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MALYSIAN COMMUNICATIONS AND MULTIMEDIA COMMISSION

BROADBAND QUALITY OF EXPERIENCE SURVEY 2021 (BQoES 2021)



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SECTION 1: EXECUTIVE SUMMARY

Broadband Quality of Experience Survey 2021 (BQoES 2021) was conducted by Malaysian Communications and Multimedia Commission (MCMC), with the objectives to explore the following:

1. To understand and measure consumer satisfaction level and expectation for broadband services;
2. To identify areas of improvement for broadband services; and
3. To continue monitoring and improving consumer needs and expectations for broadband services.

The survey focused on five (5) scopes relating to the following broadband services:

Figure 1: Five scopes on broadband services



Accordingly, the survey covered three services namely fixed-broadband fibre (FBB Fibre), fixed-broadband copper (FBB Copper) and mobile-broadband (MBB). Based on sampling methodology, the sample for this survey reached a total of 678 respondents for FBB Fibre consumers¹, 226 respondents for FBB Copper consumers² and 1,758 respondents for MBB consumers³. Survey fieldwork was conducted through MCMC secure online portal from April 2021 to November 2021.

¹ FBB Fibre consumers: Confidence level of 95% and precision of $\pm 6.52\%$

² FBB Copper consumers: Confidence level of 95% and precision of $\pm 6.52\%$

³ MBB consumers: Confidence level of 95% and precision of $\pm 5.73\%$

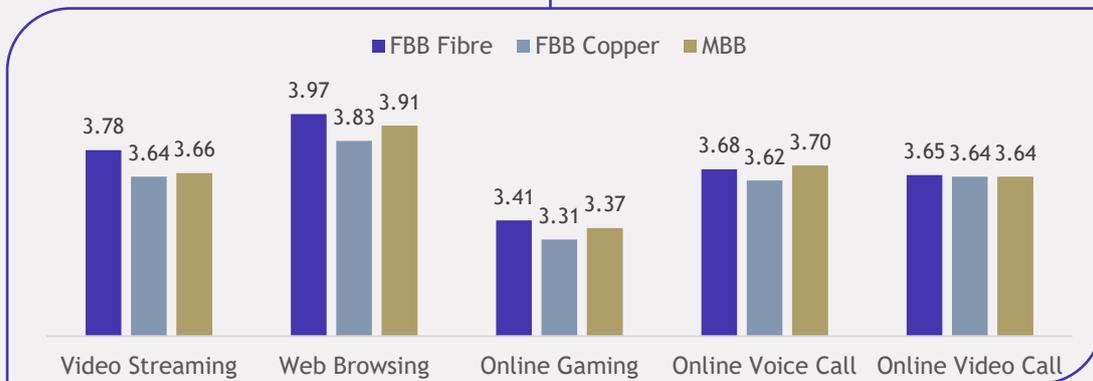
SECTION 2: MAIN HIGHLIGHTS

Highlights of Broadband Quality of Experience Survey 2021

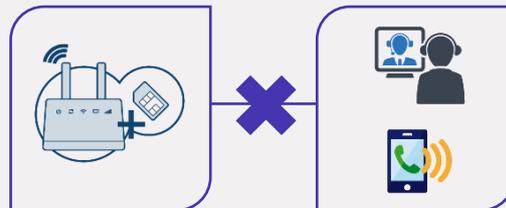
FBB Fibre consumers showed higher satisfaction level compared to FBB Copper and MBB consumers

| Overall Consumer Satisfaction Index Score | | |
|---|-------------|-------------|
| FBB Fibre | FBB Copper | MBB |
| 3.70 | 3.61 | 3.66 |

Web browsing scope topped the list for all broadband consumers



Online voice call and video call showed highest gap (0.66 to 0.81) between consumers' expectation and service provider performance for all broadband consumers



Areas to be improved by service providers for FBB Fibre, FBB Copper and MBB



SECTION 3: INTRODUCTION

SURVEY BACKGROUND

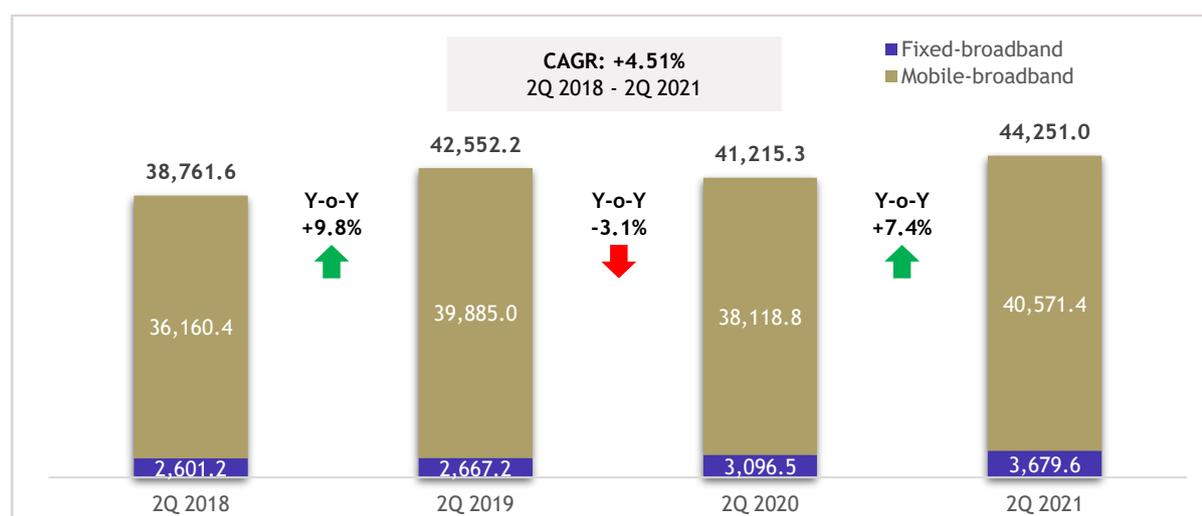
Jalinan Digital Negara (JENDELA) was launched by the government in August 2020 to enhance the digital infrastructure of the country. In line with this, the approach of Quality of Experience (QoE) was determined in the National Digital Infrastructure Lab (NDIL) to ensure service providers deliver the minimum broadband services expected to the Rakyat.

Accordingly, Broadband Quality of Experience 2021 (BQoES 2021) was launched in April 2021. The objectives of the survey are to understand and measure consumer satisfaction level and expectation for broadband services, identify areas of improvement for broadband services and continue monitoring as well as improving consumer needs and expectations for broadband services.

SIGNIFICANCE OF SURVEY

As at 2Q 2021, MCMC recorded 44.3 million broadband subscriptions from approximately 40 service providers which reflects an increase of 5.5 million from 2Q 2018 until 2Q 2021. The growing consumption of broadband services brings an extensive assortment of advantage, opportunities and challenges. In this competitive market, each service provider is putting their utmost effort to provide the best consumer experience. Hence, quality of experience is vital to meet expectations of consumers.

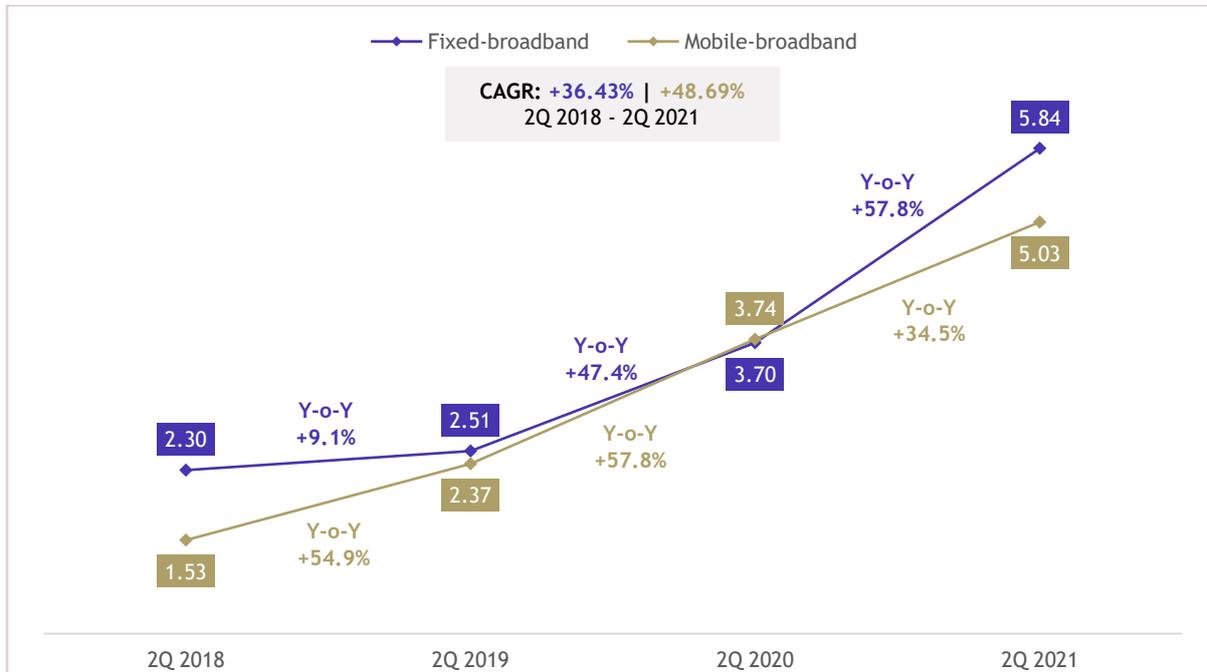
Figure 2: Broadband subscriptions ('000), 2Q 2018 - 2Q 2021



The Covid-19 pandemic has changed the behaviour trend of how users consume digital services to address the 'new normal'. Based on **Figure 3** below, it is evident that the pandemic has accelerated digital interaction among millions of broadband users in keeping many jobs, sectors and services

going. At the same time, demand for more bandwidth and higher quality of broadband services is rising to satisfy consumer behaviour shifts in consuming bandwidth-hungry Internet activities such as High-definition (HD) video streaming, online video calls and online gaming.

Figure 3: Broadband traffic (Exabyte), 2Q 2018 - 2Q 2021



Accordingly, the launch of BQoES 2021 is timely as an instrument in measuring consumers' expectation and satisfaction towards broadband quality in Malaysia. Furthermore, service providers also can have a better understanding on their consumers' expectations as well as to apply required course of actions in improving their services.

SECTION 4: METHODOLOGY

BQOES 2021 METHODOLOGY

The survey covered three types of consumers⁴, namely FBB Fibre, FBB Copper and MBB consumers. Eight service providers (SPs) were included in the survey as follows:

Table 1: List of service providers involved in BQoES 2021

| BROADBAND | SERVICE PROVIDER |
|-------------------------------------|--|
| Fixed-broadband Fibre (FBB Fibre) | Maxis Communications Berhad (Maxis FBB) |
| | Telekom Malaysia Berhad (TM Unifi) |
| | TT dotCom Sdn. Bhd. (TIME) |
| Fixed-broadband Copper (FBB Copper) | Telekom Malaysia Berhad (TM) |
| Mobile-broadband (MBB) | Celcom Axiata Berhad (Celcom) |
| | DiGi Telecommunications Sdn. Bhd. (DiGi) |
| | Maxis Broadband Sdn. Bhd. (Maxis MBB) |
| | U Mobile Sdn. Bhd. (U Mobile) |
| | Webe Digital Sdn. Bhd. (Unifi Mobile) |
| | YTL Communications Sdn. Bhd. (YTLC) |

The questionnaire was distributed to respondents via link that can be accessed from multiple online platforms such as smartphone, Internet-enabled feature phone, desktop, laptop and tablet. The respondents were reached through various methods as follows:

1. Dissemination of survey link and QR code on MCMC website and social media as well as service providers' website;
2. Leveraging representative from all Pusat Ekonomi Digital Keluarga Malaysia (PEDi) in Malaysia as an interviewer; and
3. Dissemination of survey link to consumers by service providers via SMS, e-mail and mobile apps push notification.

The survey adopted confidence level of 95% with precision level of $\pm 6.52\%$ for fixed-broadband service reaching a total of 678 respondents for FBB Fibre and 226 respondents for FBB Copper. Meanwhile for mobile-broadband service, the survey adopted confidence level of 95% with precision level of $\pm 5.73\%$ reaching a total of 1,758 consumers.

Fieldwork for BQoES 2021 started on 22 April 2021 and ended on 30 November 2021.

⁴ For this survey, BQoES 2021 consumers defined as respondents who used broadband services in the past 6 months

METHOD OF DATA ANALYSIS

Scope of survey

BQoES 2021 focused on five (5) scopes⁵ on broadband services. Inputs, suggestion and comments from relevant internal and external stakeholders were considered during the process of identifying the scopes and development of questionnaires. **Table 2** below depicted list of scopes and related questions in the survey.

Table 2: List of scopes and questions in BQoES 2021

| NO | SCOPE | QUESTION |
|----|-------------------|--|
| 1 | Video Streaming | 1. Name of video streaming service mostly used |
| | | 2. Level of importance |
| | | 3. Level of satisfaction |
| 2 | Web Browsing | 1. Name of website mostly visited |
| | | 2. Name of web browser mostly used |
| | | 3. Level of importance |
| | | 4. Level of satisfaction |
| 3 | Online Gaming | 1. Name of online game mostly played |
| | | 2. Name of device mostly used for online gaming |
| | | 3. Level of importance |
| | | 4. Level of satisfaction |
| 4 | Online Voice Call | 1. Name of application mostly used for online voice call |
| | | 2. Level of importance |
| | | 3. Level of satisfaction |
| 5 | Online Video Call | 1. Name of application mostly used for online video call |
| | | 2. Level of importance |
| | | 3. Level of satisfaction |

The scopes were evaluated according to consumers' perceptions on their expectation and performance of broadband providers, by using 5-point Likert scale. Consumers' expectation was measured based on their level of importance towards broadband services, while broadband providers' performance was based on their level of satisfaction. **Table 3** below illustrated the measurement.

Table 3: 5-point Likert scale

| RATING SCALE | EXPECTATION | PERFORMANCE |
|--------------|-------------------------|------------------------|
| 5 | Extremely important | Extremely satisfied |
| 4 | Somewhat important | Somewhat satisfied |
| 3 | Neutral | Neutral |
| 2 | Somewhat not important | Somewhat dissatisfied |
| 1 | Extremely not important | Extremely dissatisfied |

⁵ Selection of criteria was based on the discussion and final report of the National Digital Infrastructure Lab (NDIL) published by MCMC

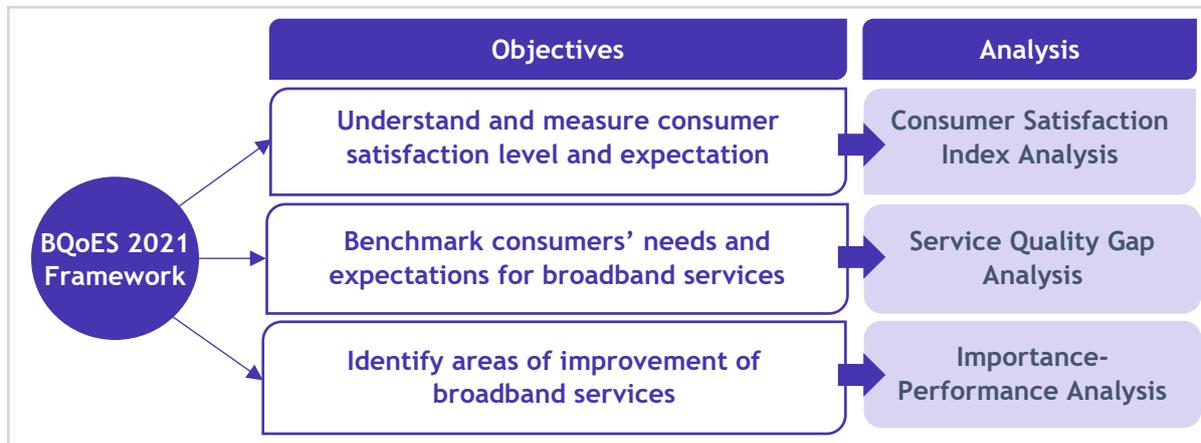
Additionally, the survey also asked questions relating to demographic profiles of broadband consumers as follows:

| | | |
|----------------|---------------|---------------------------|
| 1. Age | 4. State | 7. Income |
| 2. Nationality | 5. Occupation | 8. Device frequently used |
| 3. Gender | 6. Ethnicity | |

Survey Framework

In line with the objective of BQoES 2021, framework of the survey was developed based on three analyses as shown in **Figure 4** below:

Figure 4: Survey objectives and the correspondence analysis



i. Consumer Satisfaction Index

Over decades, consumer satisfaction has been offered several definitions. Several literatures mentioned that consumer satisfaction can be defined as judgment, impression, response, or evaluation based on the product or services received by them.

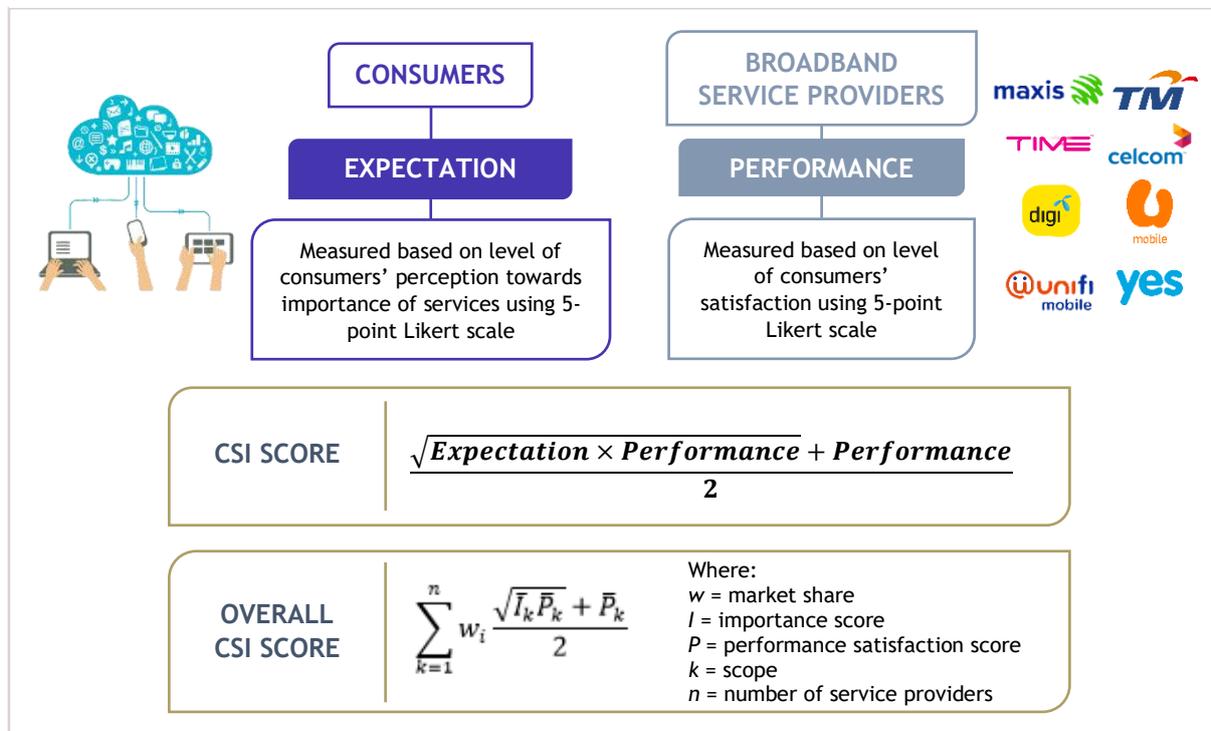
For instance, Anderson et al. (1994)⁶ suggested consumer satisfaction could be defined in two different ways depending on the consumer experiences, which are specific experiences and cumulative experiences. During specific experience, consumer satisfaction is defined as the post-choice evaluative judgement of a specific purchase occasion. Meanwhile, for cumulative experience, consumer satisfaction is determined by consumers' evaluation of his or her total purchase and consumption experience over time.

⁶ Anderson, E. W., Fornell, C., & Lehmann, D. R. (1994). Customer satisfaction, market share, and profitability: Findings from Sweden. *Journal of marketing*, 58(3), 53-66.

