Factors influencing the effects of the Starlink Satellite Project on the internet service provider market in Thailand

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ABSTRACT

This quantitative study explores the impact of the Starlink project on the internet service provider market in Thailand. A convenience sampling technique was used to recruit 617 participants, who completed an online questionnaire. The study examined several independent variables, including demographic factors, such as gender, age, education, status and income, and user behaviour, such as devices used for internet access, time spent online and social media platforms used. Binary regression was used to analyse the data. The results showed that the Starlink project had a significant impact on the competitive structure of the internet service provider market in Thailand. This impact was influenced by factors such as age, education, income, internet duration, mobile internet use, Facebook and TikTok. The study recommends that businesses develop effective strategies to meet the needs and expectations of their customers. Organisations with internet access have the opportunity to collect data to develop new products, which can give them a competitive edge. It is important to maintain a competitive environment to prevent artificially low collection rates or exorbitant prices due to collusion or tacit pricing agreements.

1. Introduction

Emerging high-speed technologies are changing the world. For instance, great numbers of people can now access the Internet through their smartphones. More generally, what has been termed "Industry 4.0" is transforming economies and societies, and internal and external application models are being developed at an ever-faster pace. Many countries are well-positioned to support new forms of consumption as the convergence of various economic, sociocultural, and technological phenomena alter traditional forms of commercial exchange [1]. In digitised welfare countries, a growing number of services to meet basic needs such as finances, housing, health care, social security, and mobility have shifted from physical to internet-based delivery [2]. Big data, Internet of Things (IoT), cloud computing, and artificial intelligence (AI) are having unprecedented effects on all aspects of society, while many economies are becoming digitally-rather than industrially based [3–7].

The internet is arguably the most significant technological advancement in human history, and it has become an essential part of people's daily lives. It has revolutionised the way we search for information, consume media, and entertainment, and manage our social

networks and relationships [8]. Starlink is a satellite internet service provided by SpaceX, a spaceflight company founded by Elon Musk in 2002. The network of orbiting satellites that powers Starlink was developed beginning in 2015, and prototypes were launched in 2018. Since then, SpaceX has successfully launched thousands of satellites into the constellations and 51 into low-Earth orbit. The total number of satellites in operation now stands at just under 4,000. The primary goal of Starlink is to provide high-speed, low-latency broadband Internet access to remote and rural areas around the world [9,10]. Industry competition encourages businesses to be innovative and offer fair prices to customers. Market structure is a method of categorising and understanding those businesses according to the degree of competition they face within their industry. Understanding market structure allows them to set appropriate prices and respond effectively to competitors' behaviours according to current demands and needs. The market structure can be used to establish how difficult it is for a company to enter an industry and how many sellers are participating, as well as clarify the relationship between businesses and their customers and the ways prices fluctuate. A market structure that allows multiple companies to participate gives customers different options and keeps prices competitive. By contrast, when an industry is dominated by a single company, it is likely

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to be less competitive, and government regulation might be needed to ensure fair prices [11,12]. Using binary logistic regression analysis, the present quantitative study examines the factors that impact the effect of the Starlink project on the competitive structure of the Internet service provider market in Thailand. The best predictive model shows that the factors influencing the Starlink project on the competitive structure of the Internet service provider market in Thailand include age, education, income, Internet duration, mobile Internet, Facebook, and TikTok. The study consists of six sections: the introduction; the literature review; the research methodology; the findings; the discussion; and the conclusion.

