Factors Influencing Intention to use 5G Mobile Technology and Adoption Onwards in Malaysia

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Abstract: - This research examines the factors that influence Malaysian consumers' intention to adopt 5G mobile technology. Drawing from the Technology Acceptance Model (TAM) and the Diffusion of Innovation Theory, the study explores how complexity, compatibility, relative advantage, perceived enjoyment, and subjective norms shape attitudes and intentions toward adopting 5G technology. Although Malaysia implemented 5G in late 2021, the adoption rate has been slow, highlighting the need for practical insights into consumers' readiness for this technology. Through a quantitative analysis of data collected from 393 usable respondents using convenience sampling, the study finds that complexity has a limited effect on user intent, while relative advantage, compatibility, and perceived enjoyment strongly influence adoption intentions. Subjective norms also play a meaningful role. The findings provide actionable insights for businesses in IT and service industries, enhancing understanding of consumer behavior toward new technologies. This research not only advances knowledge on 5G adoption in Malaysia but also lays a foundation for future studies on technology acceptance in similar contexts.

Key-Words: - Adoption, Consumer behavior, Intention, Relative Advantage, Compatibility, Complexity, Perceived Enjoyment, Subjective Norms, 5G, Malaysia.

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1 Introduction

Wireless communications have progressed from 1G to 4G in the past 30 years. 5G wireless technology represents the pinnacle of mobile communication sophistication. It boasts about improved connectivity, reduced latency, higher download speeds, and compatibility for multiple devices. 5G provides new frequency bandwidth, low latency, network slicing, energy efficiency, large-scale device connectivity, and rapid data rates, [1]. 5G provides mobile communications that are energy

efficient, have fast speeds, low latency, high throughput, and improved dependability and scalability. 5G will enhance healthcare, transport, smart cities, and education, according to the MCMC research. This will help Malaysians to be more productive for longer periods of time as their life expectancy increases. Due to its speed and device compatibility, 5G has the potential to digitalize many industries, [2].

Malaysia is shining brightly as the leader in 5G network performance in Southeast Asia, boasting an

impressive median download speed of 451.79 Mbps and the highest global Consistency Score of 97.3% for the last quarter of 2023, according to Ookla's Speedtest Intelligence report. However, despite these achievements, Malaysia's 5G availability still trails behind neighbors like Singapore and Thailand, and there has been no update from the government on the promised second 5G network, which was supposed to begin in January 2024, [3].

Digital Nasional Berhad (DNB) is the "special government-owned purpose vehicle" responsible for overseeing Malaysia's lone wholesale 5G network. Yes, Celcom, Digi, U Mobile, and Telekom Malaysia are among the few Malaysian mobile network operators that offer 5G. Customers in DNB's 5G service areas will need a smartphone that is compatible with the network, a 5G plan, and access to the network. A daily increase in 5G usage from 32TB to 253TB was reported by DNB, with five telcos offering 5G. On December 31, 2022, the number of concurrent users peaked at 90,000. The average download speed on DNB's 5G network is 380Mbps, as opposed to 35Mbps on 4G networks, according to the company. More than 12 million smartphones were sold in Malaysia in 2021, according to the most recent IDC Quarterly Mobile Phone Tracker. Even though more than 28 percent of devices shipped in 2021 will have 5G capabilities, the research found that the country's biggest companies do not provide 5G. According to IDC, 5G is expected to drive consumer upgrades, increasing the percentage of shipments from 36% in 2022 to 50% in 2023.

Consumer behavior determines the uptake of mobile technology, particularly 5G. Service providers and authorities in Malaysia need to know what consumers want in order to implement 5G properly. This study delves into the various aspects that influence the adoption of 5G technology in Malaysia, including personal and mobile benefits, customer attributes, and risk concerns. It goes on to look at these acceptance determinants and how 5G technology's perceived features could influence them.

The primary objective and specific objective are the three categories from which the research objectives are derived. The first objective is to study what factors like relative advantage, compatibility, complexity, perceived enjoyment, and subjective norms affect Malaysian consumers' intentions to use 5G mobile technology. The second objective is to look at the ways that consumers' intentions to use 5G mobile technology affect their adoption of the technology. Finally, we want to determine what Malaysian consumers would feel about 5G mobile technology in terms of its relative benefits, compatibility, complexity, enjoyment, and subjective norms in relation to their usage intentions.

2 Literature Review

2.1 Consumer Adoption (CA)

A customer's propensity to embrace a new piece of technology might swing wildly depending on their personal encounters with it, [4]. There has been significant research focusing on the idea that the intention to adopt a behavior is predicted by its current utilization, [5], [6], [7], [8], [9]. Perceptions, wants, experiences, tastes, and preferences all play a role in how consumers feel about 5G technology. According to TAM, behavioral intentions to utilize technology may be a predictor of actual technology use in innovation acceptance, [10].

According to research on innovation adoption, factors like product complexity, relative benefit, and compatibility affect when and if customers decide to adapt, [11]. To fully understand the impact of technology on service consumption intentions, it is necessary to look beyond direct consequences, [12]. There is a lack of research that addresses the need for further investigation, particularly on the correlation between user emotions and their intention to use technology, [12], [13].