However, focusing on satisfaction solely is not sufficient, as understanding the requirements or expectations from consumers need to be considered as well. In today's highly competitive market, where all service providers have equal opportunities to provide services, it is essential for them to measure themselves on their ability to meet beyond customers' expectations. According to Gitomer, J. (1998)⁷, he stated that satisfaction is the consumer's assessment of a product or service in terms of the extent to which that product or service has met his/her needs or expectations.

Therefore, BQoES 2021 evaluated Consumer Satisfaction Index (CSI) based on the consumers' experience on the performance of broadband service providers and their expectation. Further, market share of each broadband service provider will be imposed as a final weightage to the individual service provider's CSI score to compute the overall CSI score⁸, as shown in **Figure 5** below:

Figure 5: Consumer Satisfaction Index (CSI) model for BQoES 2021



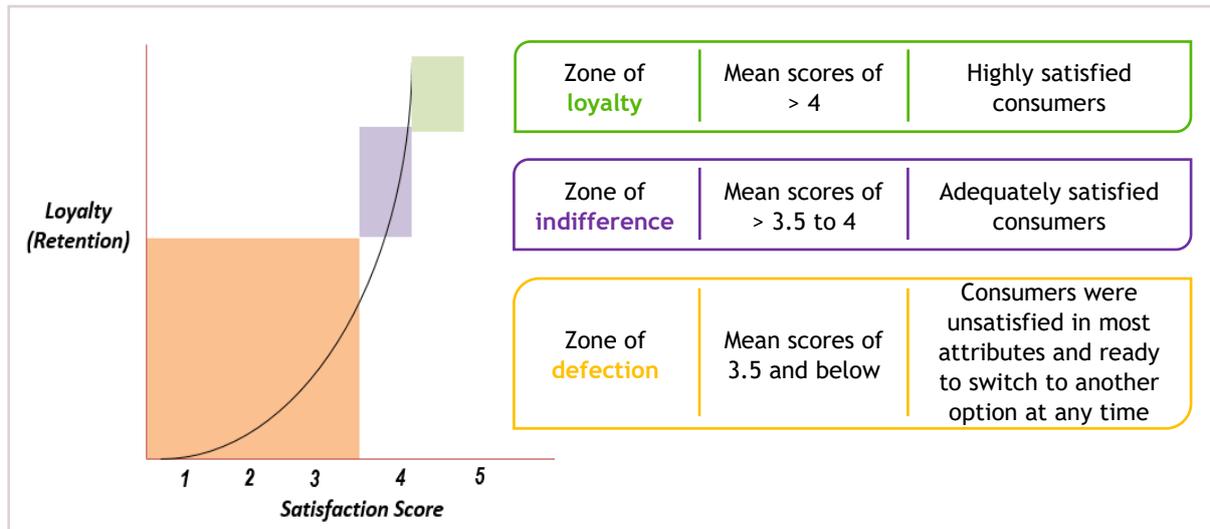
Accordingly, the interpretation of the CSI score is based on relationship between loyalty and satisfaction as described in the Profit Chain from Heskett et al. (1997). **Figure 6** below illustrated the interpretation of the CSI scores⁹.

⁷ Gitomer, J. (1998). *Customer satisfaction is worthless, customer loyalty is priceless: How to make customers love you, keep them coming back, and tell everyone they know*. Austin, TX: Bard Press

⁸ Source of CSI Model from MCMC Consumer Satisfaction Survey (2011 - 2017)

⁹ Interpretation of the CSI score based on the relationship between loyalty and satisfaction as described in the Profit Chain from Heskett, J., W. E. Sasser Jr., and L. Schlesinger. *The Service Profit Chain: How Leading Companies Link Profit and Growth to Loyalty, Satisfaction, and Value*. New York: Free Press, 1997

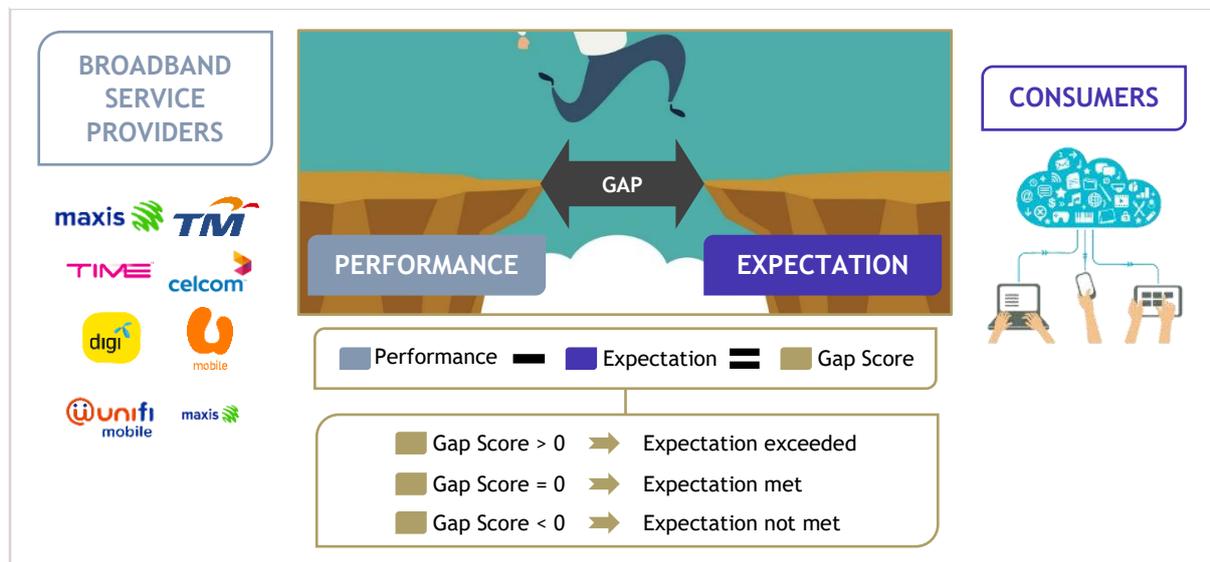
Figure 6: BQoES 2021 CSI scores and the correspondence interpretation



ii. Service Quality Gap Analysis

Service quality gap analysis was conducted to explore whether the performance of the broadband service providers meets consumers’ expectations. Adapted from Parasuraman et al. (1985), service quality gap analysis conducted by assessing the mean difference of the performance and expectation score. **Figure 7** illustrated the computation of the SQG analysis.

Figure 7: BQoES 2021 Service Quality Gap (SQG) model

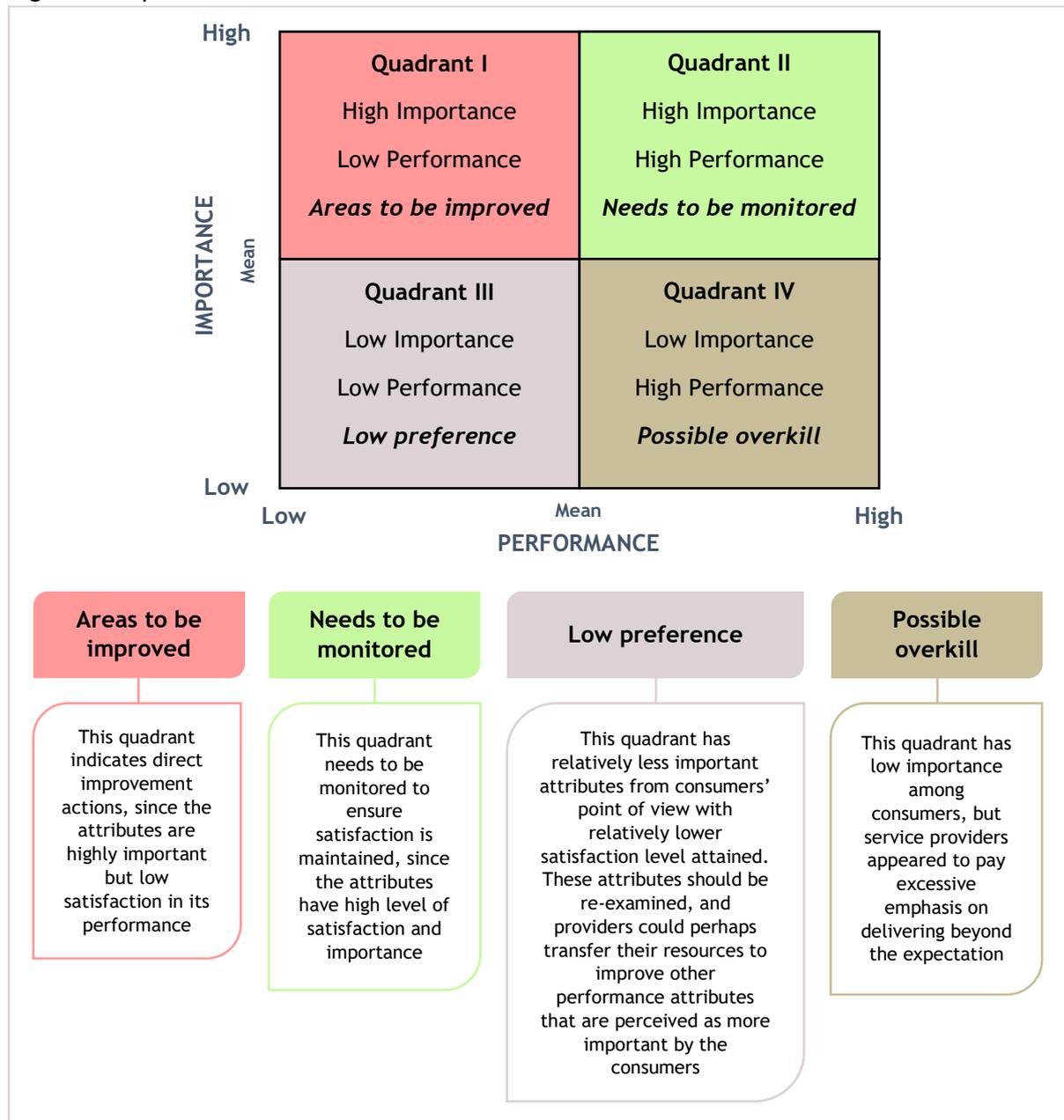


iii. Importance-Performance Matrix

Further, the Importance-Performance Matrix Analysis was carried out to identify the high-performing scopes as the strength of the service providers as well as the low performing scopes that required intervention for improvement.

Developed by Martilla and James (1977), Importance-performance analysis (IPA) identifies the relative importance (expectation) of the attributes associated with a service or product while at the same time indicating the degree of performance (satisfaction). The results are plotted graphically on a two-dimensional grid, in which the performance of the attribute is displayed on the horizontal axis while the importance level is displayed on the vertical axis. **Figure 8** illustrated details of IPA.

Figure 8: Importance-Performance Matrix



SECTION 5: MAIN FINDINGS

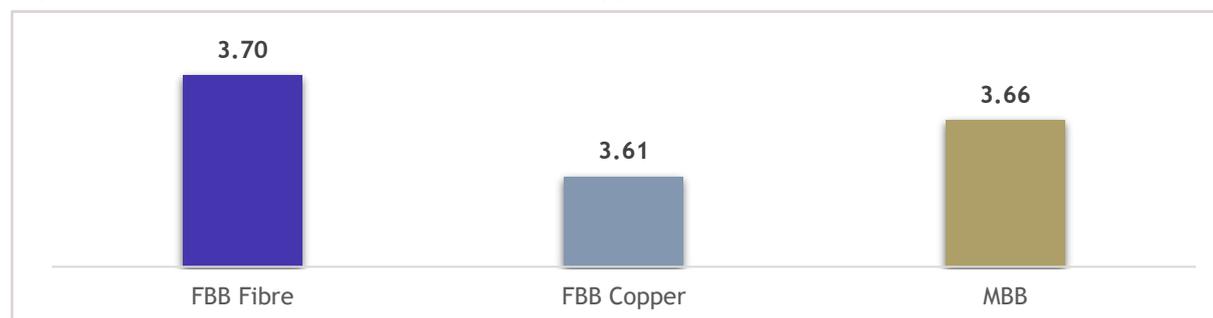
This section consists of six key findings as follows:

1. Overall CSI Score for FBB Fibre, FBB Copper and MBB consumers
2. FBB Fibre Consumers:
 - a. CSI Score by Scope
 - b. Service Quality Gap Analysis
 - c. Importance-Performance Analysis
3. FBB Copper Consumers:
 - a. CSI Score by Scope
 - b. Service Quality Gap Analysis
 - c. Importance-Performance Analysis
4. MBB Consumers:
 - a. CSI Score by Scope
 - b. Service Quality Gap Analysis
 - c. Importance-Performance Analysis
5. Broadband Consumer Consumption Pattern by Service
6. Demographic Profile for FBB Fibre, FBB Copper and MBB consumers

OVERALL CSI SCORE FOR FBB FIBRE, FBB COPPER AND MBB CONSUMERS

BQoES 2021 found that overall CSI score for FBB Fibre, FBB Copper and MBB consumers were at 3.70, 3.61 and 3.66, respectively. This reflects FBB Fibre consumers experienced higher satisfaction level compared to FBB Copper and MBB consumers. In summary, broadband consumers were adequately satisfied with their broadband service.

Figure 9: Overall CSI score for FBB Fibre, FBB Copper and MBB consumers

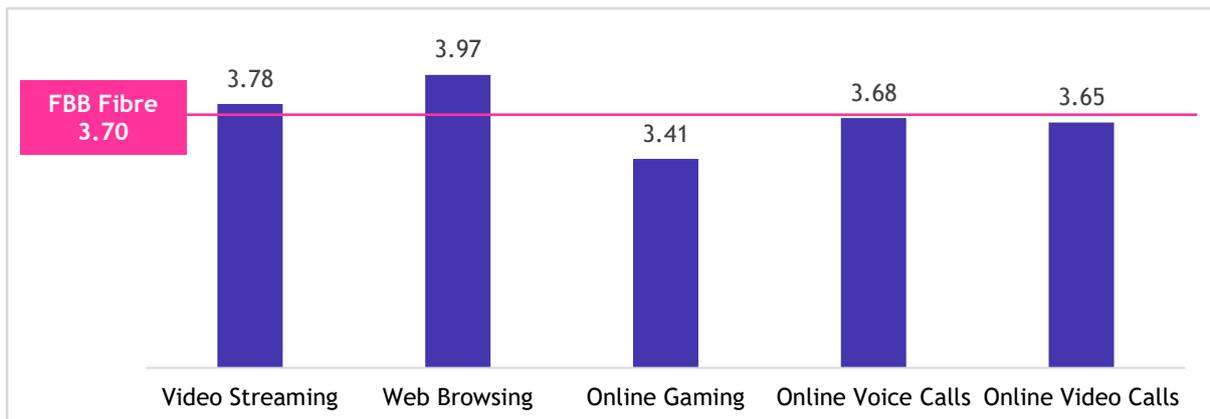


FBB FIBRE CONSUMERS

CSI Score by Scope

Overall, the consumers were adequately satisfied with their experience while using fibre based FBB services, with CSI score of 3.70. As illustrated in **Figure 10**, Web Browsing topped the list with score of 3.97, followed by Video Streaming (3.78) and Online Voice Calls (3.68). Online Gaming was the only scope where FBB Fibre consumers were unsatisfied (3.41).

Figure 10: CSI Score by Scope for FBB Fibre

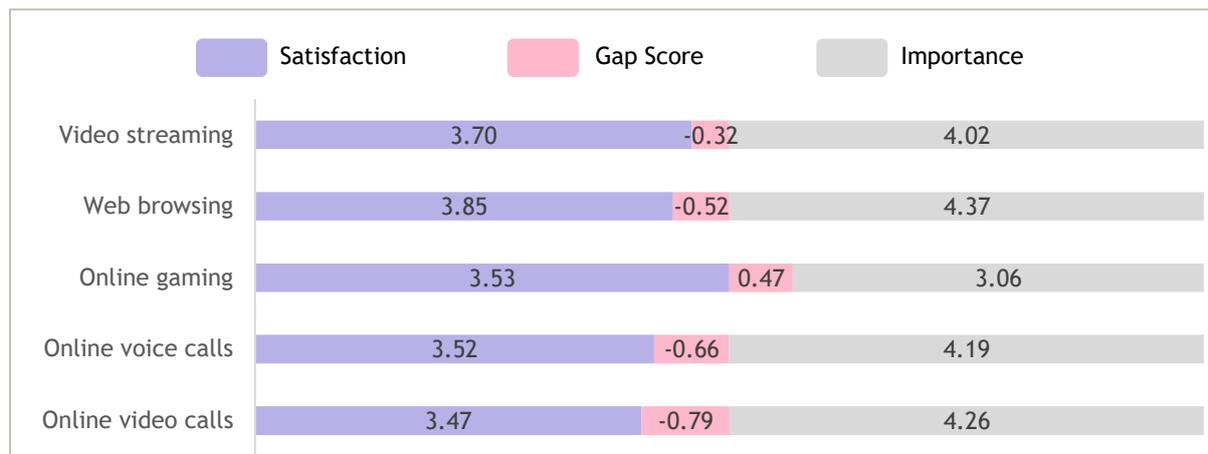


Service Quality Gap Analysis

Further, SQG Analysis was conducted to monitor consumers' expectations and satisfaction. Addressing these identified shortfalls is the foundation for planning strategies to ensure customer experiences are consistent with their expectations and thus increasing the probability of satisfaction.

Result showed gap score for four out of five scopes scored below 0 for FBB Fibre consumers. This indicates consumers' expectations were not met for these four scopes. On the other hand, Online Gaming experience exceeded consumers' expectations. **Figure 11** illustrates the gap scores for FBB Fibre consumers.

Figure 11: Service Quality Gap (SQG) Analysis for FBB Fibre

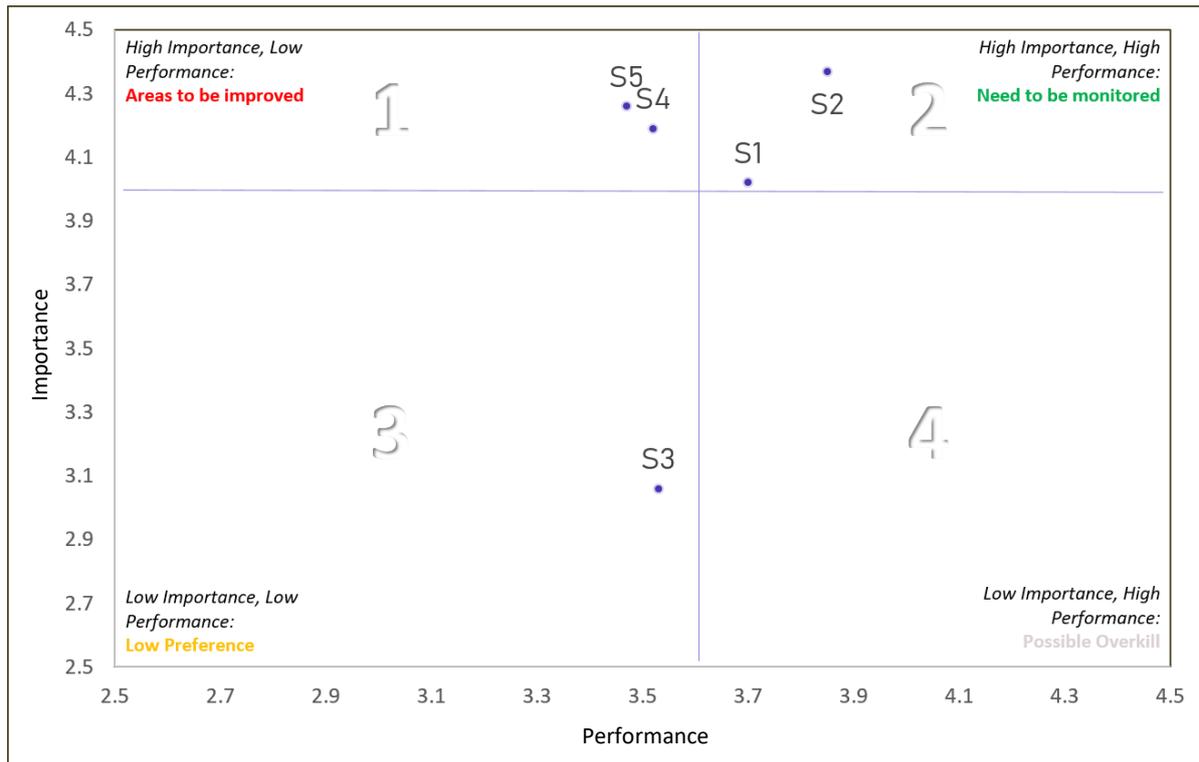


Importance-Performance Analysis

Overall, results showed that the mean importance and the mean performance were 3.98 and 3.61, respectively. These reflect FBB Fibre consumers have high expectation towards service providers and several scopes showed adequate performance.