2. Literature review

The Internet has had a significant impact on society, particularly in the economic and sociopolitical spheres [13]. In the mid-1990s, the primary internet traffic consisted of electronic mail, file transfer, and a few web applications that were delivered to users via dial-up. However, with the rise of streaming, video, and gaming applications that are delivered primarily via broadband cables, users have become less tolerant of delays. The widespread adoption of smartphones and internet access has further facilitated the growth of new businesses in the "sharing economy" (e.g., Uber and Airbnb), mobile information services (e.g., social media and messaging), and more. More than 80% of households in the US now own at least one smartphone, and Wi-Fi is used by over 86% of homes with internet access to access applications [14]. Although the space internet is known for its slow performance, significant improvements are underway. Both governments and private companies are making plans in anticipation of these improvements. SpaceX plans to launch several satellites this year to support its Starlink network, including 51 from California's Vandenberg Space Force Base. Starlink's satellites orbit the Earth at a lower height of 340 miles above sea level, bringing them 98% closer to users than competitors like EchoStar Corp. and Viasat, whose satellites orbit at 22,000 miles above sea level. This proximity, combined with the larger volume of satellites, contributes significantly to the service's faster speeds. As of July 2022, Starlink had over 2,800 satellites in low-Earth orbit, all aboard the Falcon 9 rocket. The Falcon 9's reusability aims to reduce the high costs associated with space travel. In 2021, Starlink plans to launch 989 satellites, surpassing the 833 delivered in 2020. More than 900 satellites have been added to the Starlink mega constellation since the beginning of 2022 [15].

[16] reported that The introduction of the Starlink satellite constellation has the potential to bring about a significant shift in internet access in the Chicago area. This technology, created by SpaceX under the leadership of Elon Musk, offers a low-cost, reliable internet connection that could revolutionise the local economy. In terms of economic impact, the launch of Starlink has the potential to be a game changer for Chicago, especially in the fields of education, healthcare, and business. With more people able to access high-speed internet, it will become easier for students to utilise online resources and take part in virtual classes. Additionally, healthcare providers will have better access to patient data and telemedicine services. Businesses that require high-speed internet connections for their operations will also benefit from the improved access. On the social side, the increased access to high-speed internet has the potential to bridge the digital divide between those who have internet access and those who do not. It also provides greater access to entertainment, such as streaming services, for those who do not have other options. While the exact impact of Starlink in Chicago remains uncertain, its potential to change the game is evident. Improved access to high-speed internet could create new opportunities for education, healthcare, and business, while also promoting digital inclusion. As the situation continues to unfold, the impact of Starlink on Chicago could be significant.

[17] also reported that Osaka, Japan is a major economic centre in Asia, and its telecommunications infrastructure is crucial for its sustained success. The recent deployment of SpaceX's Starlink satellite constellation has raised questions about its potential impact on Osaka's telecommunications networks. Starlink is a low-Earth orbit satellite system designed to offer high-speed internet access worldwide. The launch of the first satellite network of its kind has elicited various reactions from Osaka's telecommunications industry. According to some industry experts, Starlink could enhance Osaka's telecommunications networks' efficiency and reliability. The satellite system could expand broadband service coverage, enabling more people to access high-speed internet. Additionally, Starlink could provide a backup connection when ground-based networks encounter technical issues, minimising service disruptions. However, some in the industry are concerned that the new satellite system could complicate Osaka's telecommunications infrastructure. For instance, the presence of Starlink satellites could cause interference with existing communication networks, potentially decreasing their performance. Additionally, some worry that the high cost of accessing Starlink services could make them unavailable to many businesses and households. The effect of Starlink on Osaka's telecoms industry can only be determined with time. Meanwhile, industry experts and the general public will closely monitor the situation, eagerly anticipating how the new satellite system will shape the city's future.

During the COVID-19 pandemic [18], emphasised the importance of having reliable and fast broadband internet access, which is unfortunately not available in many areas. Satellite communication can provide high data transfer rates and broad coverage, but the high latency links of geostationary satellites make it difficult to use virtual private networks and interactive applications. Starlink, on the other hand, has emerged as a formidable competitor to terrestrial internet service providers. [19] proposed a method for analysing website adoption data as an indicator of online trading to study the impact of firms' online presence on productivity and market structure. In the United Kingdom and Spain, they discovered that website adoption is associated with higher productivity and lower market concentration. Increased competition also results in a negative selection mechanism in which productivity growth is inversely related to pre-entry productivity levels and productivity gains tend to diminish over time. [20] discovered a positive relationship between corporate social responsibility (CSR) and corporate financial performance in China's transitional market economy. State ownership, on the other hand, has a negative impact on financial performance for both state-owned and non-state-owned firms. While both an instrumental and a political view of CSR exist in China, the primary motivation is to generate economic benefits for firms, and market competition increases its strategic use. [21] investigated the relationship between market competition, infrastructure sharing, and network investment in China's mobile telecommunications industry. They concluded that market competition has a significant positive impact on total industry network investment. However, the interaction of market competition and infrastructure sharing undermines network investment. As a result, when deep infrastructure sharing and intense market competition coexist, relational operators' competitive strategy shifts from facility-based to service-based competition, resulting in insufficient network investment.