Another study found that there is no mediating effect of green entrepreneurial knowledge on green entrepreneurial intention, [14]. Also, there is a study conducted to address the existing gaps in the literature on smart hotels. It introduces new frameworks that help in comprehending customer decision-making processes in the context of technological advancements and environmental responsibilities, [15].

A customer's service usage is only one of several factors that affect the rate of 5G mobile technology adoption. Health concerns. environmental conscience, and general knowledge all have a role in people's plans to use 5G, [16]. Keep in mind that these perspectives aren't incompatible and that people might have a mix of them. There is a complicated interplay between consumer attitudes, environmental factors, and perceived technical advantages and disadvantages that affect the adoption of 5G. The overarching goal of this study is to identify and assess all independent variables that have an impact on consumers' perceptions and future behavior.

2.2 Consumer Usage Intention (CUI)

The intention to employ the concept was influenced by a prominent research work conducted in 1975. Intentionality, is a reliable predictor of behavior, [5], [6], [7], [8], [9]. The 5G technology is involved in this conduct. Customers' eagerness to use 5G mobile technology is thus a measure of their readiness to embrace the technology. Relationships between user intention to use and the Technology Acceptance Model (TAM) were found in the majority of validation studies.

Users might transfer tech items due to new competitive offerings, [17]. The need to know the user's context may grow as next-gen broadband mobile network technology becomes more prevalent.

Little is known about the factors that motivate customers to want to use 5G technology, [18], [19]. The importance of opinions in many contexts, such as attitude formation, has been the focus of previous research, but the process of opinion generation has received less attention. The perceived ease of use and convenience of an innovation can be influenced various elements, according to certain by subsequent studies, [16]. Perceived pleasure, complexity, relative benefit, subjective norm, personal circumstances, and compatibility are all considerations to be considered. The opinions of 5G mobile technology require users further investigation.

As a result, the impact of consumers' CUI attitudes, other opinions, and subjective standards on their usage of 5G mobile technology is investigated in this study.

2.3 Relative Advantage (RA)

The relative advantage hypothesis states that consumers are more likely to embrace a new product or service if they perceive it to be superior to an existing one. Innovative proportionality leads to higher adoption rates, [11]. One of the most important aspects of technology adoption is relative advantage, [20]. Relative advantage and technology adoption are connected in this study.

The adoption of both simple and complex technology and behaviors could be affected by legislation that reclassifies their benefits, [21]. The volume, risk, and stress of an invention can influence its relative advantage and the time required to evaluate, accept, or reject it, even though an invention can only be accepted once. Improved "stickiness" and less time spent integrating new practices and technologies were the results of higher adoption advantages, [22]. Inspiring sufficient goal desire to trial or deploy technologies and practices with minor relative gains may be challenging, [23].

The rate of adoption of 5G technology is greatly affected by how consumers perceive its benefits compared to 4G LTE., 5G provides solutions where 4G fails, but several respondents voiced worries that the new mobile network is even worse than the previous one in certain areas, [24].

Mobile technology is seen by most individuals as "relatively" good, simplifying their lives, and not a major factor in determining their social standing or acceptability. Beliefs that mobile technology was superior to an existing invention impacted adoption intentions in the preliminary lifespan mobile technology diffusion model. When it comes to innovative decision-making, the relative benefit of 5G mobile technology is significant throughout the information, persuasion, and intention stages, but it is not relevant during the implementation and confirmation stages, [25].

2.4 Compatibility (COM)

The term "compatibility" describes how nicely an invention fits the user's worldview, habits, way of life, background, and requirements. Adopting new innovations can be accelerated with high compatibility, [26]. Among the factors that influence people's openness to trying out new technologies, research has shown that compatibility is the most important, [27]. Their research shows that if new technology is compatible with what Malaysian firms already have, then they will embrace it.

There are studies that show how compatibility affects people's attitudes towards technology, [28], [29]. Users who are already good at using new technology pick them up quickly. The perceived usefulness of new technology for consumers' daily activities determines their desire to employ it. The adoption of 5G mobile technology could be influenced by how valuable people view it.

Regardless of the fact that compatibility predicts behavior, as demonstrated by several research. According to other studies, compatibility is a mood and behavior predictor as well. Subjective norms fail to adequately address cases where innovation conflicts with learning style and life participation. It is essential to make users feel like the technology works with their learning style. One way to achieve this is to combine performance with fun.

Understanding the key elements that impact the adoption of 5G mobile technology and whether or not they are compatible is the primary objective of this study.

2.5 Complexity (CP)

Studies on the acceptability and adoption of technology have studied complexity, along with terms like perceived value and effort expectation, with too many comparable traits. According to this research, 5G mobile technology is complicated since it is hard to understand and use. Boost the utilization of complexity in adoption models by investigating the connection between service capacity and perceived ease of interacting with online banking, [30].

