Exploring Undergraduate Perceptions of Internet Service Provider Satisfaction: A Focus on the Faculty of Humanities & Social Sciences

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Abstract

This research investigates the determinants of customer satisfaction regarding Internet Service Providers (ISPs) among undergraduates, specifically focusing on the Faculty of Humanities and Social Sciences at the University of Sri Jayewardenepura. The study encompassed students from the 1st to 4th year, utilizing a self-administered questionnaire in both Sinhala and English languages via Google Forms. Out of 350 randomly selected undergraduates, data was collected to achieve the primary objective of identifying influencing factors. The study was structured around five sub-objectives, which directed its framework. The data collected underwent both qualitative and quantitative analysis, encompassing descriptive analysis, the utilization of the Chi-Square Test, and the application of Logistic Regression. Qualitative insights were drawn from open-ended questionnaire sections, while quantitative data was derived from other questions. Findings indicate that undergraduate satisfaction was significantly impacted by the amalgamation of package offerings, services, and technological fairness. However, variables such as gender, province, academic year, monthly family income, and ISP brand had no significant influence on satisfaction levels. The study underscores the importance of delivering fast, reliable, and cost-effective services while extending Internet access across Sri Lanka. The research recommends comprehensive strategies for enhancing customer satisfaction by ensuring widespread and dependable Internet connectivity.

Keywords: *Customer Satisfaction, Internet Service Provider (ISP), Undergraduates, Technology Fairness, Internet Connectivity, Service Quality*

1. Introduction

In the current global landscape, the pervasive impact of the COVID-19 pandemic has reverberated across all sectors, reshaping daily routines and disrupting familiar activities. The usual rhythm of life, encompassing schools, businesses, and more, has been profoundly altered. However, in the midst of these challenges, the world has found a lifeline in the form of networking technologies. Online platforms have risen to the occasion, offering avenues for learning, banking, communication, shopping, and other essential activities on a global scale, including in Sri Lanka.

This digital transformation has witnessed a surge in online learning, virtual banking, digital communication, and e-commerce. To navigate intermittent isolations and curfews, individuals have increasingly turned to online banking and virtual grocery shopping. Serving as a conduit for these transformations is the internet, which has fundamentally reshaped how we connect, organize information, and share data worldwide. Across the globe, the internet has transcended its role as a mere utility to become an integral part of our daily lives, influencing both individual consumers and large economies. This growing influence is exemplified by the rapid expansion of the World Wide Web (WWW).

According to the World Bank Report, internet usage reached 48.997% of the world's population in 2019, with 4.66 billion active users as of January 2021, representing 59.5% of the global population. Notably, 92.6% of these users accessed the internet through mobile devices (Johnson, 2021).

Sri Lanka's trajectory towards globalization began with the Open Economic Policy of 1977, spearheaded by President J.R. Jayewardene. Over the years, the nation has embraced various policies, steadily embracing globalization since gaining independence from British rule. In this landscape, the internet has emerged as a pivotal tool, especially in the context of the ongoing Covid-19 pandemic. As the pandemic ushers in a "new normal," the internet has become the cornerstone of connectivity, enabling a wide array of activities in this transformed environment. The pandemic's catalytic effect has spurred widespread digital adoption, giving rise to new challenges and opportunities in the business landscape. With the shift towards remote work, individuals have embraced digital devices, fostering various forms of online interactions and connections (Jebamani, 2021). In Sri Lanka, the Telecommunication Regulatory Commission reports a population of 22.156 million in 2021 (Statistics - Telecommunications Regulatory Commission of Sri Lanka, n.d.). Furthermore, a significant increase in fixed and mobile broadband subscriptions in 2021 compared to 2018. Notably, Sri Lanka had approximately 11 million internet users in January 2021, marking an 800 thousand (+7.9%) increase from the previous year. Internet penetration in Sri Lanka reached 50.8% in January 2021, accompanied by 7.9 million social media users. Impressively, social media users in Sri Lanka grew by 1.5 million (+23%) between 2020 and 2021 (Kemp, 2021).

According to Jebamani (2021), mobile connections predominantly lean towards prepaid options, with many users accessing the internet through broadband connections. Sri Lanka boasted approximately 32 million mobile connection users in January 2021. The digital landscape is primarily dominated by global giants like Google, YouTube, google.lk, and Facebook, with the pandemic accelerating the growth of e-commerce platforms due to lockdowns and the population's shift towards the digital economy and online purchasing. The pivotal role of Internet Service Providers (ISPs) cannot be understated, as they provide crucial access to the Internet from various locations. As high-speed internet gains popularity and demand surges, ISPs face the challenge of maintaining customer satisfaction. Interestingly, the American Customer Satisfaction Index (ACSI) noted a significant increase in ISP customer satisfaction after four years of stagnation. Broadband internet options encompass cable, fiber optic, satellite, and DSL, with dial-up also offering limited service. In some cases, wireless connections or hotspots provided by cell phone providers offer another route to internet access (Shelton, 2021).