Based on the four quadrants, Online Voice Calls and Online Video Calls were identified as areas to be improved. It was also determined that Online Gaming was positioned in Quadrant III (Low Preference). Subsequently, Video Streaming and Web Browsing need to be monitored to ensure sustainability in quality of experience.

Figure 12: Importance-Performance Analysis for FBB Fibre¹⁰

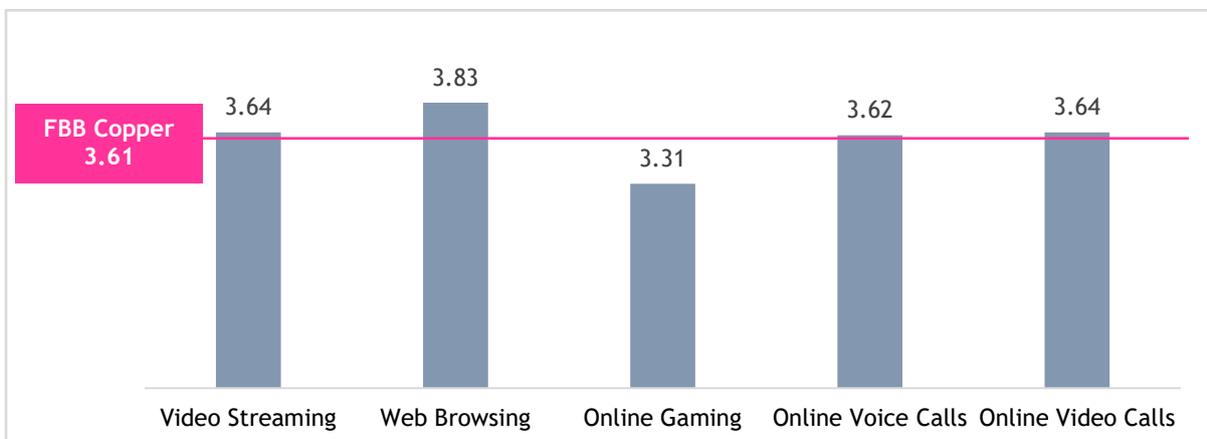


FBB COPPER CONSUMERS

CSI Score by Scope

Overall, FBB Copper consumers were adequately satisfied with their experience, with CSI score of 3.61. As illustrated in **Figure 13**, Web Browsing topped the list with score of 3.83, followed by Online Video Calls (3.64) and Video Streaming (3.64). Online Gaming was the only scope where FBB Copper consumers were unsatisfied (3.31).

Figure 13: CSI Score for FBB Copper

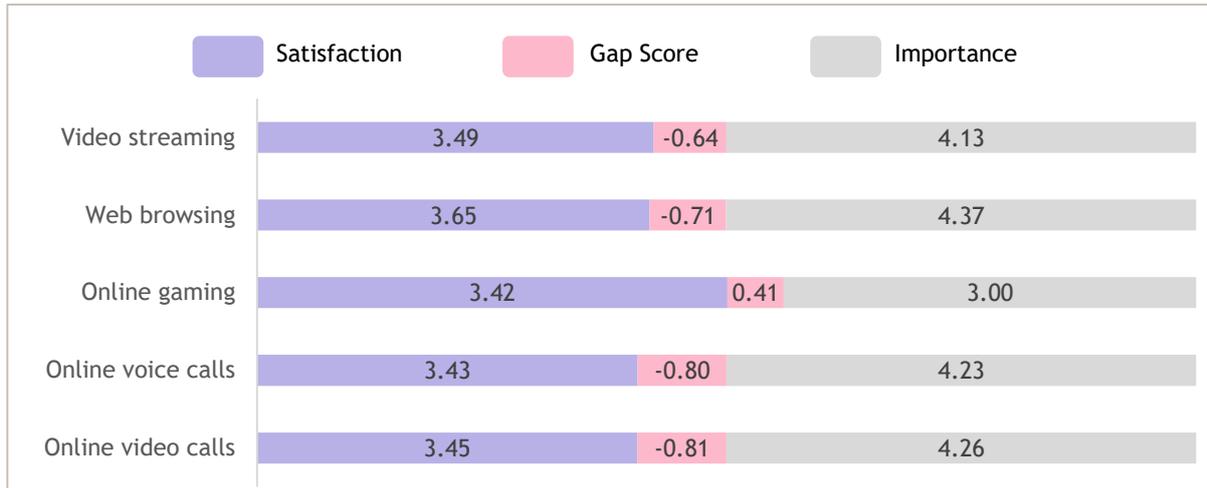


¹⁰ S1 = Video Streaming. S2 = Web Browsing. S3 = Online Gaming. S4 = Online Voice Calls. S5 = Online Video Calls.

Service Quality Gap (SQG) Analysis

Like FBB Fibre, SQG analysis for FBB Copper also showed a gap score for four out of five scopes is less than 0. This also indicates consumers' expectations were not met for these four scopes with only Online Gaming experience exceeded consumers' expectations.

Figure 14: Service Quality Gap (SQG) Analysis for FBB Copper consumers

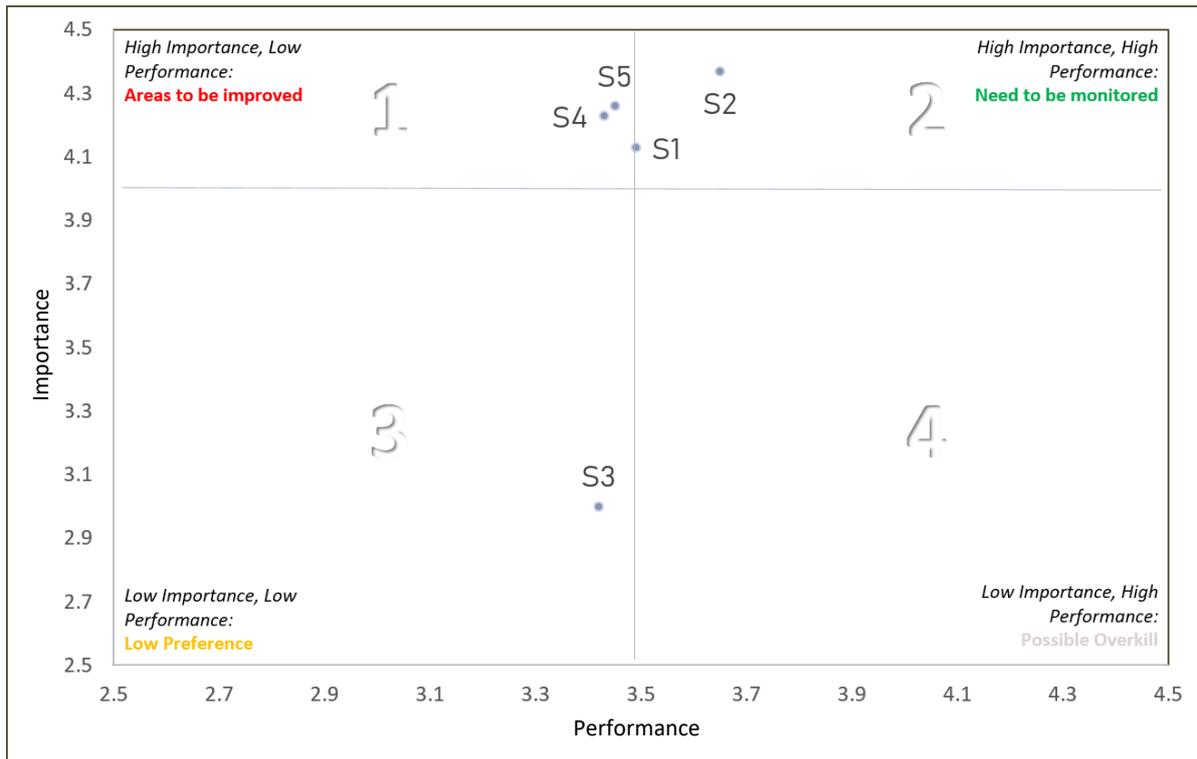


Importance-Performance Analysis (IPA)

The survey showed that the mean importance and the mean performance for FBB Copper consumers were 4.00 and 3.49, respectively. These reflect FBB Copper consumers have high expectation towards this service and several scopes showed unsatisfactory performance.

Based on **Figure 15** below, Online Voice Calls and Online Video Calls were identified as areas to be improved for FBB Copper service. Like FBB Fibre, Online Gaming was deemed as Low Preference. Meanwhile, Video Streaming and Web Browsing need to be monitored to ensure sustainability in quality of experience.

Figure 15: Importance-Performance Analysis for FBB Copper¹¹

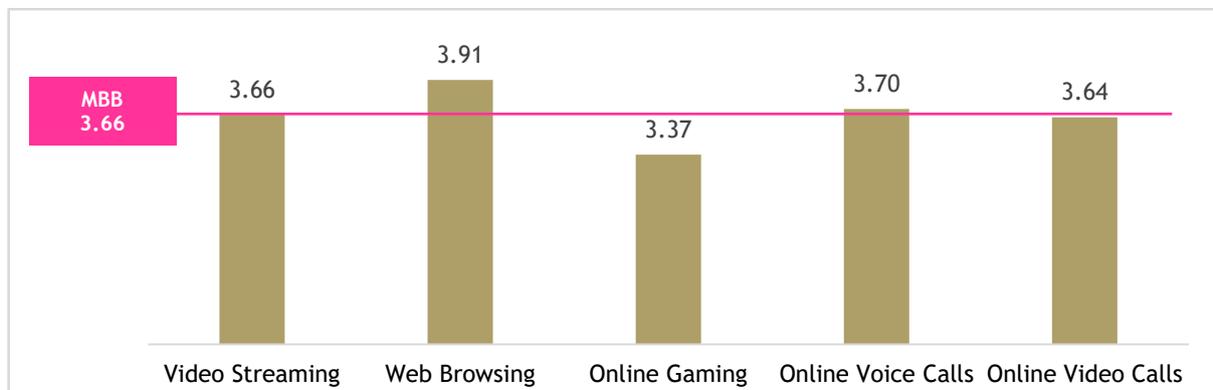


MBB CONSUMERS

CSI Score by Scope

MBB Consumers were also adequately satisfied with their experience, with CSI score of 3.66. Web Browsing topped the list with score of 3.91, followed by Online Voice Calls (3.70) and Video Streaming (3.66). Like other broadband experience, Online Gaming was the only scope where MBB consumers were unsatisfied (3.37).

Figure 16: CSI Score for MBB

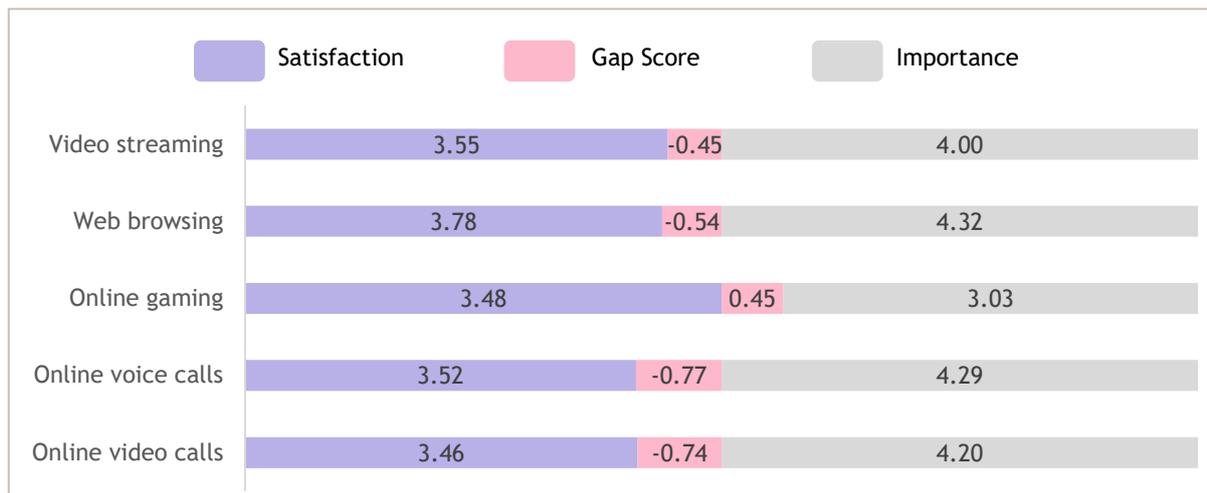


¹¹ S1 = Video Streaming. S2 = Web Browsing. S3 = Online Gaming. S4 = Online Voice Calls. S5 = Online Video Calls.

Service Quality Gap (SQG) Analysis

Apparently, the gap score for four out of five scopes scored below 0 for MBB consumers in the same way as both fixed-broadband services. Online Gaming experience was the only scope which exceeded consumers' expectations. **Figure 17** further illustrates the gap scores for MBB consumers.

Figure 17: Service Quality Gap (SQG) Analysis for MBB

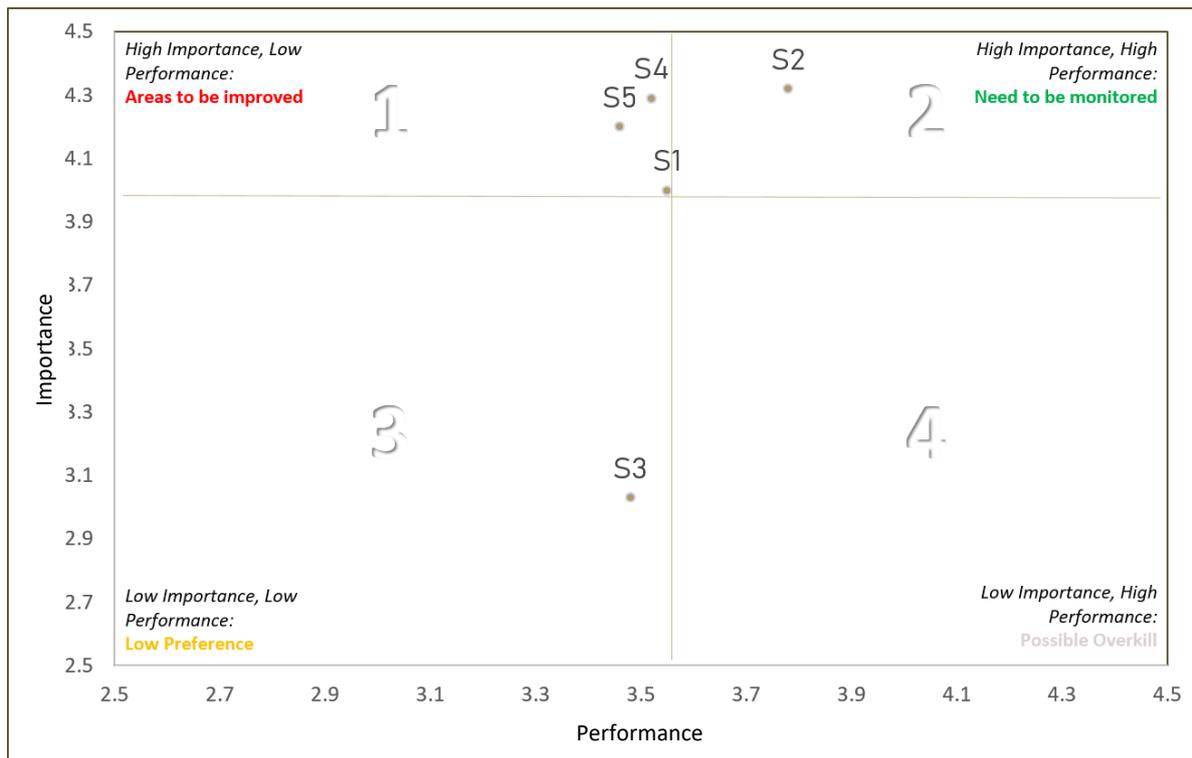


Importance-Performance Analysis (IPA)

The mean importance and the mean performance for MBB consumers were at 3.97 and 3.56, respectively. Like FBB, these reflect that consumers have high expectation towards their service providers as several scopes showed adequate performance.

Based on the IPA analysis, three scopes namely Video Streaming, Online Voice Calls and Online Video Calls were identified as areas to be improved. Online Gaming was also deemed as Low Preference by consumers while Web Browsing needs to be monitored by service providers.

Figure 18: Importance-Performance Analysis for MBB¹²

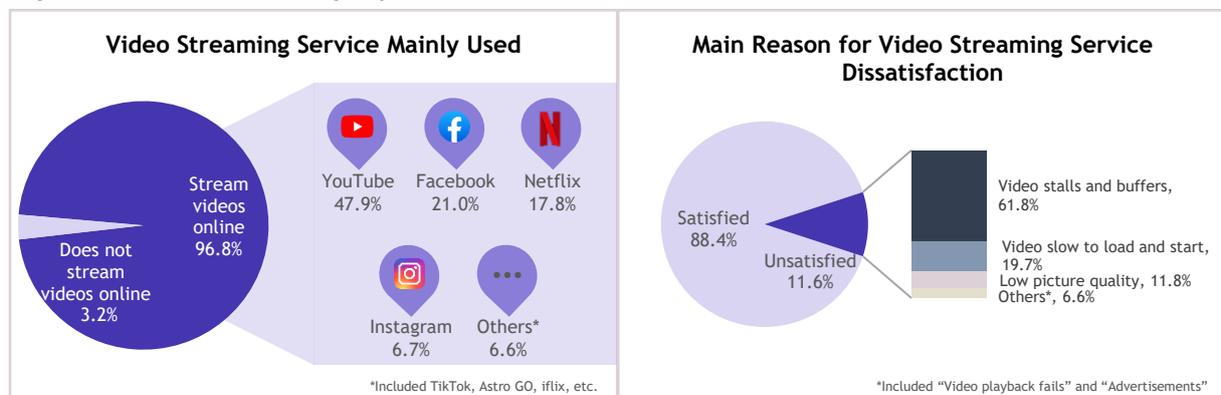


BROADBAND CONSUMER CONSUMPTION PATTERN BY SERVICE

FBB Fibre consumers

The survey further examined broadband consumer consumption in detail. On Video Streaming, results showed that majority of FBB Fibre consumers (96.8%) streamed videos online. Amongst them, almost half of the consumers (47.9%) used YouTube, followed by Facebook (21.0%) and Netflix (17.8%). However, 11.6% of these consumers mentioned that they were dissatisfied with their video streaming experience with 57.7% revealed “Video stalls and buffers” as the main cause.

Figure 19: Video Streaming experience of FBB Fibre consumers



¹² S1 = Video Streaming. S2 = Web Browsing. S3 = Online Gaming. S4 = Online Voice Calls. S5 = Online Video Calls.

As for Web Browsing, BQoES 2021 found that the most popular website used by FBB Fibre consumers was Google.com (77.6%) followed by Shopee.com (18.3%). Subsequently, the top web browser used by FBB Fibre consumers was Google Chrome (78.0%). Among them, only 5.2% were dissatisfied with their web browsing experience with almost half of them (48.6%) mentioned “Waiting for page to load” as the main reason for their dissatisfaction.