Technology is more likely to be helpful and easy to use for people who are confident in their abilities, [31]. People with more experience with technology are more inclined to see it as a useful tool and have an easier time utilizing it. It is critical that the product be easy to use, dependable, and straightforward, [32].

The complexity of technology development and application has increased, necessitating more multitechnology activities and efforts, as a result of growing complementarity. Adopting a technology appears to require less work when it is complex. The level of sophistication of developing technologies increases throughout time, [33]. Due to the complexity of 5G mobile technology, consumers remain uncertain and apprehensive about its rapid adoption.

2.6 Perceived Enjoyment (PE)

The way technology is utilized impacts the way users respond. Technology adoption may be aided by the intuitive response of enjoyment. When people are happy and invested, they enjoy technology. Product or service satisfaction is enhanced when consumers are more compliant. Happiness with an event has an effect on how much fun one has using technology, [34]. Perceived enjoyment considers how a user may feel at ease and enjoy using a system, as well as how they may feel about technology in general, [35], [36], [37].

The perceived ease of use has an effect on how useful and enjoyable something is, [38]. Perceived enjoyment and personal innovativeness have a good effect on the intentions to use 5G mobile communication services. The level of enjoyment an app provides directly influences how frequently people use it, [39], [40], [41], [42]. The increasing number of customers using e-wallets demonstrates that perceived delight enhances behavior intention, [31]. Subjective delight influences the intention to engage in digital payment activity, [43].

Perceived satisfaction influences consumers' intention to use, according to numerous research. 5G is inefficient when it comes to felt pleasure, [44]. Perceived enjoyment had a detrimental effect on behavioral intention in a different study on mobile learning intentions, [45]. Happiness doesn't matter from this vantage point.

In this research, we look at the relationship between 5G mobile technology adoption and expressed enjoyment. It takes a lot of evidence and compelling conclusions to prove that personal satisfaction influences the adoption of technology.

2.7 Subjective Norm (SN)

The extent to which consumers embrace novel technologies may be impacted by subjective norms, such as the extent to which they feel pressured or influenced by influential individuals. An individual's subjective standards are reflective of how they feel about the impact of peer pressure and critical opinions on their willingness to buy a product, [46]. Subjective norms in Malaysia express the views, expectations, and suggestions on the adoption of 5G mobile technology from friends, family, and other reference groups. The adoption of 5G mobile technology in Malaysia can be influenced by these standards.

According to the Theory of Acceptance Model (TAM), one's subjective standards and attitudes have an effect on their actions. A positive subjective norm is maintained by an individual when they are motivated to act because they believe others are expecting them to do so. Social impact refers to the extent to which an individual thinks other people must also think they can adopt 5G technology. Similar to subjective standards, user interest behavior is impacted by friends and relatives. The results of one study showed that subjective standards increased the perceived ease of use and the intention of customers to utilize the product. Perceived ease of use has little effect on usage intention, but attitude is influenced by subjective criteria, [47]. One subjective norm that the model uses to forecast the uptake of 5G technology is social impact.

Consumers' subjective norms were significantly related to their intention to use the product, with trust acting as a mediator between the two, [48]. Customers' openness to 5G mobile technology is, in the end, dictated by subjective norming. People are influenced by the opinions of influential people when it comes to 5G mobile technology. This study needs to understand consumer behavior in this context, which is important since it affects the adoption of 5G mobile technology.

2.8 Literature Gap

Research and prediction are primarily conducted in the lead-up to or during a pandemic. Whether it's the macro or microenvironment. COVID-19 has an impact on consumer spending, the economy, and individual sentiments. Research on the rollout of 5G networks both before and after the COVID-19 pandemic revealed numerous effects on consumer habits, the spread of new technologies, user tastes, and international commerce. There was a lack of evidence in the previous study regarding the desire to use new technology. Previous studies have looked at various facets of sluggish tech adoption, [49]. Evidence from a plethora of studies shows that consumers' increased digital technology usage and rapid acceptance of new technologies are direct results of COVID-19 and the converging of technologies.

It wasn't until 2021 that 5G was actually implemented in Malaysia, despite its worldwide announcement in 2019. Malaysia has a low adoption rate, and previous studies seem to have overlooked important gaps in practical ability or understanding. Insights from the actual user experience that have received little attention from researchers may hold relevance to the demand for 5G mobile technology among consumers. By exposing consumers' real experiences, research on this subject can assist in uncovering the aspects that influence consumer acceptance of 5G mobile technology. Theories underpinned the earliest consumer intention research. Practical studies and action research projects pertaining to user experience are scarce.

2.9 Underpinning Theories

2.9.1 Technology Acceptance Model (TAM)

Choosing to employ a new product is a wise choice. In order to determine their future, organizations must first learn what their customers want and how open they are to new ideas, [50]. We need to take a look at what makes people want to use new technologies. Among the many ideas and frameworks that attempt to explain how people come to accept new innovations is the Technology Acceptance Model, [10]. Perceived utility and simplicity of use are the primary drivers of consumer adoption of new technology. In order to comprehend the reasons behind customers' technology usage, this paradigm investigates their perceptions of its utility, ease, and attitude. According to TAM, the societal impacts of adopting technology are disregarded.