Sri Lanka's ISP landscape has witnessed remarkable growth, with the advent of 5G technology representing a milestone achievement. Key players in the Sri Lankan internet service scene include Dialog, SLTMobitel, Airtel, Hutch, and Lanka Bell. Notably, these providers, including SLT PLC, Lanka Bell, and Dialog Broadband, serve as both phone and data service providers as per their licenses. With the ever-evolving landscape, data on net speed variations is available through the Telecommunication Services Regulatory Commission website. The array of internet packages available in Sri Lanka is extensive, catering to diverse needs:Airtel Mobile 3G, Dialog Mobile 3G, Dialog Mobile 4G LTE, Dialog Mobile 4G LTE LTE, Etisalat Mobile 3G, Hutchison Mobile 3G, LankaBell 4G LTE, Mobitel 4.5G Mobile, Mobitel Mobile 4G LTE, SLT Fixed ADSL 4M. This study delves into the multifaceted landscape of internet services in Sri Lanka, exploring the dynamic interaction between digital connectivity, societal shifts, and the evolving role of ISPs in

this modern era.

The universal role of the Internet in various activities like education, communication, shopping, and business has made Internet Service Providers (ISPs) vital intermediaries between users and these activities. Researchers have examined customer satisfaction factors related to ISPs and identified them as Demographic Factors, Technological Factors, Services, and Packages. However, limited research has been conducted in Sri Lanka, especially among undergraduates, and prior studies did not focus on identifying factors affecting customer satisfaction in this context.

Hence, this study aims to fill this gap by investigating the factors influencing undergraduates' satisfaction with ISPs. The main objective is to identify these factors and explore their impact on customer satisfaction. The sub-objectives include understanding the distribution of undergraduates' satisfaction levels, assessing differences in satisfaction levels across various factors and internet packages, examining the association between satisfaction and different factors, and constructing a predictive model for undergraduates' satisfaction. In essence, this study seeks to comprehensively explore undergraduates' satisfaction with ISPs in Sri Lanka, recognizing the diverse surfaces that contribute to this satisfaction and providing insights into the dynamics of customer satisfaction within this specific context.

The significance of this study extends to various stakeholders, including service providers, the university community, society and government, and researchers. For service providers, understanding customer satisfaction is crucial in a competitive business landscape. By examining factors that influence satisfaction with ISPs, companies can identify areas for improvement and make informed decisions to enhance their services. Within the university community, particularly among undergraduates, the study provides insights into how they perceive their current ISPs. This knowledge can aid students in selecting suitable ISPs for their needs and help improve their internet connectivity, which is essential for educational and other activities.

On a broader social and governmental level, the study holds value as it allows individuals to make informed choices regarding their ISP, impacting home-based work and education. It sheds light on the current state of ISP services in the country, potentially influencing policy decisions in the future. Additionally, the research is beneficial for future researchers who intend to explore this area. The study's methodology and findings can serve as a reference, contributing to the overall understanding of customer satisfaction with ISPs. Measuring customer satisfaction is a critical aspect of business success, as emphasized in a 2010 study by McColl-Kennedy & Schneider on "Measuring Customer Satisfaction: Why What and How Total Quality Management." In today's economy, where knowledge is a valuable resource, companies are constantly innovating and offering additional services to gain a competitive edge. This approach recognizes the significant role of consumer satisfaction in sales and reputation, distinguishing between various types of customers. The absence of a strategy to measure customer satisfaction has led to the development of industry-specific models for monitoring satisfaction (McColl-Kennedy & Schneider, 2010).

Hill (1996) further underscores the significance of measuring consumer satisfaction in the "Handbook of Measuring Consumer Satisfaction." Hill emphasizes that measuring customer satisfaction provides a sense of accomplishment and motivates employees to achieve higher productivity, enhancing the entire customer service process.

Grigoroudis & Siskos (2009), in their book "Customer Satisfaction Evaluation: Methods for Measuring and Implementing Service Quality," outline the crucial benefits of measuring customer satisfaction. This practice helps businesses assess their position in the market, identify opportunities, understand customer behavior, and enhance communication. It also examines the impact of new initiatives on clients, uncovers organizational strengths and weaknesses, and fosters increased productivity through satisfaction measurement.

In 2006, Zeithaml and Bitner introduced several dimensions of customer satisfaction, including product and service features, consumer emotions, attribution for service success or failure, perceptions of equity and fairness, and the influence of others' opinions. These dimensions were utilized in this study to assess undergraduates' satisfaction with their Internet Service Providers (ISPs). Notably, product and service features significantly influence customer satisfaction, encompassing aspects like price, quality, and customization. Consumer emotions also play a crucial role; positive emotions enhance the service experience while negative ones can lead to dissatisfaction. Attribution for service success or failure influences perceptions, and perceptions of equity and fairness impact overall satisfaction, especially in service recovery situations. Additionally, the opinions of others, including friends and family, can sway individual satisfaction (Salim et al., 2019).

