operate (Fürst et al., 2023). This is because people's perceptions are a major factor in adoption and are correlated with levels of knowledge and management (Nysveen et al., 2005). Perceived high complexity may affect the adoption rate of Generation Z gamers, as they may consider the whole process of adopting 5G network technologies more cumbersome (Sääksjärvi & Samiee, 2010) This is consistent with another study that suggested complexity also directly influence on how long it takes a people to try and accept new technologies and practices; the more complicated the process, the longer it takes to finish (Kaine & Wright, 2022). Also, this generation's had been benefiting from the plug-and-play technology products, thus the aversion to technical complexity.

Although attitudes are described as ongoing judgments that people make about a particular item or thing and are identified as often significant predictors for behavioural intention. The results showed that in the case of Generation Z gamers' intention to adopt 5G technology, attitude does not have a significant influence. Attitude alone is not as influential as the other TPB factors (subjective norms as well as perceived behavioural control) in manifesting Generation Z gamers' intention to adopt 5G technologies for gaming. Thus, companies and developers should recognize efforts to create a generally positive perceptions towards their service offerings will not be sufficient to move Generation Z gamers towards 5G technologies adoption. This is probably due to the fact that attitudinal aspects are often difficult to achieve the desired sustained positive impact.

Lastly, the results also show that cost is not an effective driver of 5G technology adoption. This suggests that cost is not a consideration for Generation Z players, which could be a case of Generation Z gamers recognizing that higher-end technologies should be matched with higher costs. Furthermore, the respondents of this study largely were students from a private higher education institution, thus it is likely that financial factors do not form any barriers for them.

6. CONCLUSIONS

The results of this study highlight the important roles of subjective norms, perceived behavioural control and complexity in influencing the adoption intentions of Malaysian Generation Z gamers towards 5G technologies. We can summarize that businesses need to take into consideration these three predictors because Generation Z gamers are generally more inclined to listen to and adopt the opinions and ideas of those important and close to them or whom they admire and the complexity of technologies.

Developers must first target ideas and concepts that resonate with Generation Z and their peers as well as those they look up to in order to fully integrate with the intentional environment of Generation Z gamers. Furthermore, support, encouragement and endorsement of those influential others will enhance the self-efficacy of Generation Z gamers i.e. their perceived behavioural control over 5G technologies adoption. This would result in a stronger and more determined intention to adopt 5G technologies.

Furthermore, understanding the technicalities of the solutions should not be a requirement for adoption and usage. The solutions should adopt the plug-and-play model to ensure that the Generation Z gamers easily adopt them. This is because majority of the gamers are users of technology whose focus are more on the game play experiences, only small portion of the groups are the hackers and coders that would appreciate the technical complexity as well as knowledge.

The cost of 5G technologies won't significantly affect whether Generation Z gamers adopt them. Therefore, developers shouldn't limit the advancement of this technology due to these concerns. Instead, they can concentrate on R&D, innovation, the integration and complexity of 5G technologies into the gaming industry. Developers can also demonstrate the benefits of adopting 5G technologies in gaming to the gamer, and enhancing their understanding and evaluation this technologies to the moderate level of complexity. This will make them more aware of the improvements that 5G technologies can bring to the gaming experience. Ultimately, boosting their confidence and positive intentions towards it.

For further research, the study could be expanded to examine the intention to adopt 5G technologies for gaming based on other potential determinants. Given that Malaysia is a diverse country, factors such as demographics, and cultural variables could influence the outcomes of the study. Via a longitudinal approach, researchers could monitor changes over time. This would provide a more dynamic understanding of the adoption process. Additionally, studies that include larger and more diverse samples could provide more comprehensive information. This could potentially reveal trends or patterns that are not apparent in smaller groups.

In conclusion, this study recognised the increasing importance of Generation Z as a market segment, gaming as an innovative industry, and highlighted how 5G technologies can change the gaming experience for Malaysian Generation Z gamers. 5G technologies can lead to new developments in the gaming industry. Thus, driving higher levels of adoption is crucial to drive the diffusion of the technology. The findings from this study helped to better appreciate factors that drive adoption.

Authors' contribution

Conceptualization, Y.G.Y. and K.A.A.; methodology, Y.G.Y. and K.A.A.; software, Y.G.Y.; validation, K.A.A.; formal analysis, Y.G.Y.; investigation, Y.G.Y.; resources, Y.G.Y. and K.A.A.; data curation, Y.G.Y.; writing—original draft preparation, Y.G.Y.; writing—review and editing, K.A.A.; visualization, Y.G.Y.; supervision, K.A.A.. All authors have read and agreed to the published version of the manuscript.

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