3. Methodology

This present study takes a quantitative approach. Closed-ended questionnaires were used to collect the data. The questionnaire items were developed after the collation of reliable and valid sources, and the questionnaire itself was pre-tested on 30 respondents, as recommended by Refs. [22,23]. The instrument's validity, dependability, and accuracy were assessed. The researchers explained the purpose of the study to the respondents and solicited their participation before distributing the questionnaires online. The data were collected via a Google Forms-created online survey that was distributed across many online networks. The results were collected between November 2022 and January 2023. The study used convenience sampling, a non-probability method used to recruit study participants from a population that is close to hand and easily accessible [24,25]. The respondents comprised 617

Thai people over 18 years of age living in their country of origin.

To analyse the collected data, the researchers utilised statistical analysis software to conduct descriptive and inferential analyses. The dependent variable was the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand. The independent variables were demographic (i.e., gender, age, education, status, and income), user behaviour (i.e., computer, laptop, smartphone, tablet, wearable device, time, Internet duration, home Internet, and mobile Internet), and social media platforms (i.e., Facebook, Instagram, Twitter, TikTok, and YouTube). In the context of gender as a dummy variable, it typically takes on two values, often coded as 0 for female and 1 for male, representing different genders. To predict the target variable classes, binary logistic regression uses one or more continuous or categorical predictor factors. However, if the dependent variable has more than two categories that can be ordered in a sensible or logical manner, organised logistic regression can be used in the future [26]. Thus, binary regression, an efficient way to calculate the relationship between one or more explanatory variables and a single binary output variable [27,28], was used to analyse the study data.

4. Results

4.1. Demographic factors

Table 1 indicates that the chi-square value is 60.469 with 5° of freedom. Therefore, all the independent variables in the model are statistically significant at a significance level of 0.001 in predicting the dependent variable.

According to Table 2, the model explained approximately 12.5% of the variation in the result with a significance value of 0.05.

According to Table 3, the model that included demographic independent variables was able to predict the impact of the Starlink project on the competitive structure of Thailand's internet service provider market with an accuracy rate of 61.9% when using a cut-off value of 0.500 or 50%.

The predictive regression equation of Model 1 using the coefficients from Table 4 can be described by the following equation:

$$P = \frac{1}{1 + e^{-z}} \tag{1}$$

where P is the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand,

and Z = − 1.255–0.208(Age) + 0.797(Education) + 0.256(Income).

Table 4 shows that the dependent variable (the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand) could be explained in terms of age, education, and income. Gender and status were not significant. When there was an increase of one unit in age, the effects decreased from 1 to 0.812 (0.188). When there was an increase of one unit in education, the effects increased by 2.218. When there was an increase of one unit in income, the effects increased by 1.292.

4.2. User behaviour variables

Table 5 shows that the chi-square is 41.869, with *df* equal to 9. Thus, the dependent variable could be explained by all independent variables at the significance level of 0.001.

Table 1
Omnibus test of the model's performance using all the independent variables.

		Chi-square	Degrees of freedom (*df*)	Significance
Step 1	Step	60.469	5	.000 ***
	Block	60.469	5	.000 ***
	Model	60.469	5	.000 ***

*** Significant level at p < 0.001.

Table 2
The model summary using all the independent variables.

Step	−2 log-likelihood	Cox & Snell R square	Nagelkerke R square
1	783.128[a]	.093	.125

[a] Estimation terminated at iteration number 4 because parameter estimates changed by less than .001.

Table 3
Classification table for back-testing (including all the independent variables).

Observed			Predicted		
			Market competition		Percentage correct
			No	Yes	
Step 1	Market competition	No	112	154	42.1
		Yes	86	265	75.5
	Overall percentage				61.1

Note: The cut-off value is 0.500.

Table 4
Variables in the model using all the independent variables.