Generally, understanding and measuring these dimensions provide insights into customer perceptions and facilitate informed decision-making to improve service quality and customer satisfaction. The relationship between undergraduates' satisfaction and various factors has been studied by researchers in the field. Demographic factors play a role in customer satisfaction, with studies by Salim et al. (2019) and Thaichon (2010) highlighting the influence of variables like age, gender, education, income, and occupation on satisfaction. Additionally, technological factors, such as network availability and speed, are shown to impact satisfaction. Buhaljoti's study in Albania found a correlation between network quality and customer satisfaction ($r = 0.506$, $p < 0.05$). Joudeh et al. (2018) established a positive relationship between service quality and customer satisfaction, while Madushanka et al. (2020) found a positive correlation between service quality and customer satisfaction in the Gampola area.

Services provided by ISPs also affect customer satisfaction. As identified by Salim et al. (2019), attributes like billing and overall customer care service significantly contribute to customer satisfaction. Dwivedi et al. (2010) showed that service quality directly influences customers' behavioral intentions to switch ISPs. Factors like credibility, responsiveness, and promotion also play a role. The study by Joudeh et al. (2018) revealed that employee-related factors did not directly impact customer satisfaction and loyalty, while other dimensions of service quality did. Value-added services, such as low prices, high internet download limits, speed, and bundle promotions, were found to influence customer behavior and satisfaction, according to Thaichon (2010). Price, brand image, and promotions were identified by Madushanka et al. (2020) as factors positively affecting customer satisfaction. To summarize, customer satisfaction among undergraduates is influenced by various factors including demographic attributes, technological aspects, and the quality of services provided by ISPs. Each of these dimensions contributes to shaping the overall satisfaction experienced by customers.
However, the study is not without limitations. It focused solely on university students from the Western Province of Sri Lanka, limiting the generalizability of the results. The lack of responses from certain provinces, language barriers, and limited sample frame

accessibility further impacted the study's coverage and representativeness. Nonetheless, despite these limitations, the study's insights contribute to a deeper understanding of customer satisfaction with ISPs among university students in the specific region studied.

2. Materials and Methods

The study utilized primary data collected through a self-administered questionnaire distributed via digital platforms. The questionnaire encompassed demographic information, technological factors, services, package details, and customer satisfaction. A Likert scale was employed to gauge agreement on statements related to satisfaction dimensions. The data source for this research was primarily the responses provided by university students. Secondary data sources included information gathered from service provider websites and advertisements, which contributed to the analysis. The target population comprised university students from the Faculty of Humanities and Social Sciences at the University of Sri Jayewardenepura. The total number of registered students was 3508, and a sample of 485 responses was collected using stratified random sampling based on academic years.

The study employed various statistical analyses to achieve its objectives, including descriptive analysis, nonparametric analysis, and logistic regression, to explore associations and predict models. Both qualitative and quantitative data were analyzed, with qualitative data derived from open-ended questionnaire responses and quantitative data from other questions. A mixed-methods approach was used to comprehensively analyze the data.

3. Result and Discussion

The results and discussion section specifies the results that have been generated by carrying out the statistical analysis as mentioned in the previous section.

Table 1: Reliability, KMO and Bartlett's Test Statistics of Variables

Variable	Cronbach's Alpha	KMO value
Services	0.655	0.687
Technology Related Factors	0.881	0.888
Undergraduates' Satisfaction	0.848	0.872

To construct an index for measuring the level of customer satisfaction, the reliability and validity of the variables were assessed using Cronbach's alpha. The results showed that the services variable approached the acceptable threshold (0.655) for reliability, as per Taber (2018). However, the variables related to technology factors and undergraduates' satisfaction exhibited higher Cronbach's alpha values were 0.881 and 0.848, respectively compared to the acceptable level mentioned in Taber (2018). These findings indicated that the identified variables were dependable for constructing the indices. Additionally, the suitability of the variables for index construction was evaluated using the Kaiser-Meyer-Olkin (KMO) values, which were 0.687, 0.888, and 0.872, all exceeding the acceptable level of 0.6 as suggested by Reddy & Kulshrestha (2019). Bartlett's test further confirmed the validity of the variables, as evidenced by the significant p-value of 0.000 for all three variables.

Table 2: Summary Measurements of the Indices

		Services	Technology	Satisfaction
N	Valid	350	350	350
	Missing	0	0	0
Mean		57.0310	52.8452	55.2946
Median		56.5217	52.0834	56.2500
Mode		47.8261	50.0000	46.8750
Std. Deviation		18.9019	22.9845	19.5724
Skewness		-0.003	-0.051	-0.088
Kurtosis		-0.328	-0.614	-0.179

Following the data validation, indices were developed to represent Indicators for Services, Technology, and Undergraduates' Satisfaction. The characteristics of these indices were highlighted (Table 2). For the Services Index, the average value was 57.03 with a dispersion of 18.90. The median was 56.52, and the mode was 47.83. The distribution was slightly negatively skewed with a skewness coefficient of -0.003 and a negative kurtosis of -0.328, indicating a leptokurtic distribution. The Technology-Related Factors Index had an average value of 52.85 and a dispersion of 22.99. The median was 52.08, and the mode was 50. The distribution was also negatively skewed with a skewness coefficient of -0.051 and a leptokurtic distribution with a kurtosis of -0.614.