Figure 20: Web Browsing experience of FBB Fibre consumers

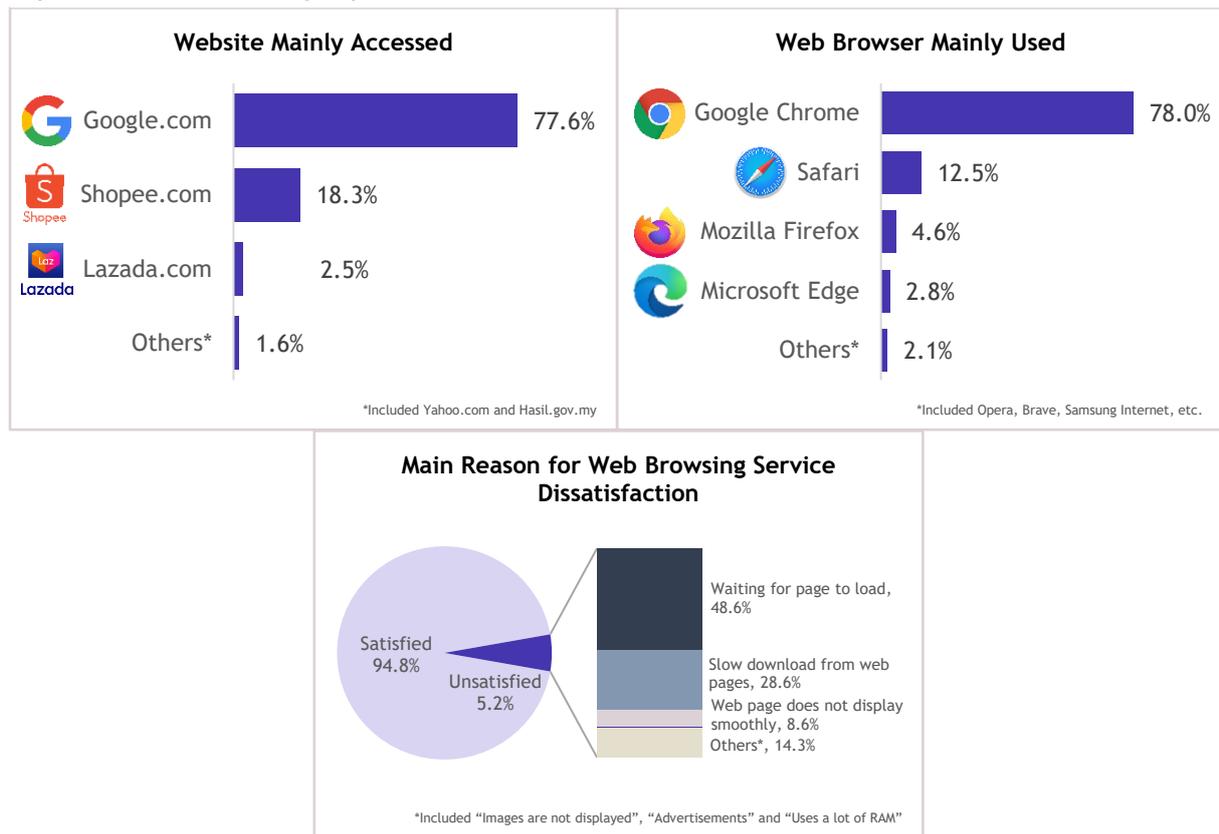
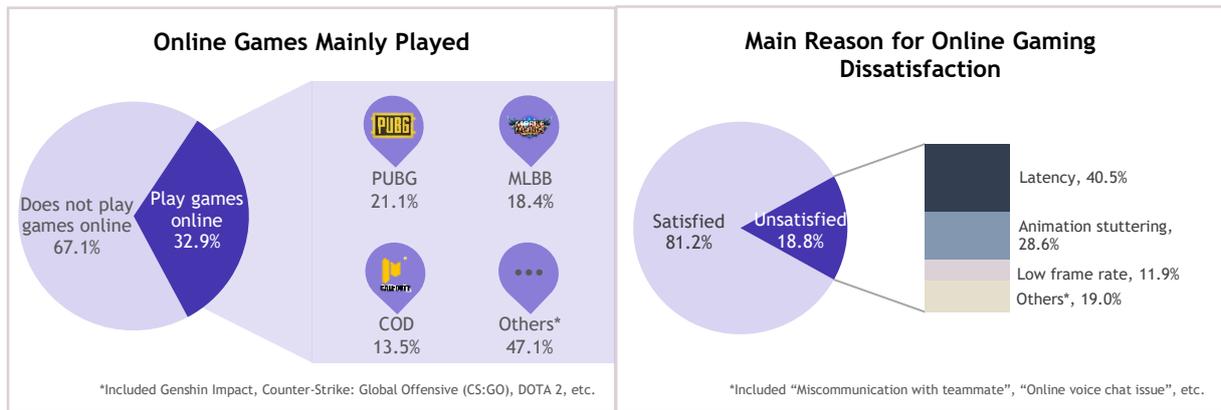


Figure 21 below showed further details regarding Online Gaming experience where almost a third of FBB Fibre consumers (32.9%) played games online. Within that group, the top three games played online were PlayerUnknown’s Battlegrounds/PUBG (21.1%), Mobile Legends: Bang Bang/MLBB (18.4%) and Call of Duty/COD (13.5%). As much as 18.8% of FBB Fibre consumers who played games online were dissatisfied with their experience where 40.5% of them cited “Latency¹³” as the main cause for their dissatisfaction.

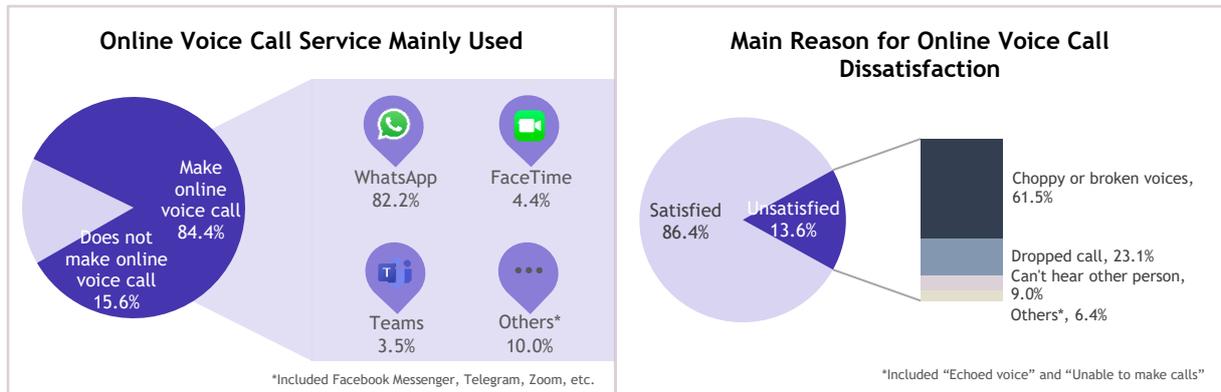
¹³ A delay between pressing buttons and seeing your actions happen on-screen

Figure 21: Online Gaming experience of FBB Fibre consumers



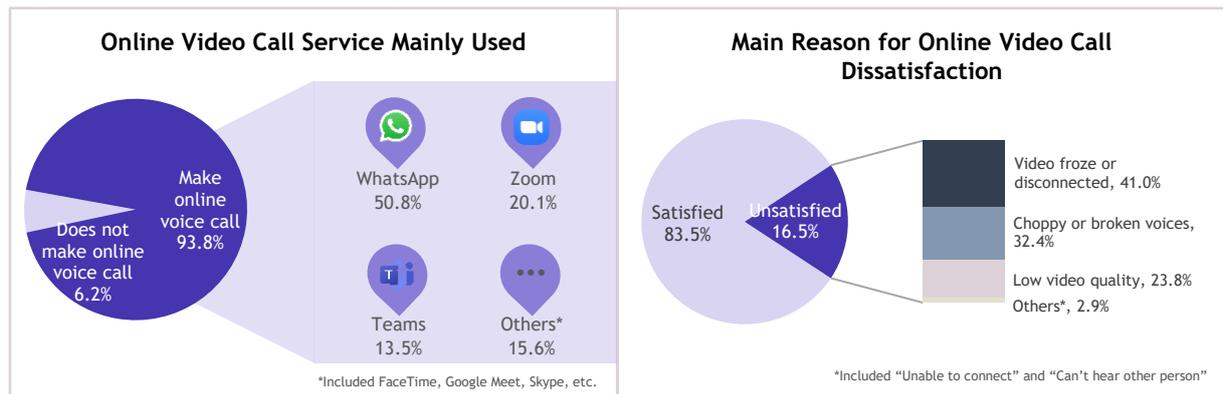
Regarding Online Voice Call, BQoES 2021 found that the most popular service used by FBB Fibre consumers who made online voice calls (84.4% out of all FBB Fibre consumers) was WhatsApp (82.2%), followed by FaceTime (4.4%). As for dissatisfaction, 13.6% of FBB Fibre consumers were dissatisfied with their online voice calls experience with 61.5% of them quoted "Choppy or broken voice" as the main reason for their dissatisfaction.

Figure 22: Online Voice Call experience of FBB Fibre consumers



The figure below displays Online Video Call experience by FBB Fibre consumers in detail. The survey found that out of the 93.8% of FBB Fibre consumers who made online video calls, WhatsApp was still the most popular service, albeit with a lower percentage distribution (50.8%). Out of those who were dissatisfied with their Online Video Call experience (16.5%), 41.0% of them quoted "Freezing or disconnected video" as the main reason for their dissatisfaction.

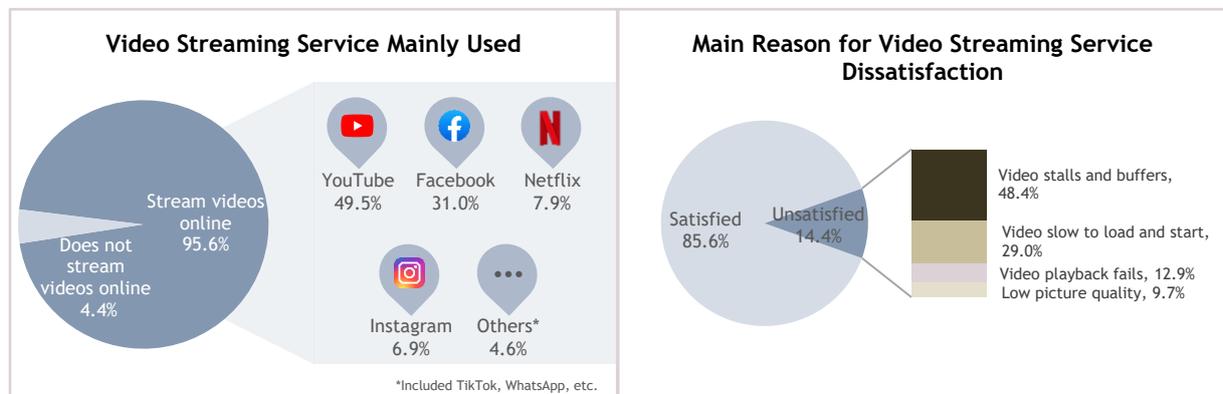
Figure 23: Online Video Call experience of FBB Fibre consumers



FBB Copper consumers

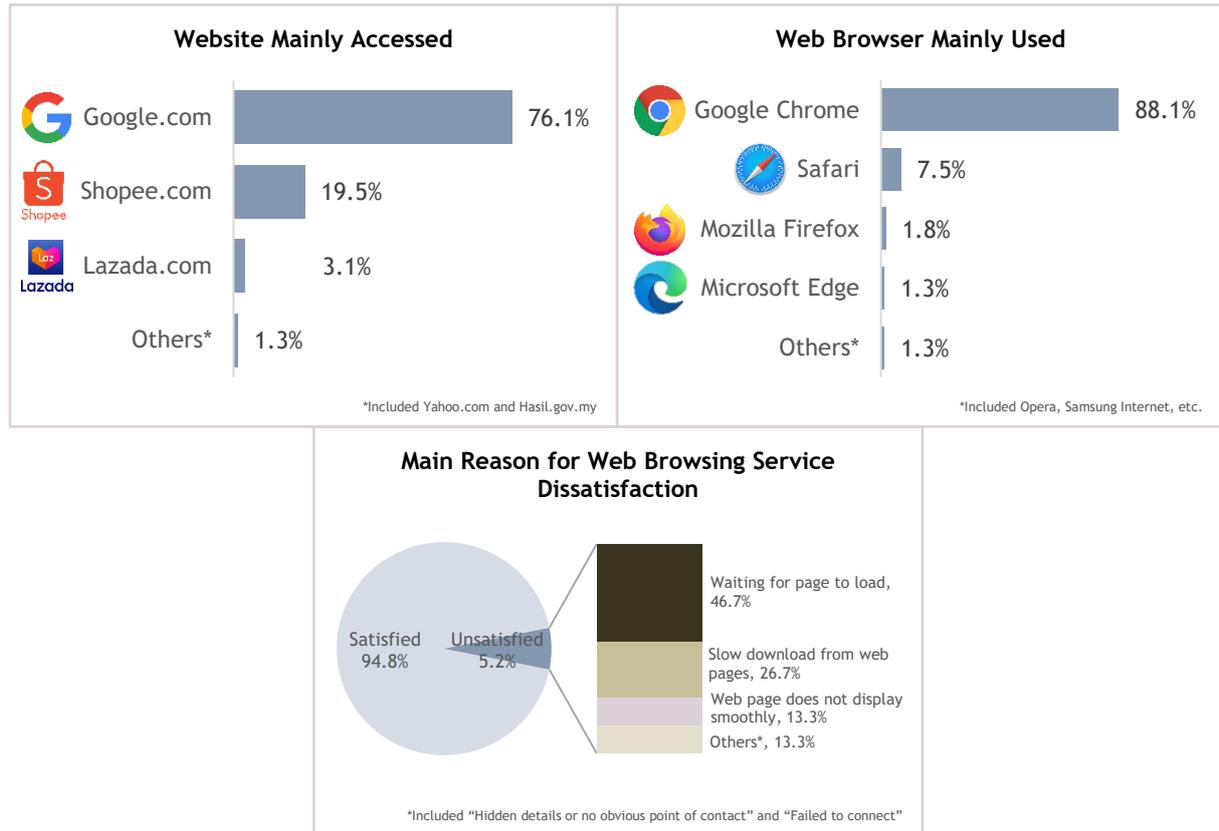
Although at a slightly lower percentage distribution than FBB Fibre consumers, most of FBB Copper consumers (95.6%) streamed and watched videos online. Out of those who streamed videos online, 49.5% consumed online video content via YouTube, followed by Facebook (31.0%) and Netflix (7.9%). For those who were dissatisfied with their Video Streaming experience (14.4%), “Video stalls and buffers” was the main reason of dissatisfaction cited, similar with FBB Fibre consumers.

Figure 24: Video Streaming experience of FBB Copper consumers



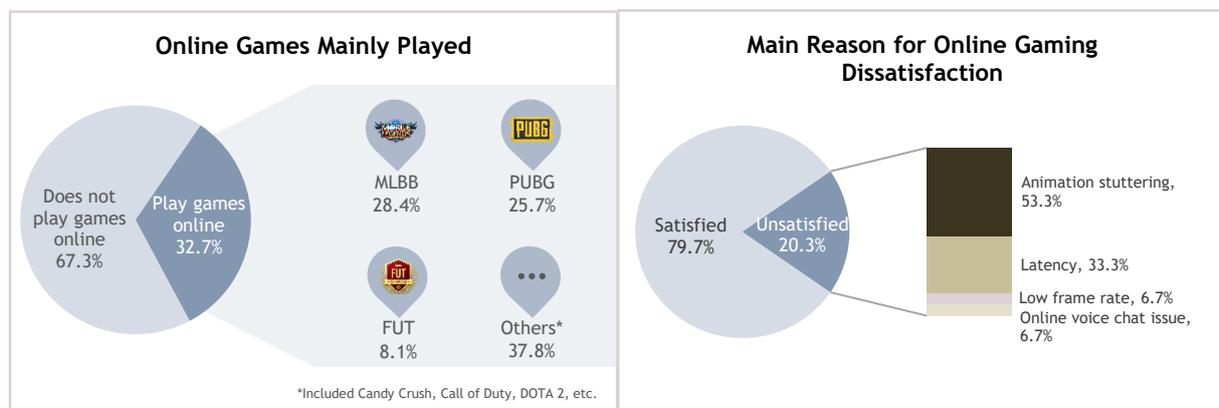
According to the survey findings, Google.com was the top website accessed by FBB Copper consumers (76.1%), followed by Shopee.com (19.5%). Meanwhile, Google Chrome was the most popular web browser used for web browsing activity (88.1%). Nonetheless, only a small group (6.6%) cited that they were not satisfied with the experience of browsing activity due to “Waiting for page to load” (Figure 25).

Figure 25: Web Browsing experience of FBB Copper consumers



With regards to Online Gaming experience, 32.7% of FBB Copper consumers played games online. Among them, the top three games played were Mobile Legends: Bang Bang/MLBB (28.4%), PlayerUnknown's Battlegrounds/PUBG (25.7%) and FIFA Ultimate Team/FUT (8.1%). As for dissatisfaction, 20.3% of FBB Copper consumers who played games online were dissatisfied with their experience where 53.3% of them cited "Animation stuttering" as the main cause of their dissatisfaction.

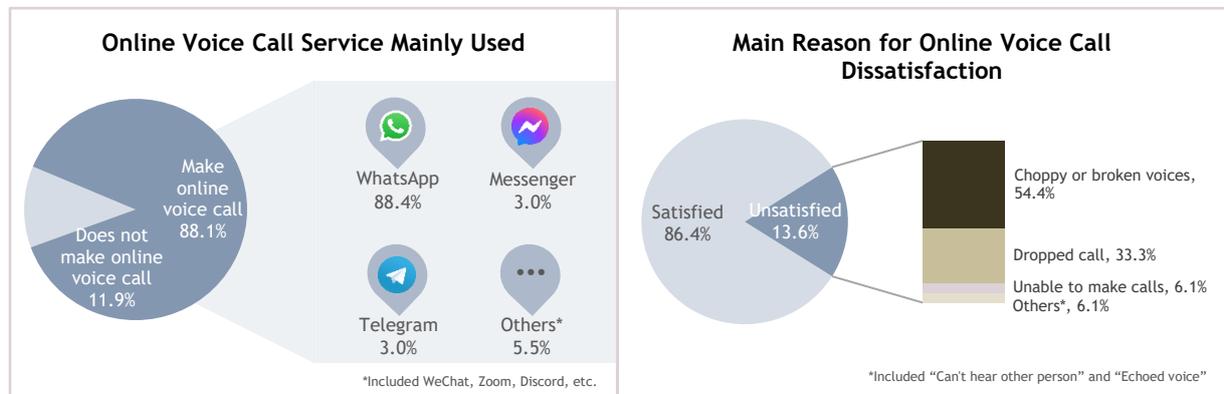
Figure 26: Online Gaming experience of FBB Copper consumers



BQoES 2021 recorded WhatsApp as the most popular service (88.4%) used by FBB Copper consumers who made online voice calls (88.1% out of all FBB Copper consumers). Among those who performed

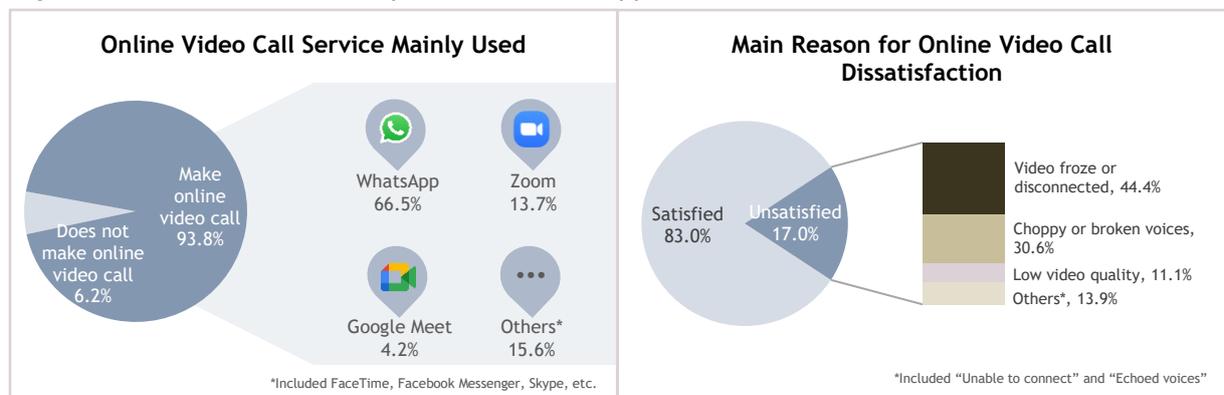
this activity, 83.4% were satisfied with their experience with 54.5% of them quoted “Choppy or broken voice” as the main reason for their dissatisfaction, followed by “Dropped call” (33.3%).