2.9.2 Diffusion of Innovation Theory (DIT)

Diffusion of Innovation (DIT) theory was influential in the social sciences, [51]. Communicating first reveals the path an idea takes inside a statistical or social environment. New ideas, attitudes, and items are assimilated into society through this distribution. To be accepted, the concept, behavior, or product must be novel to the person. The sole way for diffusion is this. Innovators, early adopters, early majority, late majority, and laggards are the five categories of adoption presented by the diffusion of innovation hypothesis.

Decisions to use or not utilize anything are influenced by five factors: information, influence, choice, execution, and confirmation, as stated in the DIT. The information organize is the starting point for development and decision-making. At this company, one makes a breakthrough and learns a lot. At the information level, both development and decision-making start. A person learns about a new invention after coming across it. This is the convincing part, when the merits of the invention are important. The act of getting someone to think about making a purchase is called persuasion. In their pursuit of decision-making data, they are relentless.

3 Conceptual Framework

From Figure 1, this study's hypothesis was TAM. Previous research suggests that TAM analysts should make minor changes to the design to suit research topics, [52]. To make the study framework better for the investigation, DIT is also applied. Six independent variables—relative advantage, compatibility, complexity, perceived enjoyment, and subjective norm—and six hypotheses comprise the framework. A similar methodology has also been used by other researchers to study users' intent to buy or accept innovation technologies, [53].



Fig. 1: Research framework.

HYPOTHESIS

H1: There is a significant relationship between RA and CUI towards 5G Mobile Technology.

H2: There is a significant relationship between COM and CUI towards 5G Mobile Technology.

H3: There is a significant relationship between CP and CUI towards 5G Mobile Technology.

H4: There is a significant relationship between PENJ and CUI towards 5G mobile technology.

H5: There is a significant relationship between SN and CUI towards 5G Mobile Technology.

H6: There is a significant influence effect of CUI towards CA of 5G Mobile Technology.

H7: This is a significant prediction from relative advantage, compatibility, complexity, perceived enjoyment, and subjective norm towards consumers' usage intention to use 5G Mobile Technology in Malaysia.

3.1 Methodology

Descriptive studies provide valuable insights and inform future research, but they do not prove causality. Descriptive research is a quantitative study that examines a population and helps identify issues within a group, organization, or community. Explanatory research addresses "what", "when", and "how" questions, but not "why", [54].

Population and target populations are the cornerstone of each research study, so they must be distinguished. Research-based graduate studies must first describe the sample and target population's interest group. The target audience must be exclusive to exclude volunteers who meet study needs but not community interests, [55]. This study targets Malaysians, particularly those in the Klang Valley, who have used mobile technology, regardless of country.

The unit of analysis is essential to all studies. Study researchers focus on the unit of analysis. Individuals, groups, associations, and institutions are units of analysis. The analysis is based on demographics, samples, and the unit of analysis, [55]. This research aims to determine consumer acceptability of 5G technology in Malaysia, hence the sample comprises everyone who plans to use 5G or utilizes a mobile network in Malaysia, regardless of country.

This study uses non-probability convenience sampling because there is no sample frame. Convenience sampling allows researchers to swiftly collect data from large populations by selecting easily available individuals. Convenience sampling is popular for this type of research since it is easy, cheap, and convenient. With the convenience sample, more species, including rare ones, were present, [56].

The Cochran formula sampling method is popular. The Cochran equation calculates an appropriate test measure given a desired exactness, certainty, and population quality division. The Cochran Formula is best for big populations, thus use it to compute the sample size. To calculate sample size, researchers must know population size, confidence interval, confidence level, and standard deviation. Previous research has utilized 0.5 as the population percentage. The desired edge mistake and certainty level are 5% and 95% for a Z-value of 1.96. According to the study, the population is 0.5, the Z-value is 1.96, and the margin of error is 0.5. Therefore, the computation is: Cochran's equation suggests 384 samples for this study.

The studies were shared on several online platforms like Facebook, Instagram, WhatsApp, and WeChat using Google Frame in order to reach a wider audience. The response rate of the current study cannot be determined because the studies' interface is transferred and conveyed through social media platforms and email. In all, 418 people responded to the Google Form after it was circulated. Following data screening, only 95.93% of the responses (N=401) are deemed valid, as 17 respondents were excluded during the filtering step. After that, Smart PLS 4 was used to clean the data using the 401 valid points. Among the 401 respondents, 393 (or 98% of the total) have used some kind of mobile network technology (3G or 4G). In other words, people who are eligible to reply are those who have the means to potentially adopt 5G technology as their mobile network along the road. Also, out of 401 people who took the survey, 8 had no idea what a mobile network was. Hence, for the following questions, only 393 sets of questionnaires will be considered. The research discarded a total of eight sets of inappropriate data.