For the Undergraduates' Satisfaction Index, the average value was 55.3 with a dispersion of 19.57. The median was 56.25, and the mode was 46.875. This index also showed a negative skewness with a skewness coefficient of -0.088 and a negative kurtosis of -0.179. The normality of undergraduates' satisfaction was tested using the Kolmogorov-Smirnov test, revealing a non-normal distribution. Therefore, non-parametric statistical techniques and logistic regression were employed. The distribution pattern of overall undergraduates' satisfaction was negatively skewed and leptokurtic.

Figure 1: Composition of Gender

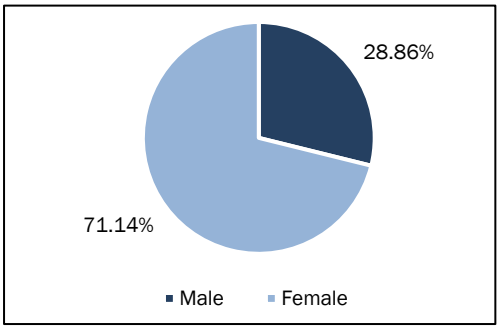
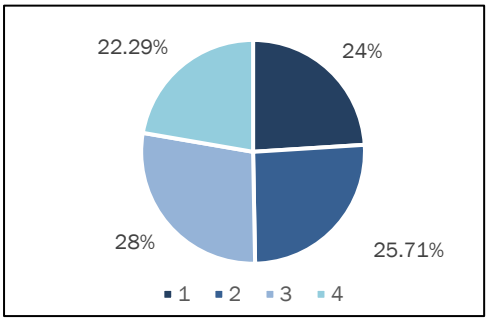
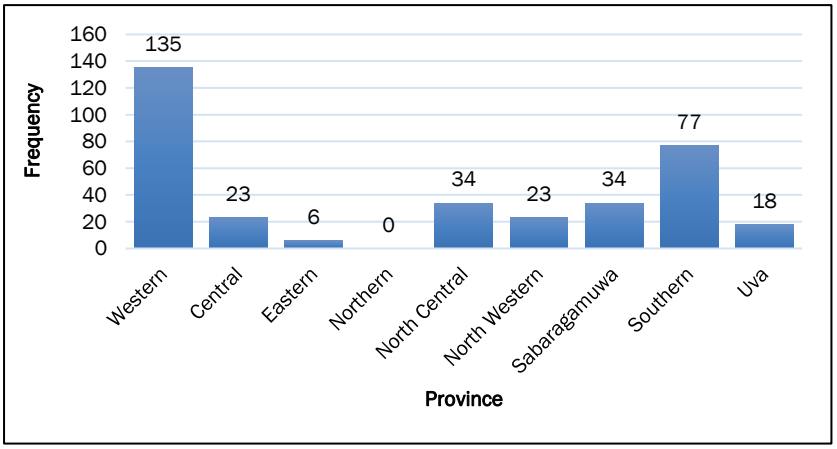


Figure 2: Academic Year



The sample's composition (Fig. 1) revealed that the majority of respondents were female (71%), while males accounted for the minority (29%). In terms of academic year (Fig:2), the majority were third-year students (28%), with the minority being fourth-year students (22%). The distribution across academic years aimed to represent all four years, with each academic year constituting approximately 20% of the total undergraduates.

Figure 3: Residential Province



Geographically, the Western Province had the highest number of undergraduates (39%), with no representation from the Northern Province. The Eastern Province had the lowest representation (2%), while the North Central, Sabaragamuwa, Central, and North Western provinces each had a similar number of undergraduates (around 10%). The Southern Province accounted for 22% of the respondents, while the Uva Province represented 5% of the sample. Regarding family monthly income (Fig:4), the majority (37%) reported earning 39,999 or less. Around 25% had a monthly income between 40,000 and 59,999, and 15% fell within the 60,000-79,999 range. A smaller percentage (9%) had a family monthly income of 80,000-99,999, and approximately 14% earned over 100,000.

When it came to internet connection providers, a significant proportion (47%) used Dialog, followed by Mobitel (24%), SLT (22%), Hutch (3.43%), and Airtel (2.57%). Notably, only a minor percentage (0.57%) used Lankabell.