Figure 27: Online Voice Call experience of FBB Copper consumers



The survey also documented that 93.8% of FBB Copper consumers made online video calls, the same percentage distribution as FBB Fibre consumers. In terms of the service used, WhatsApp was still the most popular service (66.5%), followed by Zoom (13.7%). Among those who were dissatisfied with their Online Video Call experience (17.0%), 44.4% of them quoted “Freezing or disconnected video” as the main reason for their dissatisfaction.

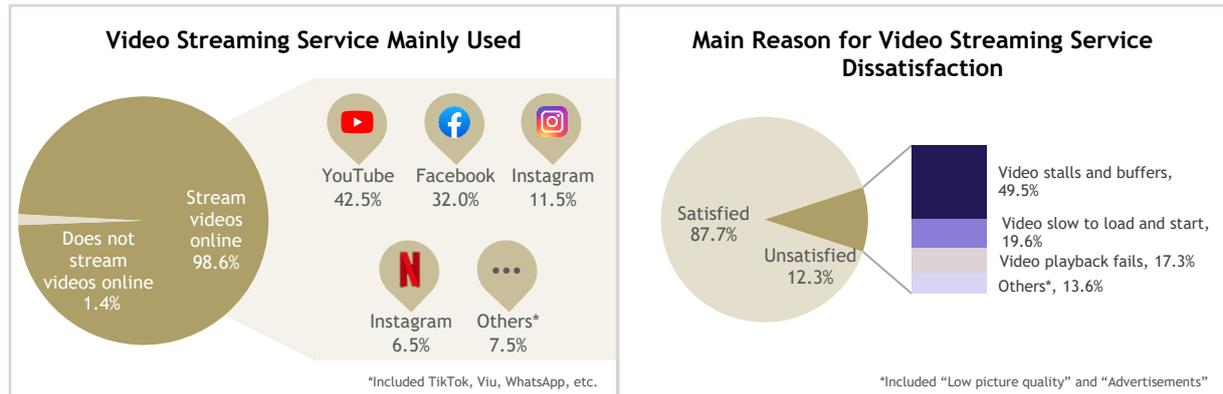
Figure 28: Online Video Call experience of FBB Copper consumers



MBB consumers

When we investigate MBB consumers, results showed that majority of them (98.6%) streamed videos online. Amongst them, 42.5% used YouTube, followed by Facebook (32.0%) and Instagram (11.5%). In terms of dissatisfaction, 12.3% of MBB consumers who streamed videos online were dissatisfied with their experience with 49.5% of them revealed “Video stalls and buffers” as the main cause for their dissatisfaction.

Figure 29: Video Streaming experience of MBB consumers



As for Web Browsing, BQoES 2021 found that the most popular website used by MBB consumers was Google.com (73.4%), followed by Shopee.com (24.6%). Subsequently, the top web browser used by MBB consumers was Google Chrome (85.8%). In terms on dissatisfaction, 6.9% of MBB consumers were dissatisfied with their web browsing experience with 37.2% of them mentioned “Waiting for page to load” as the main reason for their dissatisfaction.

Figure 30: Web Browsing experience of MBB consumers

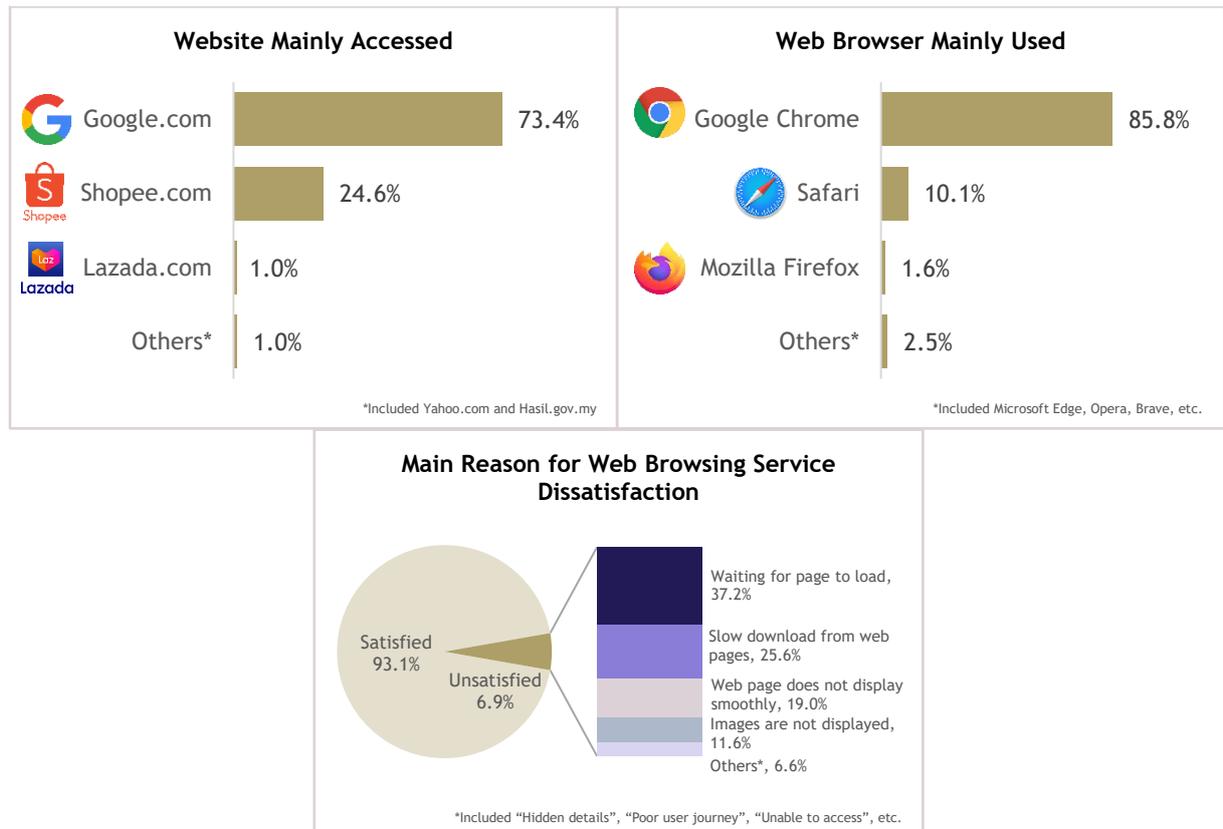
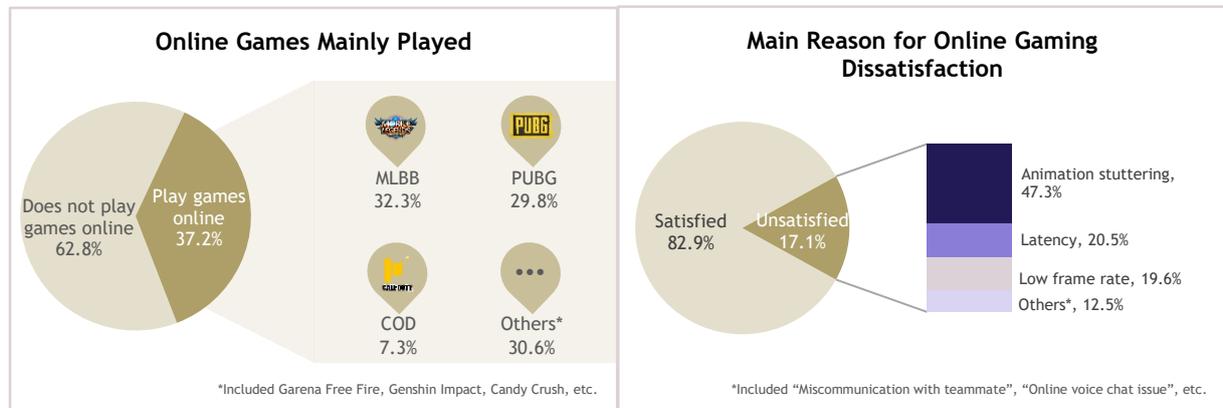


Figure 31 below showed further details with regards to Online Gaming experience where 37.2% of MBB consumers played games online. Among them, the top three games played online were Mobile Legends: Bang Bang/MLBB (32.3%), PlayerUnknown's Battlegrounds/PUBG (29.8%) and Call of

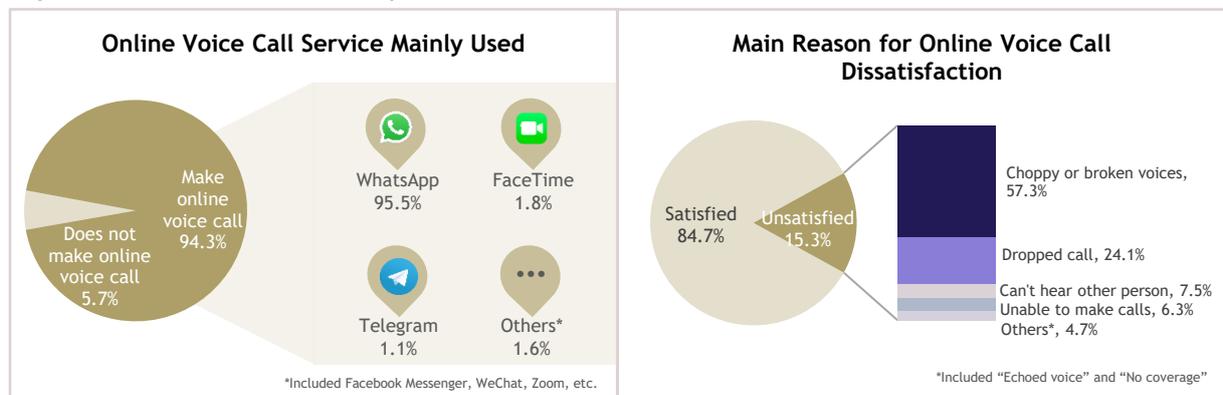
Duty/COD (7.3%). As for dissatisfaction, 17.1% of MBB consumers who played games online were dissatisfied with their experience where 47.3% of them cited “Animation stuttering” as the main cause for their dissatisfaction.

Figure 31: Online Gaming experience of MBB consumers



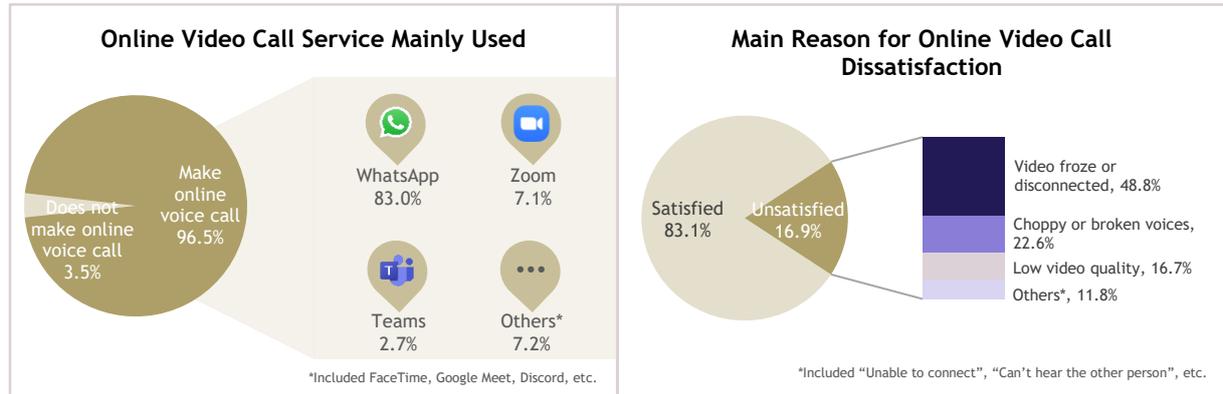
Regarding Online Voice Call, the survey found that the most popular service used by MBB consumers who made online voice calls (94.3% out of all MBB consumers) was WhatsApp (95.5%), followed by FaceTime (1.8%). As for dissatisfaction, 15.3% of MBB consumers were dissatisfied with their online voice calls experience with 57.3% of them quoted “Choppy or broken voice” as the main reason for their dissatisfaction.

Figure 32: Online Voice Call experience of MBB consumers



The survey found that out of the 96.5% of MBB consumers who made online video calls, WhatsApp was the most popular service (83.0%). Out of those who were dissatisfied with their Online Video Call experience (16.9%), 48.8% of them quoted “Freezing or disconnected video” as the main reason for their dissatisfaction.

Figure 33: Online Video Call experience of MBB consumers

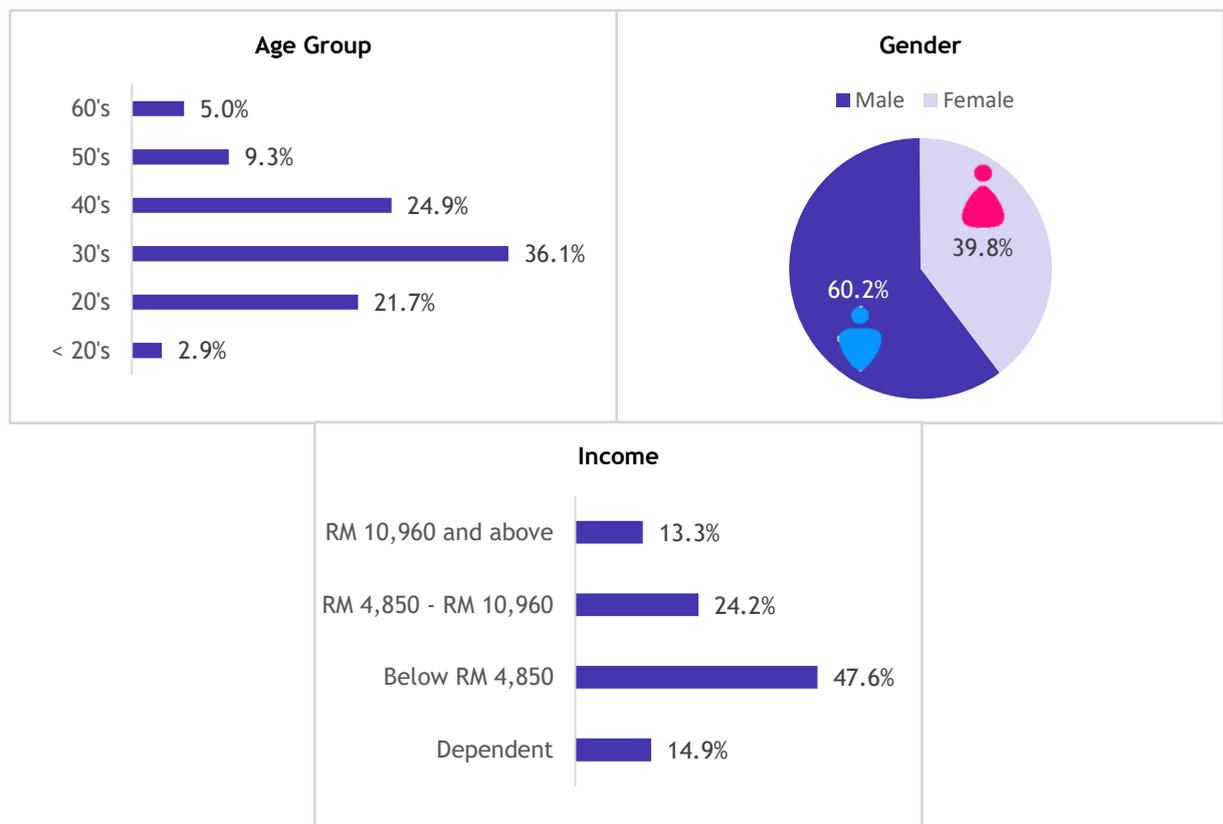


DEMOGRAPHIC PROFILE OF FBB FIBRE, FBB COPPER AND MBB CONSUMERS

FBB Fibre consumers

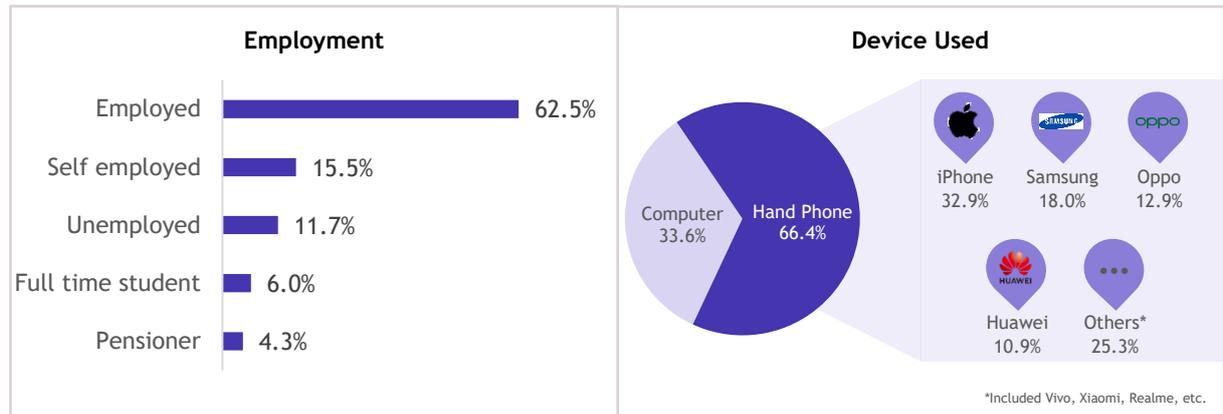
BQoES 2021 results reflect the demographic profile of young adults, where 57.8% of FBB Fibre consumers were in the age of 20s and 30s. Meanwhile, gender gap among FBB Fibre consumers was quite significant. Overall, males made up 60.2% while females accounted for 39.8%. Some notable differences also exist in terms of the average income bracket, where high percentage was observed with FBB Fibre consumers with lower income bracket, where 47.6% of FBB Fibre consumers earned below RM 4,850.

Figure 34: Demographic profile of FBB Fibre consumers (Age, Gender and Income)



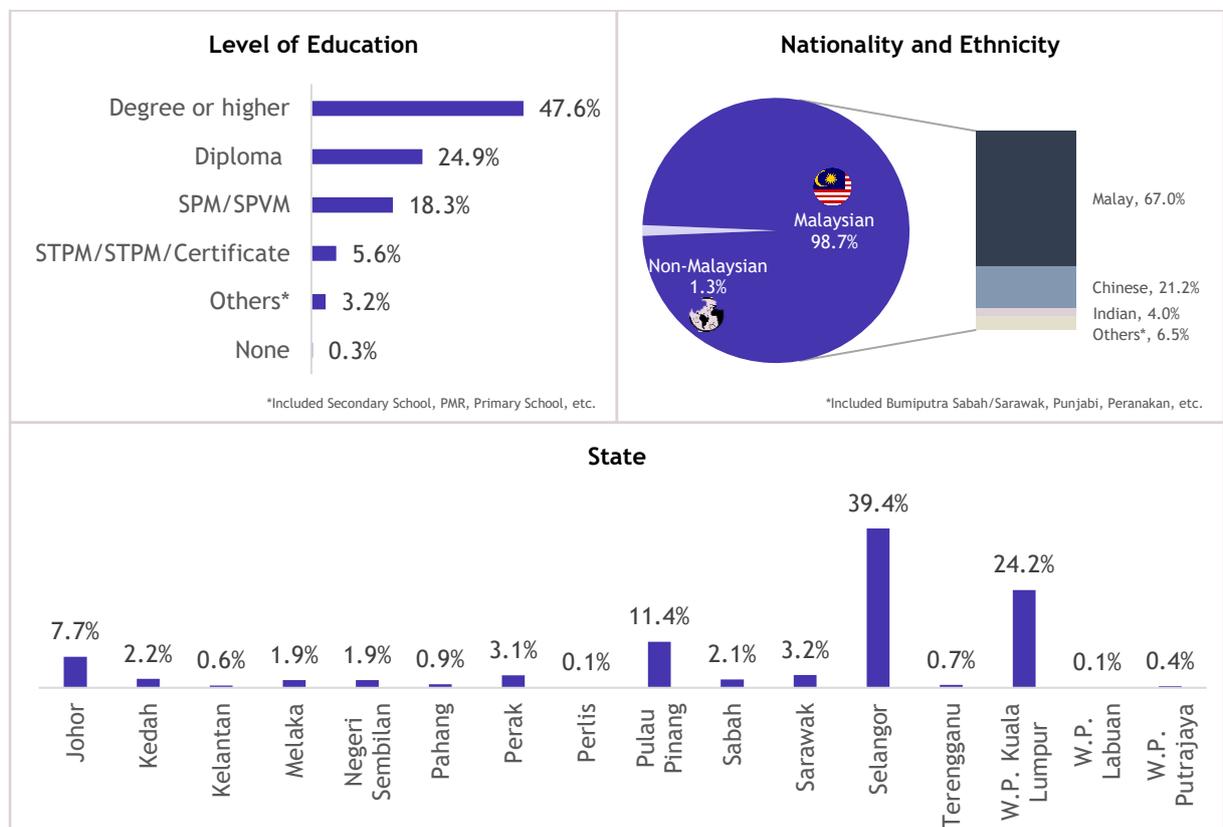
Majority of FBB Fibre consumers were employed (62.5%) while 11.7% of them were unemployed (including housewife). In terms of devices, it was observed that majority of FBB Fibre consumers mainly used smartphones for their broadband consumption (66.4%) with 32.9% used iPhone followed by Samsung (18.0%) and Oppo (12.9%) phones.