3.2 Respondent Profile

Of the 393 total respondents, 245 were male (62.34% of the sample), while the remaining 148 were female (36.66% of the sample). A larger proportion of males than females took part in the study. As for the age group, the majority fall between the age bracket of 27–35 (132 respondents, or 33.59% of the total) and the next largest age bracket, 36–45 (33.08%). Then, there were 47 respondents (11.96%) in the 18–26 age bracket, 51 respondents (12.98%) in the 46–60 age bracket, and so on. The survey only included 33 respondents who were 60 years old or older, which is 8.40% of the total 393 respondents. The educational attainment of

the 393 survey takers. A bachelor's degree or equivalent was held by 275 respondents, or 67.43% of the total, as shown by the statistical data. Just 54 people, or 13.74 percent, had either a certificate or a foundation certificate. There were 42 participants with a Master's or PhD degree (10.69%) and 32 with a PMR or SPM degree (8.14%).

3.3 Reliability for Internal Consistency

The composite reliability (CR) and Cronbach's Alpha results for the measurement model indicate that all constructs demonstrate good dependability. The composite reliability values ranged from 0.878 to 0.922, all of which are above the threshold of 0.70 but below the upper limit of 0.95, as recommended by [57]. Consumers' Adoption exhibited the highest composite reliability at 0.922, followed by Perceived Enjoyment (0.915), Compatibility (0.909), Subjective Norm (0.902), CUI (0.901), Relative Advantage (0.884), and Complexity (0.878).

All of the constructs in the current analysis have Cronbach's Alpha values ranging from 0.815 to 0.884, which indicates a satisfactory level of internal consistency reliability. A Cronbach's Alpha of 0.884 indicates that the concept of subjective satisfaction is very reliable in terms of its internal consistency, [57]. In contrast, the reliability of compatibility was 0.867 on the Cronbach's Alpha scale, which ranks it high compared to subjective norm (0.855), consumers' usage intention (0.854), relative advantage (0.835), adoption (0.832), and complexity (0.815). Indicator loading values, Cronbach's Alpha, composite reliability (rho a), composite reliability (rho c), and average variance extracted are summarised in Table 1, which also includes reliability and validity metrics for the constructs.

3.4 Structural Model

The values of the structural model's variance inflated factor (VIF). There was a collinearity problem since the VIF values for the perceived enjoyment construct were 4.246 and the VIF value for the compatibility construct was 3.481. VIF readings between 3 and 5 are usually considered acceptable and do not normally indicate anything significant, [57]. The VIF values of the remaining indicators were all less than three, [57]. Within this research, the range of possible VIF values was from 1.000 to 4.246. Therefore, convergence is not a problem in our study.

3.5 Coefficient of Determination

R2, calculated using the internal constructs of consumer adoption (CA) and consumer usage intention (CUI). The R2 value and modified R2 value in CB and CUI are both satisfactory, in line with the threshold value, [57]. CA has a moderate influence size, with an R2 value of 0.417 and an adjusted R2 value of 0.415. This suggests that outside factors such as RA, COM, CP, PENJ, and SN account for 41.7% of the variation in customers' willingness to adopt 5G technology as their mobile network, with the remaining 58.3% explained by factors that were not part of this study. In contrast, the CUI construct's R2 value was 0.724 and its adjusted R2 value was 0.721, indicating a bigger impact size. This means that characteristics not included in the current study accounted for 27.6% of the variation in consumers' usage intention, whereas consumer adoption explained 72.4%.

3.6 Path Model

Table 1 shows that the hypothesis about customers' usage intention had the highest path coefficient score of 0.684 on consumers' adoption. However, out of all the independent variables, perceived enjoyment had the highest path coefficient value of 0.351 on consumers' usage intention. The path coefficient values for all five (5) hypothesized associations (H1, H2, H4, H5, H6) were more than 0.1, [58]. Consequently, they were able to achieve the very minimum requirement of 0.100 (0.1). The route coefficient value is merely 0.002, therefore complexity has the slightest impact on consumers' intention to use.

3.7 Multiple Regression

In order to answer the following research question, H7: How can we forecast the usage intention of Malaysian consumers towards 5G mobile technology based on factors such as relative benefit, compatibility, complexity, perceived delight, and subjective norm? We used multiple regression analysis. The results of the multiple regression analysis are displayed in Table 1.

To find the exact relationship between the dependent and independent variables, multiple regression analysis is employed. This measurement report uses the following variables: RA for Relative Advantage, COM for Compatibility, CP for Complexity, PENJ for Perceived Enjoyment, and SN for Subjective Norm to determine the dependent variable, Consumers Usage Intention.