Figure 4: Family Income

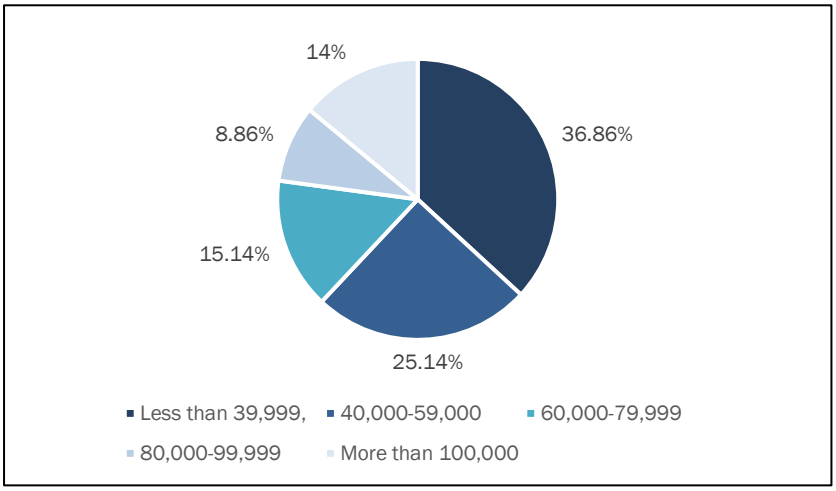


Table 3: Composition of Internet Packages

Brand Name	USMP		UNP		UYTP		WLDP		TBP	
	F	(%)	F	(%)	F	(%)	F	(%)	F	(%)
Dialog	107	30.6	13	3.7	71	20.3	126	36.0	36	10.3
SLT	27	7.7	6	1.7	19	5.4	53	15.1	29	8.3
Mobitel	65	18.6	11	3.1	38	10.9	65	18.6	32	9.1
Airtel	7	2	2	0.6	6	1.7	7	2.0	2	0.6
Hutch	6	1.7	2	0.6	6	1.7	7	2.0	6	1.7
Total	212	60.6	34	9.7	140	40.0	258	73.7	105	30.7
Missing	138	39.4	316	90.3	210	60.0	92	26.3	245	70.0

In terms of internet packages, the majority (73%) used Work & Learn Data Packages (WLDP). Of these, 36% opted for Dialog, 19% for Mobitel, 15% for SLT, 2.3% for Airtel, and 1.7% for Hutch. In contrast, 26.3% did not use Work & Learn Data Packages. Meanwhile, 60.6% used Unlimited Social Media Packages (USMP), with Dialog (31%), Mobitel (19%), and SLT (8%) being the preferred providers. The usage of Unlimited YouTube Packages (UYTP), Time-Based Packages (TBP), and Unlimited Netflix Packages (UNP) followed similar patterns, with various percentages of students subscribing to each.

Figure 5: Monthly Cost Composition for the Internet

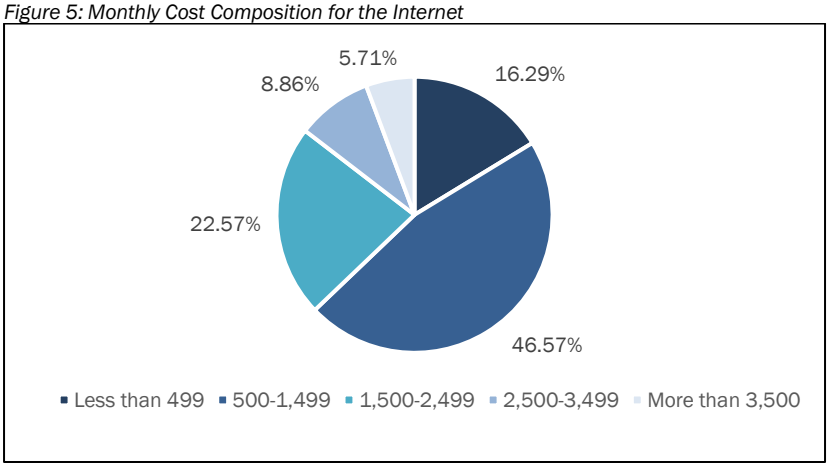
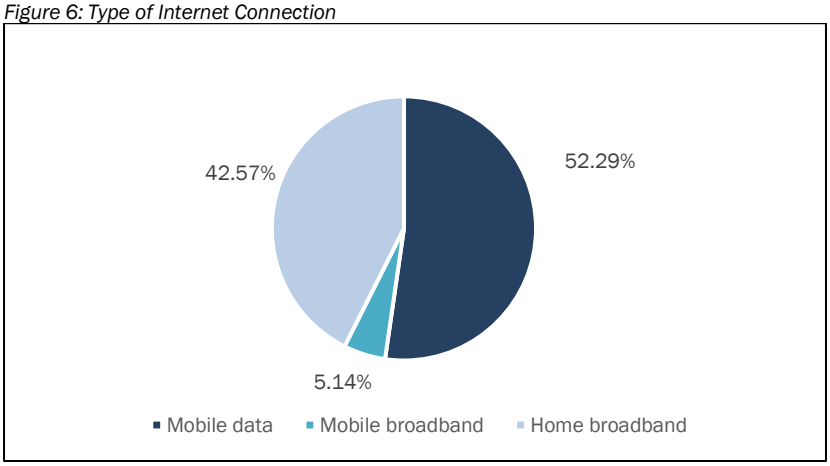
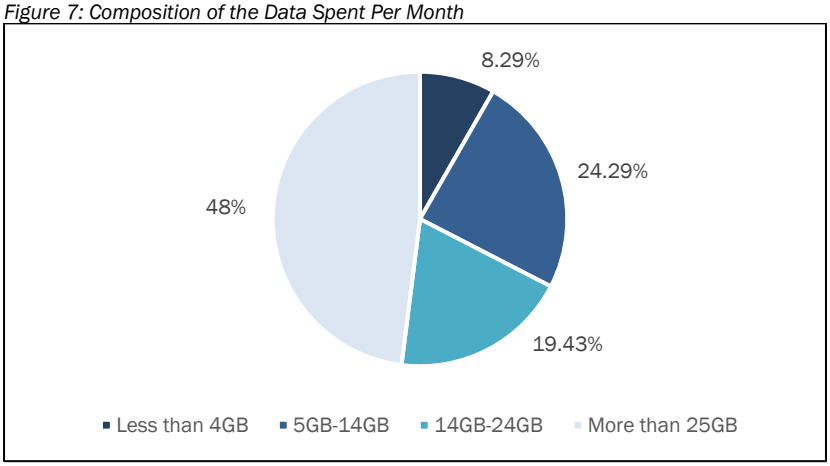