Figure 35: Demographic profile of FBB Fibre consumers (Device Used and Employment)



Other demographic profile of FBB Fibre consumers i.e., level of education, nationality, ethnicity and overall respondents' distribution by state can be observed in **Figure 36** below:

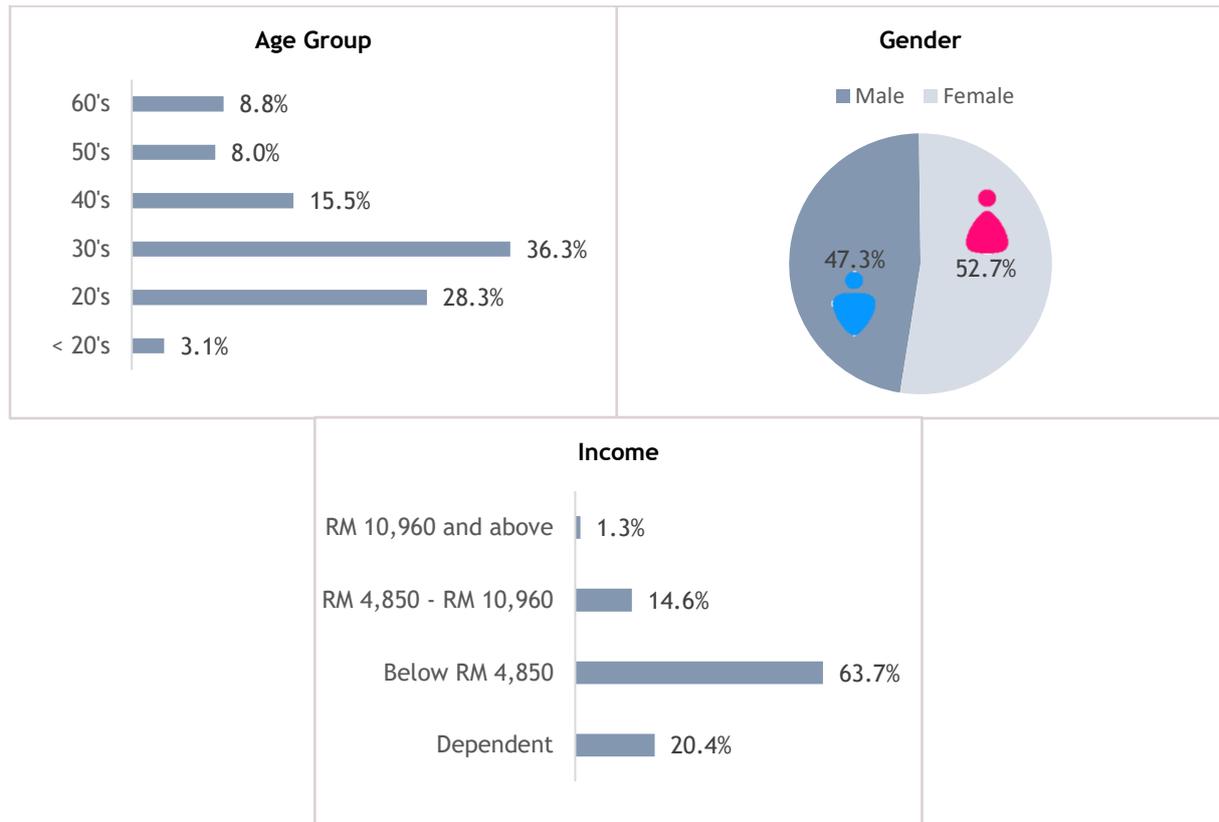
Figure 36: Demographic profile of FBB Fibre consumers (Level of Education, Nationality, Ethnicity and State)



FBB Copper consumers

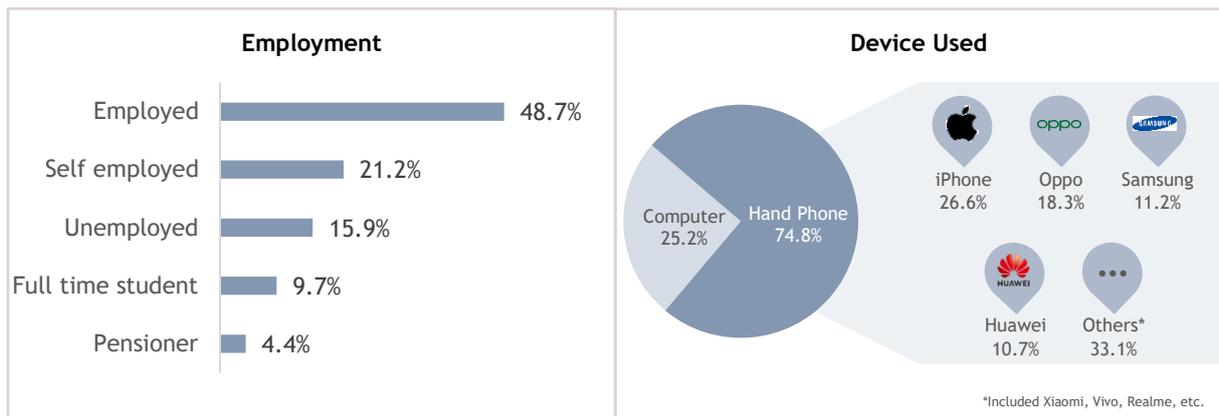
When looking at FBB Copper, the age group were skewed towards younger demographic where 64.6% of the FBB Copper consumers were in the age of 20s and 30s. Meanwhile, the gender gap among FBB Copper consumers were smaller. Overall, males made up of 47.3% while females accounted for 52.7%. In terms of average income bracket, most of FBB Copper consumers were categorised under lower income bracket, where 63.7% of them earned below RM 4,850.

Figure 37: Demographic profile of FBB Copper consumers (Age, Gender and Income)



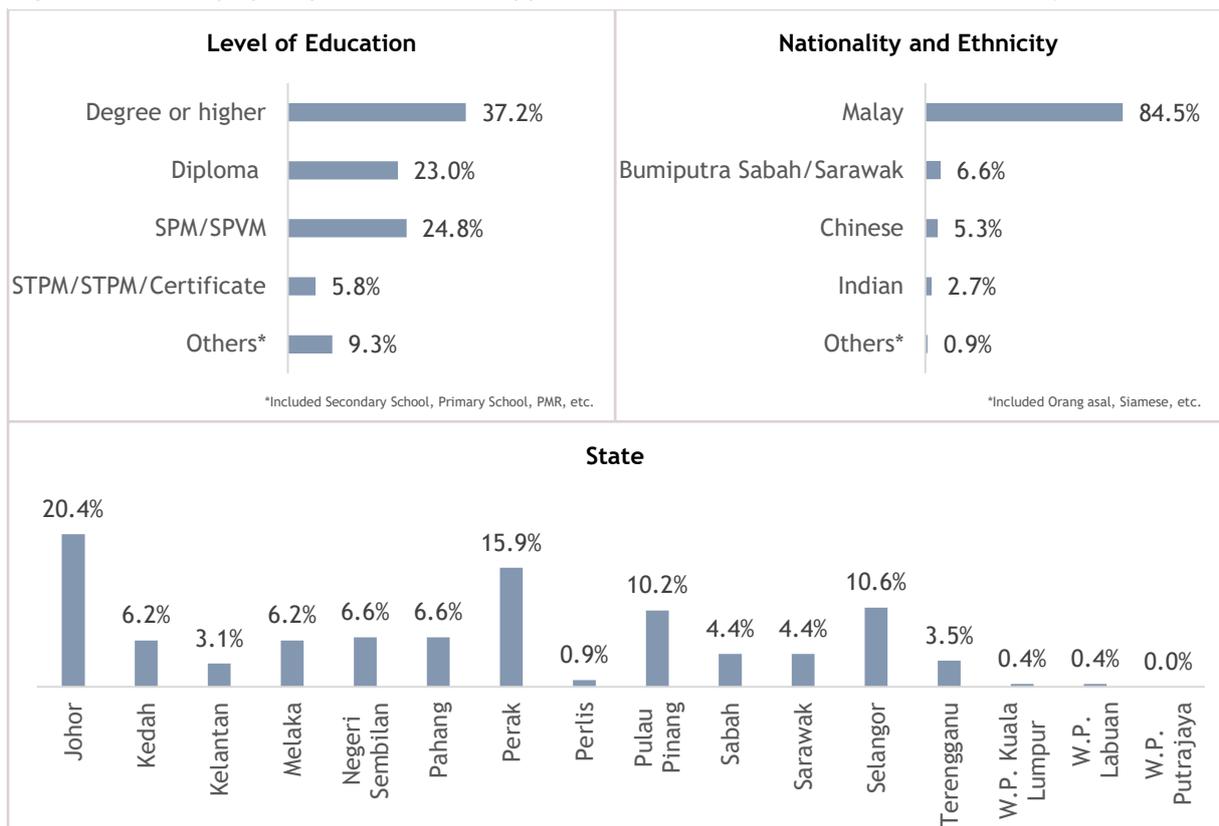
Less than half of FBB Copper consumers were employed (48.7%) while 15.9% of them were unemployed (including housewife). It was observed that majority of FBB Copper consumers mainly used smartphones for their broadband consumption (74.8%). Among them, 26.6% used iPhone followed by Oppo (18.3%) and Samsung (11.2%) phones.

Figure 38: Demographic profile of FBB Copper consumers (Employment and Device Used)



With regards to nationality, FBB Copper respondents recorded 100% of Malaysian consumers. Other demographic profile of FBB Copper consumers i.e., level of education, ethnicity and respondents' distribution by state can be observed in **Figure 39** below:

Figure 39: Demographic profile of FBB Copper consumers (Level of Education, Ethnicity and State)

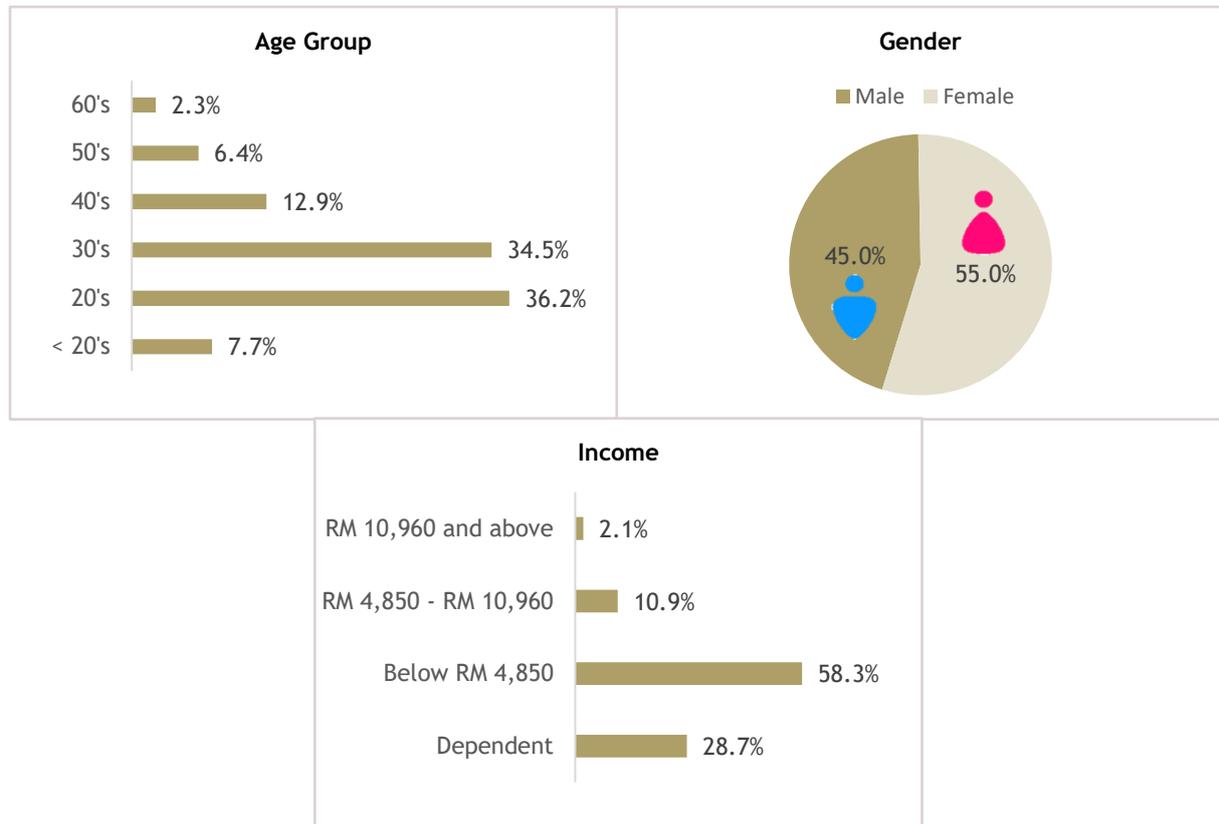


MBB consumers

Like FBB Fibre and FBB Copper consumers, majority of MBB consumers were young adults with 70.7% of MBB consumers were in the age of 20s and 30s. The gender gap among MBB consumers were

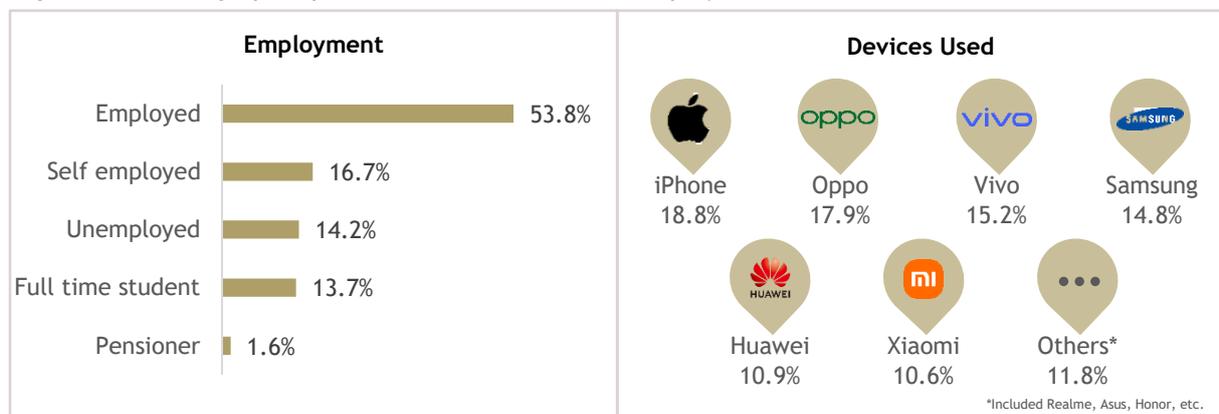
insignificant (10.0%) with higher percentage of female consumers (55.0% vs 45.0%). Like other services, significant differences also exist in terms of the average income bracket, where high percentage was observed with MBB consumers with lower income bracket, where 58.3% of MBB consumers earned below RM 4,850.

Figure 40: Demographic profile of MBB consumers (Age, Gender and Income)



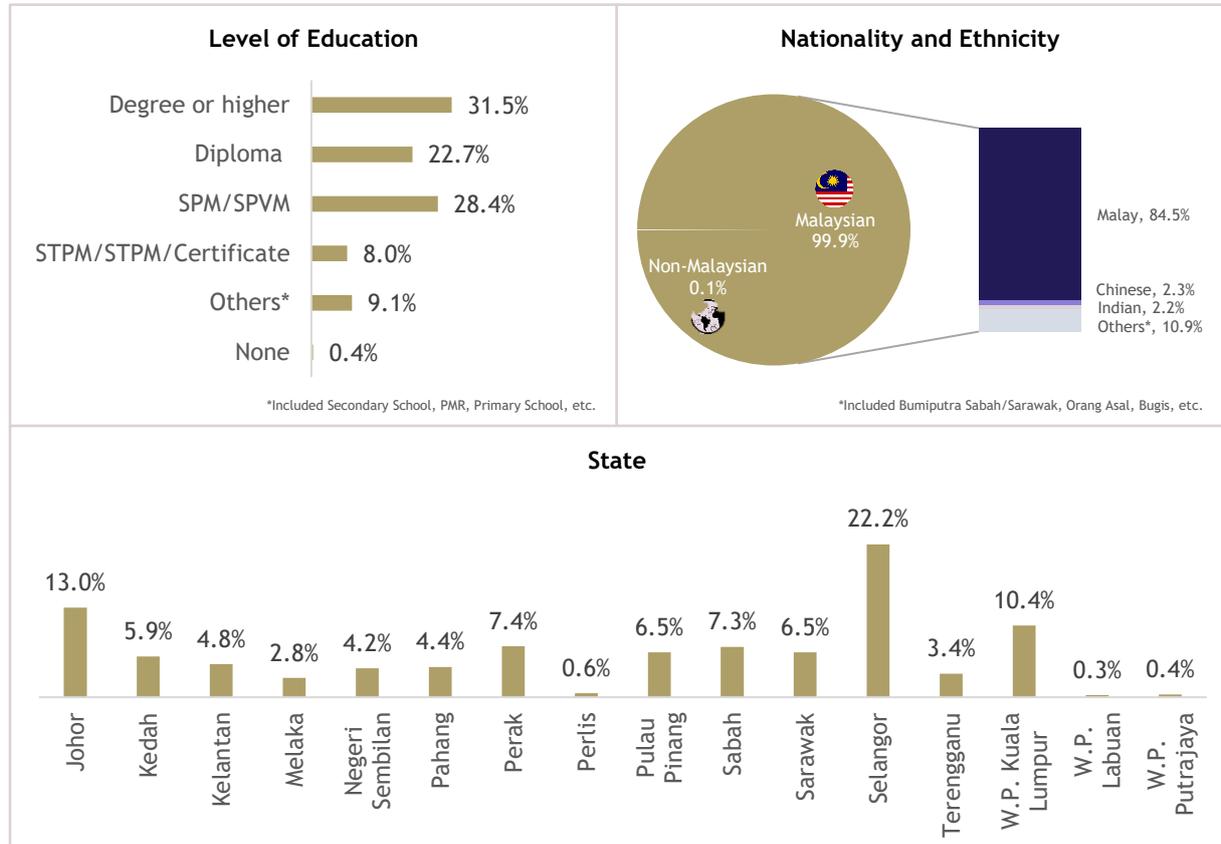
More than half of BQoES 2021 respondents for MBB were employed (53.8%). In addition, 14.2% of them were unemployed (including housewife). Regarding devices, 18.8% used iPhone followed by Oppo (17.9%) and Vivo (15.2%) phones.

Figure 41: Demographic profile of MBB consumers (Employment and Device Used)



Other demographic profile of MBB consumers i.e., level of education, nationality, ethnicity and state can be observed in **Figure 42** below:

Figure 42: Demographic profile of MBB consumers (Level of Education, Nationality, Ethnicity and State)



SECTION 6: CONCLUSIONS

In summary, BQoES 2021 concluded that all broadband consumers were adequately satisfied with their broadband experience with FBB Fibre consumers being more satisfied (CSI Score: 3.70) than FBB Copper (CSI Score: 3.61) and MBB consumers (3.66). With regards to scopes, Web Browsing topped the list for all broadband consumers with CSI scores ranging from 3.83 to 3.97.