Table 1	Regression	Analysis	Results
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Regression Statistics			
Multiple R	0.848		
R Square	0.720		
Adjusted R Square	0.716		
Standard Error	0.368		
Observations	401.000		

ANOVA					
	df	SS	MS	F	Significance F
Regression	5.000	137.037	27.407	202.681	1.16E-106
Residual	395.000	53.413	0.135		
Total	400.000	190.450			

 Table 2. Multiple Regression Results

	Coefficients	Standard Error	t Stat	P-value	Lower 95%	Upper 95%
Intercept	0.089	0.135	0.664	0.507	-0.175	0.354
RA	0.283	0.051	5.588	0.000	0.183	0.382
COM	0.219	0.050	4.387	0.000	0.121	0.317
CP	-0.003	0.044	-0.073	0.942	-0.089	0.083
PENJ	0.368	0.057	6.490	0.000	0.257	0.480
SN	0.121	0.039	3.083	0.002	0.044	0.198

From Table 2, we observe that Relative Advantage (RA), Compatibility (COM), Perceived Enjoyment (PENJ), and Subjective Norm (SN) all show a positive correlation with Consumers' Usage Intention (CUI) toward adopting 5G technology. These independent variables significantly influence consumers' intention to adopt, as indicated by their P-values, all of which are below 0.05. In particular, RA, COM, PENJ, and SN demonstrate strong positive associations, meaning that consumers are more likely to adopt 5G if they perceive advantages in using it, find it compatible with their existing habits, enjoy using it, and feel social support or pressure to adopt it.

Complexity (CP), however, displays a very different effect. Its coefficient is slightly negative, suggesting an inverse relationship with consumers' usage intention, though this effect is statistically insignificant (P-value of 0.942, which is much greater than 0.05). This result implies that the perceived complexity or difficulty of 5G technology does not significantly deter consumers from adopting it in Malaysia.

In terms of explanatory power, the combination of RA, COM, PENJ, and SN accounts for 72% of the variance in consumers' usage intention, as reflected by an R-squared (R^2) value of 0.720. This high R^2 value indicates that these four factors collectively provide a robust explanation for why consumers may choose to adopt 5G technology. The adjusted R-squared value of 0.716 further confirms that, after accounting for the number of independent variables and sample size, approximately 71.6% of the variation in consumers' usage intention can still be attributed to these variables. This high adjusted R-squared value suggests that RA, COM, PENJ, and SN are strong predictors of consumers' intentions to adopt 5G in Malaysia, offering confidence that these factors are genuinely influential beyond sample-specific nuances. However, it's worth noting that while R-squared is useful for assessing the overall fit of the model, it alone does not determine the importance of individual predictors. Instead, significance levels (Pvalues) and coefficients for each variable guide us on which factors are truly impactful.

In summary, the findings highlight that Relative Advantage, Compatibility, Perceived Enjoyment, and Subjective Norm significantly encourage consumers' intentions to adopt 5G, while Complexity is not a barrier to adoption, as initially hypothesized. This insight is valuable for stakeholders aiming to boost 5G adoption, as it emphasizes the importance of highlighting 5G's benefits, compatibility, enjoyable experiences, and social endorsement rather than focusing on reducing perceived complexity.

3.8 Testing Hypotheses

Standard errors. t-statistics. p-values. and confidence ranges for structural model coefficients are obtained by testing hypotheses in this work using the PLS-SEM bootstrapping approach. To accept the hypotheses, the t-statistic should be more than 1.96. This is because the current inquiry used a sub-sample of 5000 to test the sample mean and a significance level of 0.05 (two-tailed), [57]. Statistical significance is also indicated by p-values that are lower than 0.05. In this study, t-statistic values and p-values were examined and recorded in order to ascertain the significance of the path coefficient. Six(6) assumptions were made by the structural model. It is possible to see the results of the hypothesis tests in Table 3.

Table 3. Hypothesis Testing Results

	Path coefficients (β)	Sample mean (M)	Standard deviation (STDEV)	T statistics (O/STDEV)	P values	Interference
H1: RA -> CUI	0.245	0.244	0.058	4.194	0.000	Significant
H2: COM -> CUI	0.218	0.215	0.065	3.346	0.001	Significant
H3: CP -> CUI	0.002	0.003	0.052	0.047	0.962	Non- Significant
H4: PENJ -> CUI	0.351	0.351	0.072	4.851	0.000	Significant
H5: SN -> CUI	0.133	0.136	0.065	2.043	0.041	Significant
H6: CUI -> CA	0.645	0.645	0.048	13.542	0.000	Significant

Table 3 shows that there was a significant link between five out of six hypotheses and their respective external variables. The results show that all five anticipated path links have p-values lower than 0.05. This indicates that the exogenous factors RA, COM, and PENJ are significantly influencing consumers' adoption (p=0.000), while SN is on the borderline (p=0.041). The endogenous variable of consumer behavior is only significantly related to one of the six hypotheses (H3). The hypothesized path relationship between CP and CUI had a path coefficient value of 0.002, a p-value of 0.962, and a t-statistic value of 0.047. Consequently, CA is predicted by CUI, and CUI in turn is predicted by RA, COM, PENJ, and SN. There is still a substantial correlation between RA and CUI (H1), even though CP does not predict CUI. The tstatistics value is 4.194, the p-value is 0.000, and the path coefficient is 0.245. H2 of the compatibility and customers' usage intention relationship, as well as the interference of significance, is accepted with a path coefficient value of 0.218, a t-statistics value of 3.346, and a p-value of 0.002. In addition, the tstatistic of 0.047, the p-value of 0.962, which is greater than 0.05, and the path coefficient value of 0.002 indicate that the connection between COM and CUI (H3) is not significant and should be dismissed. With a path coefficient of 0.351, a tstatistics value of 4.851, and a p-value of 0.000, we may conclude that H4-the association between consumers' perceived enjoyment and their intention to use-is positive and accepted. Statistical evidence (path coefficient = 0.133, t-statistics = 2.043, p = 0.041) supports the hypothesis that there is a relationship between consumers' subjective norm and their intention to use (H5). All things considered, the route coefficient of 0.645, the high tstatistical value of 13.542, and the p-value of 0.000 demonstrate that the relationship between CUI and CA is very significant and strongly supported by statistical evidence. The results show that five hypotheses were accepted and supported, while one was rejected.