Figure 6: Type of Internet Connection



Regarding the monthly expenses for internet connectivity (Fig. 5), 47% of undergraduates spent between 500-1,499, while 6% spent over 3,500. Around 16% spent less than 499, and the second-largest group (23%) spent between 1,500 and 2,499. The distribution of monthly costs spanned different ranges, including 2,500-3,499. In connection type (Fig: 6), the majority (52%) used mobile data, while 5% opted for mobile broadband. Home broadband was used by 43% of respondents.

Figure 7: Composition of the Data Spent Per Month



Regarding monthly data usage (Fig:7), the highest proportion (48%) used more than 25GB, and 8% used less than 4GB. Additionally, 19% utilized 14GB-24GB, while 24% used 5GB-14GB. In terms of home telephone usage (Fig: 8, 9), 54% did not have a home telephone, while 46% had one. Of those with a home telephone, 31% had subscribed to the internet through it. Addressing the reasonability of unlimited packages, 28% moderately agreed that the packages provided a reasonable number of applications for the price charged, and 26% fully agreed. In contrast, 20% strongly agreed, 11% strongly disagreed and 15% disagreed with the statement.

Figure 8: Home Telephone Users

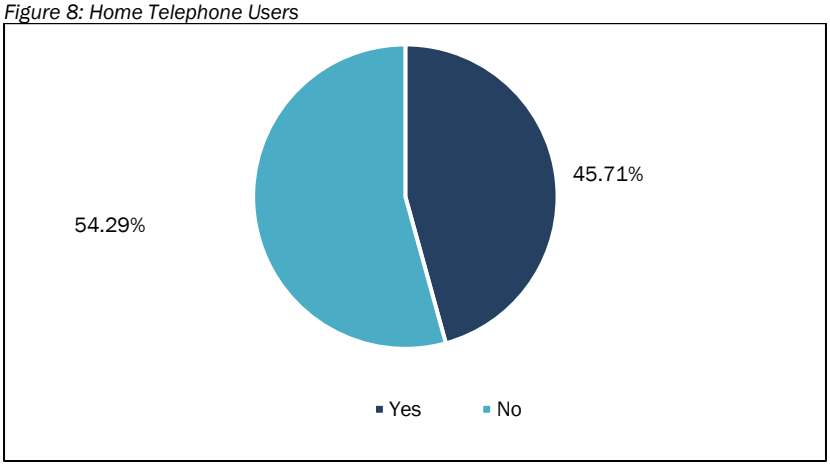
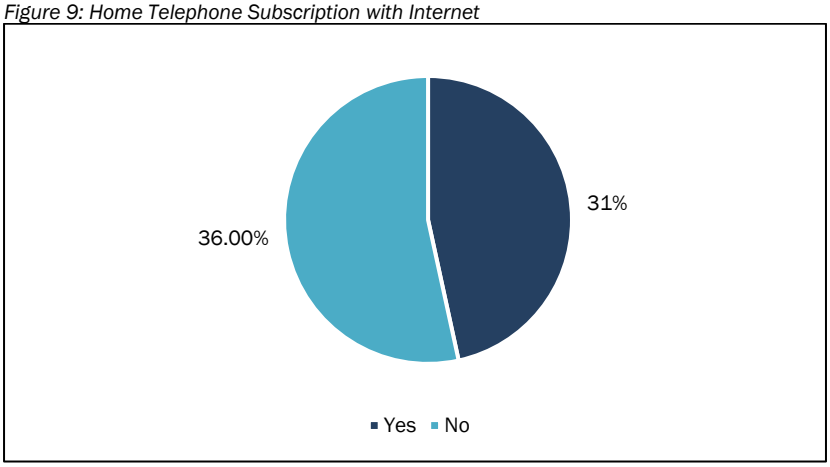