Looking at the gaps between level of satisfaction and importance, Online Gaming was the only scope where the experience has exceeded expectations for all broadband consumers with gaps ranging from 0.41 to 0.47. Meanwhile, all broadband users showed the largest gap between level of satisfaction and importance for Online Voice Call and Online Video Call experiences. In relation to that, mobile-broadband consumers rated higher importance in Online Voice Call experience than Online Video Call while fixed-broadband consumers were the other way around (higher importance in Online Video Call experience than Online Voice Call).

A closer look at each area of improvement, the survey suggests that there is still much room for improvement for service providers to enhance their consumer' experience particularly for services like Online Voice Call and Online Video Call services (FBB service providers) as well as Video Streaming (MBB service providers). These services should be a top priority for service providers' next course of action in delivering higher broadband quality of experience to consumers.

SECTION 7: TABLES

Caution is required in the use of the estimates tabulated below.

While MCMC takes every care to minimise non-sampling errors, which cannot be quantified, the estimates presented are also subject to sampling error, which is a measure of the chance variation that occurs because a sample, and not the entire population is canvassed. The sampling error of an estimate is usually expressed as a percentage of that estimate to give the relative sampling error (RSE) of that estimate.

In general, estimates that are small are subject to high RSEs. As a guide, only estimates with RSEs of 25% or less are considered reliable for general use. Estimates with RSEs greater than 25% but less than or equal to 50% are denoted with an asterisk (*) in these tables and should be used with caution; while estimates with RSEs greater than 50% are denoted by two asterisks (**) and are considered too unreliable for general use. However, these estimates may be aggregated with others until an RSE of less than 25% is obtained.

Confidence intervals for very small estimates should be based on the binomial distribution rather than the normal approximation to the binomial. As an alternative, the method of Korn and Graubard, 1998 may also be used. Percentages may not add up to 100 because of rounding.

BROADBAND CONSUMER CONSUMPTION PATTERN BY SERVICE

FBB Fibre Consumers

Table 4: FBB consumers' Video Streaming activity

| Activity | Distribution (%) | RSE |
|------------------------------|------------------|------|
| Does not stream video online | 3.2 | 17.3 |
| Stream video online | 96.8 | 0.7 |

Table 5: FBB consumers' Video Streaming service mainly used

| Service | Distribution (%) | RSE |
|-----------|------------------|------|
| YouTube | 47.9 | 4.1 |
| Facebook | 21.0 | 7.6 |
| Instagram | 6.7 | 14.6 |
| Netflix | 17.8 | 8.4 |
| TikTok | 2.7 | 23.2 |
| Others | 3.8 | 19.6 |

Table 6: FBB consumers' Video Streaming service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|-------|
| Extremely not important | 3.1 | 21.5 |
| Not important | 1.5 | 31.4* |
| Neutral | 23.0 | 7.0 |
| Important | 31.9 | 5.6 |
| Extremely Important | 40.6 | 4.6 |

Table 7: FBB consumers' Video Streaming service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|------|
| Extremely dissatisfied | 3.2 | 21.5 |
| Dissatisfied | 8.4 | 12.9 |
| Neutral | 25.0 | 6.8 |
| Satisfied | 44.4 | 4.4 |
| Extremely satisfied | 19.1 | 8.0 |

Table 8: FBB consumers' Video Streaming service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|---|------------------|-------|
| The video stalls and buffers | 61.8 | 9.0 |
| The video is slow to load up and start | 19.7 | 23.1 |
| The picture quality of the video is low | 11.8 | 31.3* |
| Others | 6.6 | 43.2* |

Table 9: FBB consumers' Website mainly visited

| Website | Distribution (%) | RSE |
|---------------|------------------|-------|
| Google.com | 77.6 | 2.1 |
| Shopee.com.my | 18.3 | 8.1 |
| Lazada.com.my | 2.5 | 23.9 |
| Others | 1.6 | 29.9* |

Table 10: FBB consumers' Web Browser mainly used

| Web Browser | Distribution (%) | RSE |
|-----------------|------------------|-------|
| Google Chrome | 78.0 | 2.0 |
| Safari | 12.5 | 10.1 |
| Mozilla Firefox | 4.6 | 17.5 |
| Microsoft Edge | 2.8 | 22.6 |
| Others | 2.1 | 26.4* |

Table 11: FBB consumers' Web Browsing service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|--------|
| Extremely not important | 0.7 | 44.6* |
| Not important | 0.4 | 57.6** |
| Neutral | 13.4 | 9.8 |
| Important | 31.1 | 5.7 |
| Extremely Important | 54.3 | 3.5 |

Table 12: FBB consumers' Web Browsing service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|-------|
| Extremely dissatisfied | 1.6 | 29.9* |
| Dissatisfied | 3.5 | 20.0 |
| Neutral | 24.9 | 6.7 |
| Satisfied | 51.6 | 3.7 |
| Extremely satisfied | 18.3 | 8.1 |

Table 13: FBB consumers' Web Browsing service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|------------------------------|------------------|-------|
| Waiting for page to load | 48.6 | 17.4 |
| Slow download from web pages | 28.6 | 26.7* |
| Others | 22.9 | 31.1* |

Table 14: FBB consumers' Onling Gaming activity

| Activity | Distribution (%) | RSE |
|----------------------------|------------------|-----|
| Does not play games online | 67.1 | 2.7 |
| Play games online | 32.9 | 5.5 |

Table 15: FBB consumers' online game mainly played

| Online Game | Distribution (%) | RSE |
|----------------------------------|------------------|-------|
| PlayerUnknown's Battlegrounds | 21.1 | 13.0 |
| Mobile Legends: Bang Bang | 18.4 | 14.1 |
| Call of Duty Mobile | 13.5 | 17.0 |
| Genshin Impact | 3.6 | 34.7* |
| Counter-Strike: Global Offensive | 3.6 | 34.7* |
| DOTA 2 | 3.6 | 34.7* |
| FIFA Ultimate Team | 3.1 | 37.2* |
| Garena Free Fire | 2.2 | 44.2* |
| Candy Crush | 1.8 | 49.5* |
| Others | 29.1 | 10.4 |

Table 16: FBB consumers' Online Gaming service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|------|
| Extremely not important | 9.0 | 12.2 |
| Not important | 24.5 | 6.7 |
| Neutral | 35.1 | 5.2 |
| Important | 15.2 | 9.1 |
| Extremely Important | 16.2 | 8.7 |

Table 17: FBB consumers' Online Gaming service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|-------|
| Extremely dissatisfied | 6.3 | 25.9* |
| Dissatisfied | 12.6 | 17.7 |
| Neutral | 25.1 | 11.6 |
| Satisfied | 42.2 | 7.8 |
| Extremely satisfied | 13.9 | 16.7 |

Table 18: FBB consumers' Online Gaming service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|--------------------------------|------------------|-------|
| Latency | 40.5 | 18.7 |
| Animation stuttering | 28.6 | 24.4 |
| Low frame rate | 11.9 | 42.0* |
| Miscommunication with teammate | 9.5 | 47.6* |
| Others | 9.5 | 47.6* |

Table 19: FBB consumers' Online Voice Call activity

| Activity | Distribution (%) | RSE |
|----------------------------------|------------------|-----|
| Does not make online voice calls | 15.6 | 8.9 |
| Make online voice calls | 84.4 | 1.7 |

Table 20: FBB consumers' Online Voice Call service mainly used

| Service | Distribution (%) | RSE |
|--------------------|------------------|-------|
| WhatsApp | 82.2 | 1.9 |
| FaceTime | 4.4 | 19.6 |
| Microsoft Teams | 3.5 | 22.0 |
| Facebook Messenger | 2.6 | 25.5* |
| Others | 7.3 | 14.9 |

Table 21: FBB consumers' Online Voice Call service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|--------|
| Extremely not important | 0.4 | 57.6** |
| Not important | 31.7 | 5.6 |
| Neutral | 22.1 | 7.2 |
| Important | 2.7 | 23.3 |
| Extremely Important | 43.1 | 4.4 |

Table 22: FBB consumers' Online Voice Call service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|------|
| Extremely dissatisfied | 3.0 | 23.9 |
| Dissatisfied | 10.7 | 12.1 |
| Neutral | 27.8 | 6.7 |
| Satisfied | 47.4 | 4.4 |
| Extremely satisfied | 11.2 | 11.8 |

Table 23: FBB consumers' Online Voice Call service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|------------------------------|------------------|-------|
| Choppy or broken voices | 61.5 | 9.0 |
| Dropped calls | 23.1 | 20.7 |
| Cannot hear the other person | 9.0 | 36.1* |
| Others | 6.4 | 43.3* |

Table 24: FBB consumers' Online Video Call activity

| Activity | Distribution (%) | RSE |
|----------------------------------|------------------|------|
| Does not make online video calls | 6.2 | 14.9 |
| Make online video calls | 93.8 | 1.0 |

Table 25: FBB consumers' Online Video Call service mainly used

| Service | Distribution (%) | RSE |
|--------------------|------------------|-------|
| WhatsApp | 50.8 | 3.9 |
| Zoom | 20.1 | 7.9 |
| Microsoft Teams | 13.5 | 10.0 |
| FaceTime | 4.4 | 18.5 |
| Google Meet | 3.1 | 22.0 |
| Skype | 3.0 | 22.6 |
| Facebook Messenger | 2.0 | 27.5* |
| Discord | 1.4 | 33.1* |
| Others | 1.6 | 25.5* |

Table 26: FBB consumers' Online Video Call service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|-------|
| Extremely not important | 0.7 | 44.6* |
| Not important | 1.3 | 33.1* |
| Neutral | 17.0 | 8.5 |
| Important | 34.5 | 5.3 |
| Extremely Important | 46.5 | 4.1 |

Table 27: FBB consumers' Online Video Call service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|------|
| Extremely dissatisfied | 4.6 | 18.1 |
| Dissatisfied | 11.9 | 10.8 |
| Neutral | 24.8 | 6.9 |
| Satisfied | 48.6 | 4.1 |
| Extremely satisfied | 10.1 | 11.9 |

Table 28: FBB consumers' Online Video Call service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|-----------------------------|------------------|--------|
| Video froze or disconnected | 41.0 | 11.7 |
| Choppy or broken voices | 32.4 | 14.1 |
| Low video quality | 23.8 | 17.5 |
| Others | 2.9 | 56.9** |

FBB Copper Consumers

Table 29: FBB consumers' Video Streaming activity

| Activity | Distribution (%) | RSE |
|------------------------------|------------------|-------|
| Does not stream video online | 4.4 | 30.9* |
| Stream video online | 95.6 | 1.4 |

Table 30: FBB consumers' Video Streaming service mainly used

| Service | Distribution (%) | RSE |
|-----------|------------------|-------|
| YouTube | 49.5 | 6.9 |
| Facebook | 31.0 | 10.1 |
| Instagram | 6.9 | 24.9 |
| Netflix | 7.9 | 23.3 |
| Others | 4.6 | 30.9* |

Table 31: FBB consumers' Video Streaming service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|--------|
| Extremely not important | 3.1 | 37.2* |
| Not important | 0.4 | 99.8** |
| Neutral | 20.8 | 13.0 |
| Important | 31.9 | 9.7 |
| Extremely Important | 43.8 | 7.5 |

Table 32: FBB consumers' Video Streaming service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|-------|
| Extremely dissatisfied | 4.2 | 32.6* |
| Dissatisfied | 10.2 | 20.2 |
| Neutral | 28.7 | 10.7 |
| Satisfied | 46.8 | 7.3 |
| Extremely satisfied | 10.2 | 20.2 |

Table 33: FBB consumers' Video Streaming service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|---|------------------|--------|
| The video stalls and buffers | 48.4 | 18.5 |
| The video is slow to load up and start | 29.0 | 28.1* |
| The picture quality of the video is low | 12.9 | 46.7* |
| Others | 9.7 | 54.9** |

Table 34: FBB consumers' Website mainly visited

| Website | Distribution (%) | RSE |
|---------------|------------------|--------|
| Google.com | 76.1 | 3.7 |
| Shopee.com.my | 19.5 | 13.5 |
| Lazada.com.my | 3.1 | 37.2* |
| Others | 1.3 | 57.4** |

Table 35: FBB consumers' Web Browser mainly used

| Web Browser | Distribution (%) | RSE |
|-----------------|------------------|-------|
| Google Chrome | 88.1 | 2.5 |
| Safari | 7.5 | 23.3 |
| Mozilla Firefox | 1.8 | 49.6* |
| Others | 2.7 | 40.3* |

Table 36: FBB consumers' Web Browsing service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|--------|
| Extremely not important | 0.9 | 70.4** |
| Not important | 0.0 | N/A |
| Neutral | 11.5 | 18.4 |
| Important | 36.7 | 8.7 |
| Extremely Important | 50.9 | 6.5 |

Table 37: FBB consumers' Web Browsing service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|-------|
| Extremely dissatisfied | 4.4 | 30.9* |
| Dissatisfied | 2.2 | 44.2* |
| Neutral | 27.0 | 10.9 |
| Satisfied | 56.2 | 5.9 |
| Extremely satisfied | 10.2 | 19.8 |

Table 38: FBB consumers' Web Browsing service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|------------------------------|------------------|-------|
| Waiting for page to load | 46.7 | 27.6* |
| Slow download from web pages | 26.7 | 42.8* |
| Others | 26.7 | 42.8* |

Table 39: FBB consumers' Onling Gaming activity

| Activity | Distribution (%) | RSE |
|----------------------------|------------------|-----|
| Does not play games online | 67.3 | 4.6 |
| Play games online | 32.7 | 9.5 |

Table 40: FBB consumers' online game mainly played

| Online Game | Distribution (%) | RSE |
|-------------------------------|------------------|-------|
| PlayerUnknown's Battlegrounds | 25.7 | 19.8 |
| Mobile Legends: Bang Bang | 28.4 | 18.5 |
| FIFA Ultimate Team | 8.1 | 39.1* |
| Candy Crush | 5.4 | 48.6* |
| Others | 32.4 | 16.8 |

Table 41: FBB consumers' Online Gaming service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|------|
| Extremely not important | 8.0 | 22.6 |
| Not important | 28.3 | 10.6 |
| Neutral | 31.9 | 9.7 |
| Important | 19.0 | 13.7 |
| Extremely Important | 12.8 | 17.3 |

Table 42: FBB consumers' Online Gaming service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|-------|
| Extremely dissatisfied | 6.8 | 43.2* |
| Dissatisfied | 13.5 | 29.4* |
| Neutral | 21.6 | 22.1 |
| Satisfied | 47.3 | 12.3 |
| Extremely satisfied | 10.8 | 33.4* |

Table 43: FBB consumers' Online Gaming service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|----------------------|------------------|--------|
| Latency | 33.3 | 24.2 |
| Animation stuttering | 53.3 | 36.5* |
| Others | 13.3 | 65.8** |

Table 44: FBB consumers' Online Voice Call activity

| Activity | Distribution (%) | RSE |
|----------------------------------|------------------|------|
| Does not make online voice calls | 11.9 | 18.1 |
| Make online voice calls | 88.1 | 2.5 |

Table 45: FBB consumers' Online Voice Call service mainly used

| Service | Distribution (%) | RSE |
|--------------------|------------------|-------|
| WhatsApp | 88.4 | 2.6 |
| Telegram | 3.0 | 40.2* |
| Facebook Messenger | 3.0 | 40.2* |
| WeChat | 2.0 | 49.5* |
| Others | 3.5 | 37.1* |

Table 46: FBB consumers' Online Voice Call service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|--------|
| Extremely not important | 0.9 | 70.4** |
| Not important | 36.7 | 8.7 |
| Neutral | 18.1 | 14.1 |
| Important | 0.0 | N/A |
| Extremely Important | 44.2 | 7.5 |

Table 47: FBB consumers' Online Voice Call service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|-------|
| Extremely dissatisfied | 4.5 | 32.6* |
| Dissatisfied | 12.1 | 19.1 |
| Neutral | 27.6 | 11.5 |
| Satisfied | 47.2 | 7.5 |
| Extremely satisfied | 8.5 | 23.2 |

Table 48: FBB consumers' Online Voice Call service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|-------------------------|------------------|-------|
| Choppy or broken voices | 54.5 | 15.9 |
| Dropped calls | 33.3 | 24.6 |
| Others | 12.1 | 46.9* |

Table 49: FBB consumers' Online Video Call activity

| Activity | Distribution (%) | RSE |
|----------------------------------|------------------|-------|
| Does not make online video calls | 6.2 | 25.9* |
| Make online video calls | 93.8 | 1.7 |

Table 50: FBB consumers' Online Video Call service mainly used

| Service | Distribution (%) | RSE |
|--------------------|------------------|--------|
| WhatsApp | 66.5 | 4.9 |
| Zoom | 13.7 | 17.3 |
| FaceTime | 3.3 | 37.2* |
| Microsoft Teams | 2.4 | 44.2* |
| Facebook Messenger | 2.8 | 40.2* |
| Discord | 1.9 | 49.5* |
| WeChat | 1.9 | 49.5* |
| Skype | 2.8 | 40.2* |
| Google Meet | 4.2 | 32.6* |
| Others | 0.5 | 99.8** |

Table 51: FBB consumers' Online Video Call service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|--------|
| Extremely not important | 0.4 | 99.8** |
| Not important | 0.9 | 70.4** |
| Neutral | 16.8 | 14.8 |
| Important | 35.8 | 8.9 |
| Extremely Important | 46.0 | 7.2 |

Table 52: FBB consumers' Online Video Call service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|-------|
| Extremely dissatisfied | 4.7 | 30.9* |
| Dissatisfied | 12.3 | 18.4 |
| Neutral | 25.5 | 11.7 |
| Satisfied | 48.1 | 7.1 |
| Extremely satisfied | 9.4 | 21.3 |

Table 53: FBB consumers' Online Video Call service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|-----------------------------|------------------|-------|
| Video froze or disconnected | 44.4 | 18.6 |
| Choppy or broken voices | 30.6 | 25.1* |
| Low video quality | 11.1 | 47.1* |
| Others | 13.9 | 41.5* |

MBB Consumers**Table 54: MBB consumers' Video Streaming activity**

| Activity | Distribution (%) | RSE |
|------------------------------|------------------|------|
| Does not stream video online | 1.4 | 19.9 |
| Stream video online | 98.6 | 0.3 |

Table 55: MBB consumers' Video Streaming service mainly used

| Service | Distribution (%) | RSE |
|-----------|------------------|------|
| YouTube | 42.5 | 2.8 |
| Facebook | 32.0 | 3.5 |
| Instagram | 11.5 | 6.7 |
| Netflix | 6.5 | 9.1 |
| TikTok | 5.4 | 10.0 |
| Others | 2.1 | 16.5 |

Table 56: MBB consumers' Video Streaming service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|------|
| Extremely not important | 3.1 | 13.4 |
| Not important | 1.5 | 19.5 |
| Neutral | 22.3 | 4.5 |
| Important | 35.7 | 3.2 |
| Extremely Important | 37.4 | 3.1 |

Table 57: MBB consumers' Video Streaming service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|------|
| Extremely dissatisfied | 3.9 | 11.9 |
| Dissatisfied | 8.4 | 7.9 |
| Neutral | 28.0 | 3.9 |
| Satisfied | 47.1 | 2.5 |
| Extremely satisfied | 12.5 | 6.3 |

Table 58: MBB consumers' Video Streaming service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|---|------------------|------|
| The video stalls and buffers | 49.5 | 6.9 |
| The video is slow to load up and start | 19.6 | 13.8 |
| Video playback fails | 17.3 | 15.0 |
| The picture quality of the video is low | 10.7 | 19.7 |
| Others | 2.8 | 40.2 |

Table 59: MBB consumers' Website mainly visited

| Website | Distribution (%) | RSE |
|---------------|------------------|-------|
| Google.com | 73.4 | 1.4 |
| Shopee.com.my | 24.6 | 4.2 |
| Lazada.com.my | 1.0 | 23.4 |
| Hasil.gov.my | 0.7 | 28.8* |
| Yahoo.com | 0.3 | 40.8* |

Table 60: MBB consumers' Web Browser mainly used

| Web Browser | Distribution (%) | RSE |
|-----------------|------------------|-------|
| Google Chrome | 85.8 | 1.0 |
| Safari | 10.1 | 7.1 |
| Mozilla Firefox | 1.6 | 18.7 |
| Microsoft Edge | 0.9 | 25.7* |
| Opera | 0.9 | 24.9 |
| Others | 0.7 | 27.6* |