4 Conclusion, Implications, and Discussion

4.1 Discussion of Major Findings

This study examines the factors influencing Malaysian consumers' willingness to adopt 5G mobile technology. Six hypotheses were tested based on data collected through survey responses, as presented in Table 4.

4.1.1 Hypothesis 1: The Influence of Relative Advantage on Usage Intention

The analysis reveals a strong positive relationship between Relative Advantage (RA) and consumers' intention to use 5G, as shown by a highly significant p-value of 0.000 and a β coefficient of 0.245. This finding supports the notion that when consumers perceive 5G as offering significant benefits over existing technologies (e.g., 4G), they are more inclined to adopt it. This aligns with prior research, which found that consumers' perception of technological benefits is a key driver of adoption, [23], [24].

Table 4.	Results	Summarv	
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Hypothesis	Value Scored	Result
H1: There is a significant relationship between Relative Advantage and Consumers' Usage Intention towards 5G Mobile Technology.	$\begin{array}{l} \beta=0.245\\ p=0.000 \end{array}$	Supported
H2: There is a significant relationship between Compatibility and Consumers' Usage Intention towards 5G Mobile Technology.	$\begin{array}{l} \beta=0.218\\ p=0.001 \end{array}$	Supported
H3: There is a significant relationship between Complexity and Consumers' Usage Intention towards 5G Mobile Technology.	$\begin{array}{l} \beta=0.002\\ p=0.962 \end{array}$	Rejected
H4: There is a significant relationship between Perceived Enjoyment and Consumers' Usage Intention towards 5G mobile technology.	$\begin{array}{l} \beta=0.351\\ p=0.000 \end{array}$	Supported
H5: There is a significant relationship between Subjective Norm and Consumers' Usage Intention towards 5G Mobile Technology.	$\begin{array}{l} \beta=0.133\\ p=0.041 \end{array}$	Supported
H6: There is a significant influence effect of Consumers' Usage Intention towards Consumers' Adoption of 5G Mobile Technology.	$\begin{array}{l} \beta=0.645\\ p=0.000 \end{array}$	Supported
H7: To predict relative advantage, compatibility, complexity, perceived enjoyment, and subjective norm towards consumers' usage intention to use 5G Mobile Technology in Malaysia.	P-value for F-Test = 1.16E-106	Supported

4.1.2 Hypothesis 2: Compatibility's Role in Adoption

Compatibility (COM) also demonstrates a significant positive effect on adoption intentions, with a β of 0.218 and a p-value of 0.001. This suggests that consumers are more likely to adopt 5G when they find it compatible with their existing behaviors, devices, and daily routines. Previous studies reinforce this outcome, showing that higher compatibility enhances user attitudes toward new technology, [28], [29]. This finding highlights the importance of 5G's alignment with consumers' lifestyles as a critical factor in adoption, [59].

4.1.3 Hypothesis 3: The Impact of Complexity on Usage Intention

Unexpectedly, Complexity (CP) does not significantly influence consumers' intention to adopt 5G, as evidenced by its near-zero β coefficient (-0.003) and an insignificant p-value of 0.942. This suggests that perceived complexity does not hinder adoption, potentially due to users' growing familiarity with advanced technologies, [31], [32], [33]. This aligns with findings that self-confidence in navigating technology mitigates concerns over

complexity, making it a non-issue for 5G adoption in Malaysia.

4.1.4 Hypothesis 4: The Role of Perceived Enjoyment in Driving Adoption

Perceived Enjoyment (PENJ) significantly affects consumers' intention to use 5G, with a β value of 0.351 and a p-value of 0.000. This indicates that the enjoyment consumers associate with 5G enhances their willingness to adopt it. Similar findings in technology adoption literature highlight enjoyment as a critical factor that encourages user engagement, [38], [39], [40], [41], [42]. Consumers appear more likely to adopt 5G if they anticipate a satisfying and enjoyable experience with the technology.

4.1.5 Hypothesis 5: Subjective Norm's Influence on Usage Intention

The study finds Subjective Norm (SN) to be a relevant factor, with a β of 0.133 and a marginally significant p-value of 0.041. This result suggests that social influences, including peer and family expectations, play a role in adoption intentions. The impact of subjective norms aligns with existing research, which shows that individuals' decisions are often shaped by social pressure or support studies, [60].