Figure 9: Home Telephone Subscription with Internet



In response to recommendations, the majority (28.32%) suggested improving speed and bandwidth, while 27.75% recommended enhancing (Table 4) signal strength. Another 17.92% proposed introducing new packages, increasing data allocation, and eliminating daytime and nighttime divisions. A smaller percentage (3.47%) emphasized the need for improved customer care and technical support. Additionally, 4.62% advocated for price reductions, and 7.51% recommended constructing new communication towers.

Table 4: Agreement with the Statement "Provides a reasonable number of apps (WhatsApp, Zoom, Facebook, etc.) for the price charged for the packages

Category	Percentage (%)
Strongly Disagree	11.43
Disagree	14.57
Moderate	28.29
Agree	26.00
Strongly Agree	19.71

Various nonparametric tests were utilized to assess the significant differences between different factors and undergraduates' satisfaction, yielding the following outcomes. In the case of the Independent-Sample Mann Whitney U test examining gender, the p-value

(0.008) was found to be less than the significance level (0.05). This leads to a 95% confidence conclusion that the median satisfaction levels of male and female undergraduates are distinct. Given the higher representation of females (71.14%) in the sample, it can be inferred that undergraduates' satisfaction levels varied between genders.

Table 5: Respondents' Recommendations

Category	Percentage (%)
Speed & Bandwidth	28.324
Signal Strength	27.746
Tower	7.5145
Data Packages	17.919
Customer Care & Technical Support	3.4682
Cost	10.405
Technology	4.6243

For province-related distinctions, the Independent-Sample Kruskal Wallis test yielded a p-value (0.007) lower than the significance level (0.05). Thus, at a 95% confidence level, it was determined that the distribution of undergraduates' satisfaction differed across the eight provinces. This discrepancy in satisfaction levels can be attributed to the higher number of respondents from the Western Province compared to other provinces. A similar conclusion emerged from the independent-sample Kruskal Wallis test on Internet connection, where the p-value (0.006) indicated a distinction in the median satisfaction levels among various Internet service providers. Notably, the median satisfaction levels differed between Dialog, Mobitel, SLT, and other providers. The prevalence of Dialog usage among respondents further contributed to this difference in medians. By comparing pairwise comparisons across provinces and internet connection types, it was possible to identify the specific cases where median differences existed. Notably, the medians differed in the Sabaragamuwa and Central Provinces and the Sabaragamuwa and Eastern Provinces, while they remained the same in other cases. Moreover, while the medians were distinct for Dialog and SLT, they were the same for other ISPs.

Table 6: The significant differences between different factors and undergraduates' satisfaction

Factor	Name of the test	p-value
Gender	Mann Whitney U Test	0.008
Province	Kruskal Wallis Test	0.007
Academic Year	Kruskal Wallis Test	0.340
Family Income	Kruskal Wallis Test	0.060
Internet Connection	Kruskal Wallis Test	0.006
Monthly Cost for the Internet	Kruskal Wallis Test	0.646
Type of Internet Connection	Kruskal Wallis Test	0.444
Data Spent Per Month	Kruskal Wallis Test	0.860

Conversely, Independent-Sample Kruskal Wallis tests conducted on the academic year, family income, monthly internet cost, type of internet connection, and monthly expenditure yielded p-values (0.340, 0.060, 0.646, 0.444, 0.860) that were notably higher than the significance level (0.05). As a result, it can be concluded that the satisfaction levels of undergraduates remain consistent across the categories associated with each of these variables.

Table 7: Relationship between Independent Variables and Undergraduates' Satisfaction

Variable	Pearson Chi-Square	Likelihood Ratio	df	p-value	CoC
Gender	7.534	-	4	0.110	0.145
Province	-	36.169	28	0.138	0.281
Academic Year	19.919	-	12,	0.069	0.232
Monthly Income	-	21.545	16	0.159	0.233
Internet Connection	-	17.834	12	0.121	0.221
Type of Connection	-	8.093	8	0.424	0.148
Packages	83.717	-	16	0.000	0.439
Services	-	87.610	16	0.000	0.459
Technology	-	208.362	16	0.000	0.626

To investigate the correlation between independent variables represented by indicators for services and technology, and the indicators for undergraduates' satisfaction, the analysis was split into five segments using the methodology outlined by Jeong and Lee (2016). If 20% of the anticipated value was greater than 5, the Pearson Chi-Square analysis was employed; if less than 5, the Likelihood ratio analysis was used. The outcomes of the Chi-square analysis revealed that the p-values for independent variables such as gender, province, academic year, monthly income, internet connection, and type of connection exceeded the significance threshold (0.05). This suggests that no substantial correlation exists between these independent variables and undergraduates' satisfaction. On the contrary, independent variables including packages, services, and technology yielded p-values below the significance level (0.05), indicating a pronounced connection between these variables and undergraduates' satisfaction. The coefficient of contingency values for packages, services, and technology (0.439, 0.459, 0.626) elucidate that packages, services, and technology contribute to 43.9%, 45.9%, and 62.6% of undergraduates' satisfaction, respectively.