		B	*SE*	Wald	*df*	Sig.	Exp(B)
Step 1[a]	Gender	−.114	.180	.404	1	.525	.892
	Age	−.208	.067	9.540	1	.002 **	.812
	Education	.797	.176	20.462	1	.000 ***	2.218
	Status	.180	.183	.972	1	.324	1.197
	Income	.256	.109	5.520	1	.019 *	1.292
	Constant	−1.255	.478	6.891	1	.009 **	.285

* Significant level at p < 0.05; ** Significant level at p < 0.01; *** Significant level at p < 0.001.

Table 5
Omnibus test of the model's performance using all the independent variables.

		Chi-square	Degrees of freedom (*df*)	Significance
Step 1	Step	41.869	9	.000 ***
	Block	41.869	9	.000 ***
	Model	41.869	9	.000 ***

*** Significant level at p < 0.001.

According to Table 6, the model explained approximately 8.8% of the variation in the result, with a significance value of 0.05.

Table 7 indicates that the model with all the user behaviour variables was able to predict the Starlink project on the competitive structure of the internet service provider market in Thailand with an accuracy rate of 66.1% of cases when there was a cut-off value of 0.500, or 50%.

The predictive regression equation of Model 2 using the coefficients from Table 8 can be described by the following equation:

$$P = \frac{1}{1 + e^{-z}} \tag{2}$$

where P is the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand, and Z = − 1.911–0.418(Computer) + 0.326(Duration) + 0.567(Home Internet) − 0.334(Mobile Internet).

The significance level of each independent variable is presented in

Table 6
The model summary using all the independent variables.

Step	−2 log-likelihood	Cox & Snell R square	Nagelkerke R square
1	801.728[a]	.066	.088

[a] Estimation terminated at iteration Number 4 because parameter estimates changed by less than .001.

Table 7
Classification table for back-testing (including all the independent variables).

Observed			Predicted		
			Market competition		Percentage correct
			No	Yes	
Step 1	Market competition	No	126	140	47.4
		Yes	69	282	80.3
	Overall percentage				66.1

Note: The cut-off value is 0.500.

Table 8
Variables in the model using all the independent variables.

		B	*SE*	Wald	*df*	Sig.	Exp (B)
Step 1a	Computer	−.418	.211	3.935	1	.047 *	.658
	Laptop	.171	.298	.330	1	.566	1.187
	Smartphone	1.027	.603	2.900	1	.089	2.793
	Tablet	.110	.220	.249	1	.618	1.116
	Wearable device	.252	.215	1.376	1	.241	1.286
	Time	−.139	.081	2.954	1	.086	.871
	Duration	.326	.113	8.324	1	.004 **	1.386
	Home Internet	.567	.118	23.069	1	.000 ***	1.762
	Mobile Internet	−.334	.108	9.501	1	.002 **	.716
	Constant	−1.911	.765	6.237	1	.013 *	.148

* Significant level at p < 0.05; ** Significant level at p < 0.01; *** Significant level at p < 0.001.

Table 8. The dependent variable (the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand) could be described by computer, Internet duration, home Internet, and mobile Internet. Conversely, laptop, smartphone, tablet, wearable device, and Internet time were insignificant. In the case of computer use, the effects decreased from 1 to 0.658 (0.342). When there was an increase of one unit in Internet duration, the effects increased by 1.386. When there was an increase of one unit in home Internet use, the effects increased by 1.762. When there was an increase of one unit in mobile Internet, the effects decreased from 1 to 0.716 (0.284).

4.3. Social media variables

Table 9 shows that the chi-square is 86.139, with *df* equal to 6. Thus, a dependent variable can be explained by all independent variables at the significance level of 0.001.

According to Table 10, the model explained approximately 17.6% of the variation in the result, with a significance value of 0.05.

The classification in Table 11 indicates that the model with all the social media variables was able to predict the effects of the Starlink project with an accuracy rate of 63.7% of cases when there was a cut-off value of 0.500, or 50%.

The predictive regression equation of Model 3 using the coefficients from Table 12 can be described by the following equation:

$$P = \frac{1}{1 + e^{-z}} \tag{3}$$

Table 9
Omnibus test of the model's performance using all of the independent variables.

