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Work from home connection: a cluster analysis based on the Internet service attributes towards subscribers profile

Emmanuel Posadas Paulino
College of Business Administration and Accountancy, De La Salle University Dasmarinas, Cavite, Philippines, and
Gladys Cuenca Esteban
Department of Management Studies, Cavite State University – Bacoor Campus, Cavite, Philippines

Abstract

Purpose – The purpose of the study is to discover clusters or homogenous groups of work-from-home (WFH) Internet subscribers in the Philippines based on the attributes of speed, network quality, customer service, after-sales support, price, contract and value for money. Another objective is to determine if the formed clusters are related to the demographic profile.

Design/methodology/approach – A total of 275 internet subscribers from Metro Manila were surveyed. K-means cluster analysis using the Hartigan-Wong algorithm was performed on the data to generate the clusters.

Findings – Results generated four significant clusters, which were named service value expecters, average expecters, low expecters and high expecters. Most of the subscribers are under the high expecters, followed by the service value expecters. The age and income of the subscribers are the profile that can affect the formulation of clusters in the Internet service industry. Those people in the younger age groups can be seen as more demanding, while older people tend to be content with the Internet service. Counter-intuitively, people with higher income seem to be more easily satisfied with Internet service features, while those people with lower income seem to be more demanding. Educational attainment and the number of household members do not have a direct effect on the formulation of clusters of Internet subscribers.

Originality/value – This is the first study to use cluster analysis in identifying possible segments of WFH Internet subscribers based on Internet service attributes. Its value is the provision of market segments based on which can be the basis for formulating marketing strategies and policies for the telecommunications industry.

Keywords Internet service providers, Internet service attributes, Cluster analysis, Market clusters, Network quality, Value for money

Paper type Research paper

Introduction

The Internet has become a great tool for every household, especially during this time of pandemic (Candela, Luconi, & Vecchio, 2020). To contain the spread of Covid-19, restrictions were put into place so that the Internet platform has become the major, if not the only, means of transaction and communication. According to Bekkerman and Gilpin (2013), Internet

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access impacts every aspect of our day-to-day lives. People rely on it for the conveniences and efficiencies it provides and its importance in education, employment, health, and public safety, government operations, transportation, commerce and more (Boz & Karatas, 2015).

Salac and Kim (2016) claim that Internet speeds in the Philippines have considerably improved in the last ten years. Internet speeds even further improved with the introduction of the fourth generation (4G) and long-term evolution (LTE) networks (Minges, 2015). But due to the Covid-19 pandemic, a large fraction of the global workforce was forced to switch to work from home (WFH) (Parilla, Abadilla, Villanueva, & Tarrazona, 2022). This made the Internet service an essential household utility rather than just a means for pleasure or entertainment (Nerjaku & Braimllari, 2021).

Due to this setting, choosing an internet service provider (ISP) is important since the features of the service differ from company to company. There are certain factors that consumers consider when selecting which ISP is the most beneficial to them. ISPs formulate different market packages for Internet access (Hurtado, 2016).

Based on previous studies on the topic of ISPs, consumer preference for Internet service packages is among the important studies we need to understand (Pan, Ma, & Wu, 2018; Tanford, Baloglu, & Erdem, 2011; Maeng, Kim, & Shin, 2020). These studies reveal that an average of 40% of home Internet consumers switch their service providers annually not only because of price but based on different factors (Mahmood & Manzoor, 2021; Dos Santos & Basso, 2012). These studies also revealed that the level of churn rate for telecommunications industry customers continues to increase by a steady 29% annually. This kind of result demonstrates that service providers must be able to understand the behavior of Internet subscribers. Several studies pointed out that subscribers choose Internet service based on the quality of service (Thaichon, Lobo, Prentice, & Quach, 2014; Akroush & Mahadin, 2019; Quach, Thaichon, & Jebarajakirthy, 2016). At the same time, there are those who concluded that preference for Internet service is based on the aspects of the ISP and the contract or packages offered (Chiou, 2004; Syahnur & Basalamah, 2019; Buhaljoti, 2019; Totoraitis, 2020; Becker, Spann, & Schulze, 2015).

It can be observed that existing studies may have different or conflicting results as to understanding how Internet subscribers give value to their Internet service. It can also be noted that vast majority of related literature used regression models such as factor analysis, weighted least squares and structural equation models in testing their hypotheses (Santouridis, Trivellas, & Reklitis, 2009; Quach *et al.*, 2016; Akroush & Mahadin, 2019; Joudeh & Dandis, 2018). The use of cluster analysis has not been utilized as a method to understand customer preference for the ISP. As of this writing, there are no published studies on Internet service packages in the context of the Philippines telecommunications industry. Therefore, this study intends to address these gaps. This pursuit provides an opportunity to explore the offerings attributes of ISPs and to identify homogenous consumer groups in terms of their preference for Internet subscriptions (Gabidinova, 2021). The researcher employed the use of cluster analysis and advanced statistical method used to identify groups or patterns in a dataset (Staples & Biber, 2015). The researcher also determined if these attributes correlate with the demographic profile of the consumer's preferences when subscribing to Internet services. The goal of the study is to evaluate consumer preferences based on the attributes of Internet service. The output is the clusters formed based on such preferences. The culmination of this approach is to determine if these clusters are related to the demographic profile of the Internet subscribers. This study may serve as a concrete reference in formulating a marketing strategy that will offer more relevant Internet service packages.

Research questions

The study aims to determine customer preference and its attributes when selecting Internet data services. Specifically, the study sought to answer the following questions:

(1) What are the demographic clusters that can be extracted from the preferred Internet data package in terms of?