Moreover, in terms of satisfaction with the fairness of the packages, 44% of respondents expressed moderate contentment on the Likert scale. Meanwhile, 45.7% believed that the company offered a reasonable assortment of applications (e.g., WhatsApp, Zoom, Facebook) for the price paid for the packages. Conversely, 26% felt that this was not the case. Neutrality was observed among 28.3% of individuals. As for their Internet service providers, 23.7% were satisfied, considering that they receive a fair range of applications for their Internet service fee, while 3.9% disagreed.

Analyzing the Likert scale responses for services, 46.3% of participants concurred with the statements, while 19% expressed disagreement. About 34% held a neutral stance, with 8.7% voicing dissatisfaction and disagreement. Interestingly, 3.2% of those dissatisfied actually agreed with the statement, and 2.6% of the content respondents disagreed. A noteworthy 25.4% concurred.

Turning to technology-related statements, the Likert scale revealed that 38.3% of participants were in agreement, whereas 29.7% expressed disagreement. A sizable 32% maintained a neutral viewpoint. Among those who agreed, 26.9% also expressed satisfaction. Curiously, of those in agreement, only 1.1% were dissatisfied. The dissatisfaction rate was 14.9%, while 1.8% disagreed despite being content. A central aim of this study was to discern the connection between undergraduates' satisfaction

with ISP and variables encompassing demographics, services, technology, and packages. The chi-square analysis effectively confirmed a noteworthy link between services, technology, and packages, and the levels of undergraduates' satisfaction. Subsequently, a binary logistic regression analysis was executed to explore this variable in greater detail. To construct a prediction model, logistic regression was performed. The model's goodness of fit was assessed using the Hosmer-Lemeshow test, and likelihood ratio tests were employed. The Cox & Snell R Square and Nagelkerke R Square values indicated the model's explanatory power, with technology and certain package variables emerging as significant predictors of undergraduates' satisfaction.

The fitted model of the undergraduates' satisfaction with ISP is:

$$\log\left(\frac{\mathrm{p}}{1-\mathrm{p}}\right) = -4.797 + 0.018_{\text{Services}} + 0.70_{\text{Technology}} - 1.626_{\text{Package (1)}} - 2.116_{\text{Package (2)}}$$

In summary, the study assessed the reliability and validity of variables, described sample characteristics and distribution patterns, explored associations, and constructed a prediction model using logistic regression. The results provided insights into factors influencing undergraduates' satisfaction with their internet service providers.

4. Conclusions

The findings of the study revealed several important insights. Since there was no response from the Northern Province, the survey focused on all other provinces. The majority of participants were female students from the Western Province, with a monthly family income of less than 39,999. Most respondents used Dialog as their internet service provider and relied heavily on Work & Learn Data Packages, likely due to the shift to online learning during the pandemic. Regarding satisfaction levels, the study found that overall satisfaction did not follow a normal distribution. While the skewness and kurtosis were negative, suggesting moderate satisfaction, a significant difference in satisfaction was observed between males and females. The analysis explored various factors influencing satisfaction. The study indicated that gender, province, academic year, family income, and internet connection did not significantly affect satisfaction. However, packages, services, and technology showed a significant association with undergraduates' satisfaction. The binary logistic regression model predicted undergraduates' satisfaction based on services, technology, and specific package variables. It was evident that services and technology positively influenced satisfaction, while increased package costs led to decreased satisfaction.

Based on these findings, the study provided several suggestions for Internet Service Providers to enhance customer satisfaction. These suggestions included offering fast, robust, and affordable services, eliminating the division of peak and off-peak times, improving speed, bandwidth, signal strength, introducing new packages, providing more data, enhancing customer service and technical support, and expanding coverage through the establishment of new towers. The study also highlighted recommendations for future research. It suggested investigating why the effect of the services variable varied between chi-square analysis and logistic regression. Further research could explore whether demographic factors indeed impact customer satisfaction and examine different age groups across all districts. Additionally, the study recommended conducting a follow-up study once the country returns to normalcy, considering the potential impact of external factors like the pandemic on customer satisfaction. In terms of government

and broader implications, the study recommended the government establish regulations and policies to oversee and regulate the services provided by Internet providers. In summary, the study's findings shed light on the complex interplay of factors influencing undergraduates' satisfaction towards ISPs and offered valuable suggestions for improvement and future research directions.

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