		Chi-square	Degrees of freedom (*df*)	Sig.
Step 1	Step	86.139	6	.000 ***
	Block	86.139	6	.000 ***
	Model	86.139	6	.000 ***

*** Significant level at p < 0.001.

Table 10
Model summary using all the independent variables.

Step	−2 log-likelihood	Cox & Snell R square	Nagelkerke R square
1	754.061a	.131	.176

a Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Table 11
Classification table for back-testing (including all the independent variables).

Observed			Predicted		
			Market competition		Percentage correct
			No	Yes	
Step 1	Market competition	No	99	167	37.2
		Yes	56	292	83.9
	Overall percentage				63.7

Note: The cut-off value is 0.500.

Table 12
Variables in the model using all the independent variables.

	Social media variable	B	*SE*	Wald	*df*	Sig.	Exp (B)
Step 1a	Facebook	−1.502	.397	14.282	1	.000 ***	.223
	Instagram	−2.054	1.137	3.263	1	.071	.128
	Twitter	.266	.212	1.571	1	.210	1.305
	TikTok	.861	.203	17.943	1	.000 ***	2.365
	YouTube	.676	1.156	.342	1	.558	1.967
	Constant	1.986	.495	16.088	1	.000 ***	7.284

*** Significant level at p < 0.001.

where P is the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand, and Z = 1.986–1.502(Facebook) + 0.861(TikTok).

The significance level of each independent variable is presented in Table 12. It shows that the dependent variable (the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand) could be described by Facebook and TikTok. Instagram, Twitter, and YouTube were not significant. When using Facebook, the effects decreased from 1 to 0.223 (0.777). When using TikTok, the effects increased by 2.365.

All the significant variables.

Table 13 shows that the chi-square is 174.234, with *df* equal to 9. Thus, the dependent variable could be explained by all of the independent variables at a significance level of 0.001.

According to Table 14, the model explained approximately 33.1% of the variation in the result, with a significance value of 0.05.

Table 15 shows that the model with all significant independent variables was able to predict the effects of the Starlink project on the competitive structure of Thailand's Internet service provider market with an accuracy rate of 73.5% when a cut-off value of 0.500, or 50%, was used.

The predictive regression equation of Model 4 using the coefficients

Table 13
Omnibus test of the model's performance using all the independent variables.

		Chi-square	Degrees of freedom (*df*)	Sig.
Step 1	Step	174.234	9	.000 ***
	Block	174.234	9	.000 ***
	Model	174.234	9	.000 ***

*** Significant level at p < 0.001.

Table 14
The model summary using all the independent variables.

Step	−2 log-likelihood	Cox & Snell R square	Nagelkerke R square
1	665.966[a]	.247	.331

[a] Estimation terminated at iteration number 5 because parameter estimates changed by less than .001.

Table 15
Classification table for back-testing (including all the independent variables).

Observed			Predicted		
			Market competition		Percentage correct
			No	Yes	
Step 1	Market competition	No	172	94	64.7
		Yes	69	279	80.2
	Overall percentage				73.5

Note: The cut-off value is 0.500.

from Table 16 can be described by the following equation:

$$P = \frac{1}{1 + e^{-z}} \qquad (4)$$

where P is the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand,

and $Z = -1.104 - 0.288(\text{Age}) + 0.849(\text{Education}) + 0.694(\text{Income}) + 0.358(\text{Duration}) - 0.596(\text{Mobile Internet}) - 2.279(\text{Facebook}) + 1.387(\text{TikTok})$.

The significance level of each independent variable is presented in Table 16. As can be seen, the dependent variable (the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand) could be described by age, education, income, Internet duration, mobile Internet, Facebook, and TikTok. Computer and home Internet were not significant. When there was an increase of one unit in age, the effects decreased from 1 to 0.750 (0.250). When there was an increase of one unit in education, the effects increased by 2.337. When there was an increase of one unit in income, the effects increased by 2.002. In addition, when using a computer, the effects decreased from 1 to 0.785 (0.215). When there was an increase of one unit in Internet duration, the effects increased by 1.431. When there was an increase of one unit in mobile Internet, the effects decreased from 1 to 0.551 (10.449). Moreover, when using Facebook, the effects decreased from 1 to 0.102 (0.898). When using TikTok, the effects increased by 4.002.