4.1.6 Hypothesis 6: The Link between Usage Intention and 5G Adoption

Finally, the hypothesis confirming Consumers' Usage Intention (CUI) as a predictor of 5G adoption is strongly supported, with a β of 0.645 and a p-value of 0.000. This reinforces the idea that intentions are reliable indicators of actual behavior, consistent with established theories in technology adoption that link usage intention directly to subsequent usage, [61], [62].

4.1.7 Hypothesis 7: Overall Predictive Power of the Independent Variables

The collective impact of Relative Advantage, Compatibility, Perceived Enjoyment, and Subjective Norm explains approximately 72% of the variance in consumers' usage intention ($R^2 = 0.720$). This substantial R^2 value suggests these factors provide a comprehensive understanding of why consumers in Malaysia are inclined to adopt 5G technology. The adjusted R^2 value of 0.716 further supports the robustness of these predictors, confirming that they reliably account for most of the variance in adoption intention when accounting for model complexity and sample size.

4.1.8 Summary

In summary, this study confirms the importance of Relative Advantage, Compatibility, Perceived Enjoyment, and Subjective Norm in predicting consumers' intent to adopt 5G technology in Malaysia. Complexity does not appear to be a barrier, suggesting that consumers are comfortable with the technical aspects of 5G. For companies and policymakers, these findings emphasize the need to focus on the perceived advantages, compatibility with existing routines, enjoyable aspects, and social support to foster 5G adoption across Malaysia.

4.2 Implications in Theory

The principles and theories that underpinned the research were derived from the Diffusion of Innovation Theory and the Technology Acceptance Model (TAM). The five factors that influence the acceptance and desire to utilize 5G technology among Malaysian consumers will be studied in this study: RA, COM, CP, PENJ, and SN.

4.3 Implications for Management

These two outcomes should be taken into account management practitioners. First. bv service providers have repeatedly promised that 5G will be used for the benefit of customers and will not be left behind. Providers should discover ways to pique consumers' interest and encourage them to utilize 5G as it becomes available in urban centers, suburbs, and rural areas. Spread of 5G will be aided by the service. The advantages of 5G and how it works with people's present lives should be emphasized by service providers. Furthermore, it is imperative that governments persistently advocate for 5G technologies. Additionally, governments need to dispel 5G falsehoods while promoting its ground-breaking capabilities.

4.4 Limitations on Findings Applicability

We can't say for sure that these findings will hold true outside of Malaysia's cellular sector. This research relies heavily on the dataset that is subject to the study's restrictions. The dataset assessed the level of confidence that Malaysian consumers had in 5G. When utilizing datasets from different countries to get more insights, researchers should keep dataset considerations in mind for future studies. The inquiry was further constrained by the assumption of a universal understanding of 5G improvements. The results were simplified and the barriers were better understood based on this premise. When evaluating the difficulties of 5G technology, the assumption can lead to errors due to the abundance of 5G options. Therefore, not all 5G advances were covered by the article's findings. The findings corroborated the article's aim of determining the obstacles to the adoption of 5G mobile technology among Malaysian customers.

4.5 Suggestions for Further Study

Motivate additional researchers to utilize different sample approaches to validate and enhance the results in order to expand the scope of this study that focuses on 5G. Notwithstanding these constraints, researchers seeking to comprehend 5G user behavior should integrate pertinent ideas from many fields. The study setting is the only place to evaluate the approach's viability and bias. Make sure everyone can see how you sampled your data so they can judge the reliability of your results. Reducing bias, improving generalizability, allowing in-depth exploration, and comparing findings are all possible through different sampling approaches.

5 Conclusion

Once a low-middle-income nation with sluggish industries, Malaysia is rapidly becoming a highincome nation with state-of-the-art technologies. In the year 2030. In order to take the lead in the region's digital economy, Malaysia plans to commercialize new digital technologies as they emerge. A successful implementation of the new 5G mobile network is vital since it is projected to enable various advancements relating to the innovative notion. Intentional usage as it relates to the adoption of 5G mobile technology by Malaysian consumers was the focus of this study. The components were located using a seven-variable plan provided a literature review for each variable, and detailed the methodology. Two prominent theoretical frameworks were used to assess the data, [10], [51]. The literature on technology diffusion and the technology acceptance model, [10] were used to investigate customers' intentions to utilize the new technology and their interactions with it. Key enabling and barrier components for end customers in Malaysia to adopt 5G apps were highlighted in this study. Customer usage intention is not a mediator of complexity, according to the statistics.

To get to the bottom of this, we required more time and data. More studies could lead to more targeted mitigation strategies for restrictions that impact particular populations. A more specific methodological definition could be helpful in narrower research.

Declaration of Generative AI and AI-assisted **Technologies in the Writing Process**

The authors wrote, reviewed and edited the content as needed and they have not utilised artificial intelligence (AI) tools. The authors take full responsibility for the content of the publication.

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Conflict of Interest

The authors have no conflict of interest to declare.

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