Table 61: MBB consumers' Web Browsing service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|-------|
| Extremely not important | 0.6 | 30.1* |
| Not important | 0.4 | 37.7* |
| Neutral | 13.5 | 6.0 |
| Important | 35.8 | 3.2 |
| Extremely Important | 49.7 | 2.4 |

Table 62: MBB consumers' Web Browsing service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|------|
| Extremely dissatisfied | 1.7 | 18.1 |
| Dissatisfied | 5.2 | 10.2 |
| Neutral | 23.7 | 4.3 |
| Satisfied | 52.4 | 2.3 |
| Extremely satisfied | 17.0 | 5.3 |

Table 63: MBB consumers' Web Browsing service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|------------------------------------|------------------|-------|
| Waiting for page to load | 37.2 | 11.8 |
| Slow download from web pages | 25.6 | 15.5 |
| Web pages not displaying smoothly | 19.0 | 18.8 |
| Images for web pages not displayed | 11.6 | 25.1* |
| Others | 6.6 | 34.2* |

Table 64: MBB consumers' Onling Gaming activity

| Activity | Distribution (%) | RSE |
|----------------------------|------------------|-----|
| Does not play games online | 62.8 | 1.8 |
| Play games online | 37.2 | 3.1 |

Table 65: MBB consumers' online game mainly played

| Online Game | Distribution (%) | RSE |
|--------------------------------------|------------------|-------|
| Mobile Legends: Bang Bang | 32.3 | 5.7 |
| Call of Duty (COD) Mobile | 7.3 | 13.9 |
| Genshin Impact | 3.7 | 20.0 |
| Garena Free Fire | 3.8 | 19.6 |
| Clash of Clans | 1.8 | 28.6* |
| PlayerUnknown's Battlegrounds (PUBG) | 29.8 | 6.0 |
| Pro Evolution Soccer (PES) | 2.8 | 23.2 |
| Candy Crush | 3.7 | 20.0 |
| Others | 14.8 | 9.4 |

Table 66: MBB consumers' Online Gaming service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|-----|
| Extremely not important | 8.4 | 7.9 |
| Not important | 23.3 | 4.3 |
| Neutral | 36.7 | 3.1 |
| Important | 14.7 | 5.8 |
| Extremely Important | 17.0 | 5.3 |

Table 67: MBB consumers' Online Gaming service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|------|
| Extremely dissatisfied | 5.0 | 17.0 |
| Dissatisfied | 12.1 | 10.5 |
| Neutral | 27.8 | 6.3 |
| Satisfied | 43.7 | 4.4 |
| Extremely satisfied | 11.3 | 10.9 |

Table 68: MBB consumers' Online Gaming service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|----------------------|------------------|------|
| Latency | 47.3 | 10.0 |
| Animation stuttering | 20.5 | 18.6 |
| Low frame rate | 19.6 | 19.1 |
| Others | 12.5 | 25.0 |

Table 69: MBB consumers' Online Voice Call activity

| Activity | Distribution (%) | RSE |
|----------------------------------|------------------|-----|
| Does not make online voice calls | 5.7 | 9.7 |
| Make online voice calls | 94.3 | 0.6 |

Table 70: MBB consumers' Online Voice Call service mainly used

| Service | Distribution (%) | RSE |
|--------------------|------------------|-------|
| WhatsApp | 95.5 | 0.5 |
| FaceTime | 1.8 | 18.4 |
| Telegram | 1.1 | 22.8 |
| Facebook Messenger | 0.9 | 25.7* |
| Others | 0.7 | 30.1* |

Table 71: MBB consumers' Online Voice Call service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|-------|
| Extremely not important | 0.7 | 27.6* |
| Not important | 1.5 | 19.5 |
| Neutral | 15.4 | 5.6 |
| Important | 32.8 | 3.4 |
| Extremely Important | 49.5 | 2.4 |

Table 72: MBB consumers' Online Voice Call service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|------|
| Extremely dissatisfied | 3.9 | 12.3 |
| Dissatisfied | 11.4 | 6.8 |
| Neutral | 26.5 | 4.1 |
| Satisfied | 45.8 | 2.7 |
| Extremely satisfied | 12.4 | 6.5 |

Table 73: MBB consumers' Online Voice Call service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|------------------------------|------------------|-------|
| Choppy or broken voices | 57.3 | 5.4 |
| Dropped calls | 24.1 | 11.2 |
| Cannot hear the other person | 7.5 | 22.1 |
| Unable to make calls | 6.3 | 24.2 |
| Echoed voices | 2.8 | 37.3* |
| Others | 2.0 | 44.3* |

Table 74: MBB consumers' Online Video Call activity

| Activity | Distribution (%) | RSE |
|----------------------------------|------------------|------|
| Does not make online video calls | 3.5 | 12.6 |
| Make online video calls | 96.5 | 0.5 |

Table 75: MBB consumers' Online Video Call service mainly used

| Service | Distribution (%) | RSE |
|--------------------|------------------|-------|
| WhatsApp | 83.0 | 1.1 |
| Zoom | 7.1 | 8.8 |
| FaceTime | 2.3 | 15.8 |
| Microsoft Teams | 2.7 | 14.5 |
| Facebook Messenger | 1.4 | 20.7 |
| Discord | 0.9 | 25.7* |
| WeChat | 0.2 | 49.9* |
| Skype | 0.5 | 35.3* |
| Google Meet | 1.6 | 18.7 |
| Others | 0.3 | 44.7* |

Table 76: MBB consumers' Online Video Call service level of importance

| Level of Importance | Distribution (%) | RSE |
|-------------------------|------------------|-------|
| Extremely not important | 0.6 | 30.1* |
| Not important | 1.1 | 22.2 |
| Neutral | 16.4 | 5.4 |
| Important | 39.8 | 2.9 |
| Extremely Important | 42.0 | 2.8 |

Table 77: MBB consumers' Online Video Call service level of satisfaction

| Level of Satisfaction | Distribution (%) | RSE |
|------------------------|------------------|------|
| Extremely dissatisfied | 5.2 | 10.3 |
| Dissatisfied | 11.7 | 6.7 |
| Neutral | 27.2 | 4.0 |
| Satisfied | 44.5 | 2.7 |
| Extremely satisfied | 11.3 | 6.8 |

Table 78: MBB consumers' Online Video Call service main reason for dissatisfaction

| Reason | Distribution (%) | RSE |
|-----------------------------|------------------|-------|
| Video froze or disconnected | 48.8 | 6.0 |
| Choppy or broken voices | 22.6 | 10.9 |
| Low video quality | 16.7 | 13.2 |
| Unable to connect | 7.0 | 21.6 |
| Others | 4.9 | 26.1* |

BROADBAND CONSUMER DEMOGRAPHIC BY SERVICE**FBB Fibre Consumers****Table 79:** FBB consumers' age distribution

| Age group | Distribution (%) | RSE |
|--------------|------------------|-------|
| 15 - 19 | 2.9 | 22.0 |
| 20 - 24 | 6.6 | 14.4 |
| 25 - 29 | 15.0 | 9.1 |
| 30 - 34 | 18.9 | 8.0 |
| 35 - 39 | 17.3 | 8.4 |
| 40 - 44 | 15.3 | 9.0 |
| 45 - 49 | 9.6 | 11.8 |
| 50 - 54 | 5.9 | 15.3 |
| 55 - 59 | 3.4 | 20.5 |
| 60 - 64 | 2.8 | 22.6 |
| 65 and above | 2.2 | 25.5* |

Table 80: FBB consumers' employment distribution

| Employment | Distribution (%) | RSE |
|---------------------|------------------|------|
| A full-time student | 6.0 | 15.1 |
| Employed | 62.5 | 3.0 |
| Pensioner | 4.3 | 18.2 |
| Self employed | 15.5 | 9.0 |
| Unemployed | 11.7 | 10.6 |

Table 81: FBB consumers' full time student distribution

| Student status | Distribution (%) | RSE |
|--------------------|------------------|--------|
| College/University | 95.0 | 3.6 |
| Secondary school | 5.0 | 68.9** |

Table 82: FBB consumers' highest level of education distribution

| Education level | Distribution (%) | RSE |
|---|------------------|-------|
| Degree or higher | 47.6 | 4.0 |
| Diploma | 24.9 | 6.7 |
| PMR/UEC-Junior Middle Three | 1.2 | 35.1* |
| Secondary school | 1.8 | 28.6* |
| SPM/SPVM | 18.3 | 8.1 |
| STPM/STAM/Certificate/UEC-Senior Middle Three | 5.6 | 15.8 |
| Others | 0.6 | 49.9* |

Table 83: FBB consumers' gender distribution

| Gender | Distribution (%) | RSE |
|--------|------------------|-----|
| Male | 60.2 | 3.1 |
| Female | 39.8 | 4.7 |

Table 84: FBB consumers' nationality distribution

| Nationality | Distribution (%) | RSE |
|---------------|------------------|-------|
| Malaysian | 98.7 | 0.4 |
| Non-malaysian | 1.3 | 33.1* |

Table 85: FBB consumers' Malaysian ethnicity distribution

| Ethnicity | Distribution (%) | RSE |
|-------------------------|------------------|-------|
| Bumiputra Sabah/Sarawak | 5.1 | 16.7 |
| Chinese | 21.5 | 7.4 |
| Indian | 4.0 | 18.9 |
| Malay | 67.9 | 2.7 |
| Others | 1.5 | 31.4* |

Table 86: FBB consumers' state distribution

| Ethnicity | Distribution (%) | RSE |
|-----------------|------------------|--------|
| Johor | 7.7 | 13.3 |
| Kedah | 2.2 | 25.5* |
| Kelantan | 0.6 | 49.9* |
| Melaka | 1.9 | 27.5* |
| Negeri Sembilan | 1.9 | 27.5* |
| Pahang | 0.9 | 40.6* |
| Perak | 3.1 | 21.5* |
| Perlis | 0.1 | 99.9** |

| | | |
|----------------------------------|------|--------|
| Pulau Pinang | 11.4 | 10.7 |
| Sabah | 2.1 | 26.4* |
| Sarawak | 3.2 | 21.0 |
| Selangor | 39.4 | 4.8 |
| Terengganu | 0.7 | 44.6* |
| Wilayah Persekutuan Kuala Lumpur | 24.2 | 6.8 |
| Wilayah Persekutuan Labuan | 0.1 | 99.9** |
| Wilayah Persekutuan Putrajaya | 0.4 | 57.6** |

Table 87: FBB consumers' income distribution

| Ethnicity | Distribution (%) | RSE |
|---------------------|------------------|------|
| More than RM15,039 | 6.3 | 14.8 |
| RM10,960 - RM15,039 | 6.9 | 14.1 |
| RM8,700 - RM10,959 | 5.9 | 15.3 |
| RM7,100 - RM8,699 | 4.9 | 17.0 |
| RM5,880 - RM7,099 | 6.9 | 14.1 |
| RM4,850 - RM5,879 | 6.5 | 14.6 |
| RM3,970 - RM4,849 | 7.8 | 13.2 |
| RM3,170 - RM3,969 | 7.2 | 13.8 |
| RM2,500 - RM3,169 | 15.5 | 9.0 |
| Less than RM2,500 | 17.7 | 8.3 |
| Dependent | 14.3 | 9.4 |

FBB Copper Consumers

Table 88: FBB consumers' age distribution

| Age group | Distribution (%) | RSE |
|--------------|------------------|-------|
| 15 - 19 | 3.1 | 37.2* |
| 20 - 24 | 8.8 | 21.3 |
| 25 - 29 | 19.5 | 13.5 |
| 30 - 34 | 16.4 | 15.0 |
| 35 - 39 | 19.9 | 13.3 |
| 40 - 44 | 8.0 | 22.6 |
| 45 - 49 | 7.5 | 23.3 |
| 50 - 54 | 4.4 | 30.9* |
| 55 - 59 | 3.5 | 34.7* |
| 60 - 64 | 5.8 | 26.9* |
| 65 and above | 3.1 | 37.2* |

Table 89: FBB consumers' employment distribution

| Employment | Distribution (%) | RSE |
|---------------------|------------------|-------|
| A full-time student | 9.7 | 20.3 |
| Employed | 48.7 | 6.8 |
| Pensioner | 4.4 | 30.9* |
| Self employed | 21.2 | 12.8 |
| Unemployed | 15.9 | 15.3 |

Table 90: FBB consumers' full time student distribution

| Student status | Distribution (%) | RSE |
|--------------------|------------------|-------|
| College/University | 78.9 | 11.8 |
| Secondary school | 21.1 | 44.4* |

Table 91: FBB consumers' highest level of education distribution

| Education level | Distribution (%) | RSE |
|---|------------------|--------|
| Degree or higher | 37.2 | 8.6 |
| Diploma | 23.0 | 12.2 |
| PMR/UEC-Junior Middle Three | 1.3 | 57.4** |
| Primary school | 2.2 | 44.2* |
| Secondary school | 5.8 | 26.9* |
| SPM/SPVM | 24.8 | 11.6 |
| STPM/STAM/Certificate/UEC-Senior Middle Three | 5.8 | 26.9* |

Table 92: FBB consumers' gender distribution

| Gender | Distribution (%) | RSE |
|--------|------------------|-----|
| Male | 47.3 | 7.0 |
| Female | 52.7 | 6.3 |

Table 93: FBB consumers' nationality distribution

| Nationality | Distribution (%) | RSE |
|-------------|------------------|-----|
| Malaysian | 100.0 | N/A |

Table 94: FBB consumers' Malaysian ethnicity distribution

| Ethnicity | Distribution (%) | RSE |
|-------------------------|------------------|--------|
| Bumiputra Sabah/Sarawak | 6.6 | 24.9 |
| Chinese | 5.3 | 28.1* |
| Indian | 2.7 | 40.3* |
| Malay | 84.5 | 2.8 |
| Others | 0.9 | 70.4** |

Table 95: FBB consumers' state distribution

| Ethnicity | Distribution (%) | RSE |
|----------------------------------|------------------|--------|
| Johor | 20.4 | 13.2 |
| Kedah | 6.2 | 25.9* |
| Kelantan | 3.1 | 37.2* |
| Melaka | 6.2 | 25.9* |
| Negeri Sembilan | 6.6 | 24.9 |
| Pahang | 6.6 | 24.9 |
| Perak | 15.9 | 15.3 |
| Perlis | 0.9 | 70.4** |
| Pulau Pinang | 10.2 | 19.8 |
| Sabah | 4.4 | 30.9* |
| Sarawak | 4.4 | 30.9* |
| Selangor | 10.6 | 19.3 |
| Terengganu | 3.5 | 34.7* |
| Wilayah Persekutuan Kuala Lumpur | 0.4 | 99.8** |
| Wilayah Persekutuan Labuan | 0.4 | 99.8** |
| Wilayah Persekutuan Putrajaya | 0.0 | N/A |

Table 96: FBB consumers' income distribution

| Ethnicity | Distribution (%) | RSE |
|--------------------|------------------|--------|
| More than RM10,959 | 1.3 | 57.4** |
| RM8,700 - RM10,959 | 2.7 | 40.3* |
| RM7,100 - RM8,699 | 1.8 | 49.6* |
| RM5,880 - RM7,099 | 5.3 | 28.1* |
| RM4,850 - RM5,879 | 4.9 | 29.4* |
| RM3,970 - RM4,849 | 11.1 | 18.9 |
| RM3,170 - RM3,969 | 9.3 | 20.8 |
| RM2,500 - RM3,169 | 17.7 | 14.3 |
| Less than RM2,500 | 25.7 | 11.3 |
| Dependent | 20.4 | 13.2 |

MBB Consumers

Table 97: MBB consumers' age distribution

| Age group | Distribution (%) | RSE |
|--------------|------------------|------|
| 15 - 19 | 7.7 | 8.3 |
| 20 - 24 | 14.1 | 5.9 |
| 25 - 29 | 22.1 | 4.5 |
| 30 - 34 | 18.9 | 4.9 |
| 35 - 39 | 15.6 | 5.6 |
| 40 - 44 | 8.0 | 8.1 |
| 45 - 49 | 4.9 | 10.5 |
| 50 - 54 | 4.6 | 10.9 |
| 55 - 59 | 1.8 | 17.8 |
| 60 - 64 | 1.1 | 22.2 |
| 65 and above | 1.2 | 21.7 |

Table 98: MBB consumers' employment distribution

| Employment | Distribution (%) | RSE |
|---------------------|------------------|------|
| A full-time student | 13.7 | 6.0 |
| Employed | 53.8 | 2.2 |
| Pensioner | 1.6 | 18.7 |
| Self employed | 16.7 | 5.3 |
| Unemployed | 14.2 | 5.9 |

Table 99: MBB consumers' full time student distribution

| Student status | Distribution (%) | RSE |
|--------------------|------------------|-------|
| College/University | 71.4 | 4.2 |
| Secondary school | 26.8 | 11.0 |
| Others | 1.8 | 49.6* |

Table 100: MBB consumers' highest level of education distribution

| Education level | Distribution (%) | RSE |
|---|------------------|-------|
| Degree or higher | 31.5 | 3.5 |
| Diploma | 22.7 | 4.4 |
| PMR/UEC-Junior Middle Three | 1.9 | 17.0 |
| Primary school | 1.4 | 19.9 |
| Secondary school | 5.5 | 9.9 |
| SPM/SPVM | 28.4 | 3.8 |
| STPM/STAM/Certificate/UEC-Senior Middle Three | 8.0 | 8.1 |
| Others | 0.6 | 30.1* |

Table 101: MBB consumers' gender distribution

| Gender | Distribution (%) | RSE |
|--------|------------------|-----|
| Male | 45.0 | 2.6 |
| Female | 55.0 | 2.2 |

Table 102: MBB consumers' nationality distribution

| Nationality | Distribution (%) | RSE |
|---------------|------------------|--------|
| Malaysian | 99.9 | 0.1 |
| Non-malaysian | 0.1 | 70.7** |

Table 103: FBB consumers' Malaysian ethnicity distribution

| Ethnicity | Distribution (%) | RSE |
|-------------------------|------------------|-------|
| Bumiputra Sabah/Sarawak | 10.1 | 7.1 |
| Chinese | 2.3 | 15.4 |
| Indian | 2.2 | 16.0 |
| Malay | 84.5 | 1.0 |
| Others | 0.8 | 26.6* |

Table 104: MBB consumers' state distribution

| Ethnicity | Distribution (%) | RSE |
|----------------------------------|------------------|-------|
| Johor | 13.0 | 6.2 |
| Kedah | 5.9 | 9.6 |
| Kelantan | 4.8 | 10.6 |
| Melaka | 2.8 | 14.1 |
| Negeri Sembilan | 4.2 | 11.5 |
| Pahang | 4.4 | 11.1 |
| Perak | 7.4 | 8.4 |
| Perlis | 0.6 | 30.1* |
| Pulau Pinang | 6.5 | 9.0 |
| Sabah | 7.3 | 8.5 |
| Sarawak | 6.5 | 9.0 |
| Selangor | 22.2 | 4.5 |
| Terengganu | 3.4 | 12.8 |
| Wilayah Persekutuan Kuala Lumpur | 10.4 | 7.0 |
| Wilayah Persekutuan Labuan | 0.3 | 44.7* |
| Wilayah Persekutuan Putrajaya | 0.4 | 37.7* |

Table 105: MBB consumers' income distribution

| Ethnicity | Distribution (%) | RSE |
|---------------------|------------------|-------|
| More than RM15,039 | 0.4 | 37.7* |
| RM10,960 - RM15,039 | 1.7 | 18.1 |
| RM8,700 - RM10,959 | 1.1 | 22.8 |
| RM7,100 - RM8,699 | 1.4 | 19.9 |
| RM5,880 - RM7,099 | 3.8 | 12.0 |
| RM4,850 - RM5,879 | 4.6 | 10.9 |
| RM3,970 - RM4,849 | 5.9 | 9.5 |
| RM3,170 - RM3,969 | 6.7 | 8.9 |
| RM2,500 - RM3,169 | 17.9 | 5.1 |
| Less than RM2,500 | 27.9 | 3.8 |
| Dependent | 28.7 | 3.8 |

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