Table 16
Variables in the model using all the independent variables.

	Independent variable	B	SE	Wald	df	Sig.	Exp (B)
Step 1[a]	Age	−.288	.082	12.442	1	.000 ***	.750
	Education	.849	.214	15.789	1	.000 ***	2.337
	Income	.694	.142	24.063	1	.000 ***	2.002
	Computer	−.242	.231	1.099	1	.294	.785
	Duration	.358	.130	7.633	1	.006 **	1.431
	Home Internet	.167	.135	1.527	1	.217	1.181
	Mobile Internet	−.596	.118	25.347	1	.000 ***	.551
	Facebook	−2.279	.380	35.934	1	.000 ***	.102
	TikTok	1.387	.250	30.723	1	.000 ***	4.002
	Constant	−1.104	.797	1.918	1	.166	.332

** Significant level at p < 0.01; *** Significant level at p < 0.001.

5. Discussions

The present study investigated the factors determining the effects of the Starlink project on the competitive structure of the Internet service provider market in Thailand. The findings reveal that said factors included age, education, income, Internet duration, mobile Internet, Facebook, and TikTok. There may be several reasons why these factors were found to be significant in influencing the effects of the Starlink Satellite Project on Internet Service. Firstly, age and education may be important factors as they may affect individuals' familiarity and comfort level with technology. For instance, younger individuals who are more tech-savvy and have a higher level of education may be more open to adopting new technology such as the Starlink Satellite Project. Secondly, income and internet duration may play a role in determining individuals' access to and usage of the internet. Those with higher incomes and longer internet durations may be more likely to use the internet for work or other purposes that require a reliable and fast connection. Thirdly, mobile internet use may also be a factor as it may affect individuals' reliance on internet service providers and their willingness to try alternative methods of accessing the internet such as the Starlink Satellite Project. Finally, the use of social media platforms such as Facebook and TikTok may be relevant as these platforms rely heavily on internet connectivity and may be affected by changes in internet service. The findings of the study are consistent with [29] assertion that the use of technology is more widespread among the educated population in developing countries. Differences in technological use across countries are significantly correlated with education. Better-educated people are more likely to use the Internet in every country surveyed. [30] demonstrated that the digital divide is not only between rural or urban areas; it is also evident within cities. Thus, broadband adoption rates are significantly lower in low-income areas. The authors also observed that an increase in technology deployment costs could decrease home broadband use in marginalised communities. Correspondingly, the greater the disparities in socioeconomic status with marginalised groups (i.e., income, age, race, and gender) the greater the decrease in home broadband access. According to Ref. [31]; information technology (IT) provides a dynamic platform for national competition commissions (who each have official websites) to perform advocacy and outreach work globally. Some competition commissions use social media in their advocacy and outreach work to keep up with technological advances. For example, the Competition Commissions of South Africa, Singapore, and the Philippines all have official Facebook pages to communicate with the public. To keep pace with technological advances, some competition commissions use social media in their advocacy and outreach work. For instance, Competition Commission Singapore, Competition Commission Philippines, and the Competition Commission South Africa each have official Facebook pages through which they communicate with the public.

The study conducted on the impact of the Starlink project on the Internet service provider market in Thailand offers valuable insights into the broader socio-technical implications of emerging technologies. The findings demonstrate the significant influence of the Starlink project on the competitive structure of the Internet service provider market in Thailand, underscoring the need to understand and address the consequences of such initiatives for consumers, businesses, and regulatory bodies. The findings of this study, which align with the research conducted by Ref. [32]; carry significant theoretical and practical implications for governments and policymakers. The study underscores the importance of actively fostering the creation of new ventures and providing support for entrepreneurship as means to enhance sustainable competitiveness. These findings are also in line with [33] research, which emphasises the progression of AI ethics from establishing general principles to developing sustainable and inclusive guidance, necessitating stakeholder engagement and citizen involvement in shaping ethical and societal expectations. The study highlights the significance of demographic factors, such as age, education, and income, in shaping

the impact of the Starlink project. This suggests that technological advancements affect different segments of the population differently, emphasising the importance of inclusive strategies that cater to the diverse needs and expectations of customers. Consequently, businesses operating in the Internet service provider market should consider these demographic factors when designing their services and marketing strategies. Moreover, the study underscores the role of user behaviour in the impact of the Starlink project. Factors such as internet duration, mobile internet use, and social media platform preferences were found to influence the competitive dynamics in the market. This highlights the interconnected nature of various aspects of the digital ecosystem and the need to consider user behaviour when assessing the implications of technological interventions. This aligns with the findings of [34]; who explored consumer behaviour and the acceptance of AI-enabled service encounters, shedding light on an emerging area of research. Additionally, the study draws attention to the potential benefits for businesses to leverage data collection and analysis for developing new products and gaining a competitive edge. This underscores the growing importance of data-driven approaches in the evolving landscape of the Internet service provider market. However, it is crucial to maintain a competitive environment to prevent monopolistic practices or collusion that could lead to unfair collection rates or excessively high prices. Regulatory bodies should remain vigilant in ensuring fair competition and consumer protection in light of these emerging technologies.

6. Conclusions

The study has shown that several factors play a significant role in the effects of the Starlink Satellite Project on the internet service. These factors include age, education, income, internet duration, mobile internet use, Facebook, and TikTok. The findings indicate that younger, more educated, and higher-income individuals tend to benefit more from the Starlink Satellite Project, likely due to their greater access to technology and willingness to adapt to new technologies. Additionally, longer internet duration, increased mobile internet use, and frequent use of social media platforms such as Facebook and TikTok were also found to be significant predictors of the positive effects of the Starlink Satellite Project on the internet service. These findings suggest that the impact of the Starlink Satellite Project may be most beneficial for those who are already well-connected and technologically savvy. It is important for policymakers and stakeholders to consider these factors when planning and implementing technology initiatives to ensure that the benefits are distributed equitably among all populations. Understanding the demographic and socioeconomic factors that influence the effects of the Starlink Satellite Project on the internet service is important for ensuring equitable access and benefits for all individuals, regardless of their background.

This study contributes to our understanding of the socio-technical implications of the Starlink project on the Internet service provider market in Thailand. It underscores the need for businesses to adapt their strategies to meet the evolving needs of customers and emphasises the importance of demographic factors and user behaviour in shaping the impact of emerging technologies. Furthermore, it highlights the significance of maintaining a competitive environment and regulating the market to prevent anti-competitive practices. Overall, these findings have implications for businesses, policymakers, and researchers seeking to navigate the complex interplay between technology and society.

In light of the study's findings, it is recommended that businesses develop effective strategies to meet their customers' needs and expectations. Any organisation with access to the Internet can gather data that can be used to develop new products and thereby gain competitive advantage. Effective competition means that customers are subjected neither to artificially low collection rates that would jeopardise the business environment nor exorbitant collection prices resulting from weak competitive pressure, collusion, or tacit pricing agreements. Finally, it should be noted that the present study has several limitations.

Convenience sampling methods in research have inherent limitations that researchers must acknowledge. The lack of random selection increases the risk of sampling bias, reducing the generalizability of findings to the broader population. It is important for researchers to openly recognize this limitation, discuss its impact on validity and reliability, and allow readers to evaluate the findings critically. To improve future research, more rigorous sampling methods should be used to enhance generalizability and foster a representative understanding of the phenomenon being studied. Moreover, the sample comprised Thai people over 18 years of age who were living in Thailand; further studies on the subject in question might extend the geographical remit. Also, the data were gathered using a closed-ended questionnaire only; qualitative studies involving interviews or focus group discussions would offer additional insights.

Authors' individual contribution

The authors are responsible for all the contributions to the paper according to CRediT (Contributor Roles Taxonomy) standards.

Author contributions

Conceptualization – Y.S. T.K., and S.B.; Methodology – Y.S. and T.K.; Investigation – Y.S. T.K., and S.B.; Software – Y.S. and T.K.; Validation – Y.S. T.K., and S.B.; Writing – Y.S. T.K., and S.B.; Resources – Y.S. T.K., and S.B.; Supervision – T.K.

Declaration of competing interest

The authors declare that there is no conflict of interest.

Data availability

No data was used for the research described in the article.

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