- Age
- Income
- Educational attainment
- Number of household members

(2) What is the level of importance given by the respondents on the attributes of Internet data service in terms of

- Speed
- Service/Network quality
- Customer service
- After sales support
- Price
- Data cap
- Lock-in period
- Value for money

Hypothesis

In this study, we formulate five hypotheses based on the literature review.

H1. There are significant clusters of Internet service subscribers in terms of the attributes of Internet data service and packages

H2. There is a significant relationship between the clusters and the age of the respondents.

H3. There is a significant relationship between the clusters and the income of the respondents.

H4. There is a significant relationship between the clusters and the educational attainment of the respondents.

H5. There is a significant relationship between the clusters and the number of household members of the respondents.

Literature review

Theoretical underpinnings

This study founds its inspiration from previous studies that have studied customer groups of Internet subscribers based on quality service attributes. Thaichon *et al.* (2014) look at how different aspects of ISPs' service quality correlate with their customers' opinions of the value they deliver as well as their level of confidence in and dedication to that service. As part of the analysis, users are categorized according to their Internet use habits, and their opinions on various aspects of ISPs' services are analyzed. Based on this empirical pursuit, there are four factors that contribute to an ISP's service quality: network quality, customer service and technical assistance, information quality and security and privacy. Although all aspects

positively impact trust, their research shows that only network quality, information support and privacy substantially impact consumer value, and only information support is directly connected to commitment. Furthermore, the value added by customer care and information assistance varies depending on how a client typically makes use of the Internet. Quach *et al.* (2016), on the other hand, studied the relationship between customer loyalty and the many aspects of an ISP's service quality. They performed grouping of customers into distinct groups based on their patterns of Internet use, as well as an assessment of how those groups rate various aspects of their ISP's service.

Demographic characteristics linked with preference

Demographic variables have been reported to have an influence on the way people choose service providers (Jain, 2016). Internet usage is affected by gender and age, as found out by Servidio (2014). Hajiheydari, Maskan and Ashkani (2017) have concluded that the attitudes of respondents towards ISP selection are dependent on some demographic determinants – age, income and status and should be considered the key determinants affecting the attitudes and preferences of customers.

Deursen and Dijk (2013) concluded that age appears to be one of the most significant variables that affect Internet use. Young adults take the lead with the use of communication tools and are more likely to pursue entertainment and leisure activities, such as downloading music or surfing for fun. In contrast, buying products online, emailing and searching for health-related information is more popular among older users. Lee (2017) stated that income can be an explanatory variable. Furthermore, according to Chiou and Tucker (2020), preference for high-speed access comes from households with a higher income and higher education. Furthermore, according to the study by Balhara *et al.* (2019), income and education level play a key role when it comes to ISP usage and preference. Some studies supported the impact of the number of household members as a factor (Roder-DeWan *et al.*, 2019; Siaw, Jiang Twumasi, & Agbenyo, 2020; Chiou & Tucker, 2020). Furthermore, Chong (2013) concluded that demand for Internet service rises as the number of household members also increases.

Attributes of Internet service packages

Speed. Manzoor (2014) stated that the increase in mobile Internet speed is one attribute that their choice expert comes up with as missing upgrade on most telecommunication market regardless of 4G network being available nationwide because of many regions that are not covered or covered but lagging. Moreover, Akroush and Mahadin (2019) concluded in their study that when it comes to choosing an ISP, customers consider speed to be the most important factor. The classification of connection speed is an extraordinarily important quality feature. Download and upload speeds are in the interest of consumers with their access provider (Gerpott & Meinert, 2018). Liu, Prince and Wallsten (2018) stated in their study that as of 2018, ISPs were spending billions of dollars on speed improvements annually as they view Internet speed to be important, and ISPs are competing based on the speed that they can offer.

Network quality. Consumers are motivated by overall service quality, which emanates from a stable and fast Internet network quality (Ghezzi, Cortimiglia, & Frank, 2015). According to Nerjaku and Braimllari (2021), in the telecommunications market, network quality is one of the most important drivers of overall service quality, which leads to customer satisfaction in the context of telecommunication. Network quality includes the quality and strength of the network signal, number of errors and downloading and uploading speed (Gerpott, 2018). Stability, transmission speed and network coverage are the core attributes of network quality. Breaks in Internet connectivity can lead to poor perceptions of network quality from the customer's perspective (Abd-Elrahman, Hassan, El-Borsaly, & Hafez, 2019).

Network quality helps to create the necessary competitive advantage for ISPs by being an effective differentiating factor (Oluwafemi & Adebiyi, 2018; Santouridis *et al.*, 2009). While in the study by Adebiyi, Shitta and Olonade (2016), it was stated that consumers prefer service quality when the price and other cost elements are held constant. It has become a distinct and important aspect of the product and service offering. The strongest predictor of perceived value was, as expected, network quality. When a service package from an ISP contains a high-quality network, it is regarded to be of great value (Thaichon, Lobo, & Mitsis, 2014). Customers' first concern when reviewing an ISP's service is usually the network's strength and stability.

Customer service. Adebiyi *et al.* (2016) suggested that customer service be viewed as a system of activities that comprises customer support systems, complaint processing, speed of complaint processing, ease of reporting complaints and friendliness when reporting complaints.

Thaichon *et al.* (2014) stated that users prefer fast check outlines and friendly customer personnel instead of competent sales personnel and quick issue resolving facility of the operators. Customer service representatives are a vital link between customers and service providers (Caplin & Dean, 2015; Joudeh & Dandis, 2018). Studies found that customer service encounters increase customer intention and satisfaction (Nasereddin & Faqir, 2019; Sobolewski & Kopczewski, 2017). However, Ogunnaike, Salau, Adeniyi and Tairat (2014) discovered that not all customers of telecommunications services have access to online information support, especially in developing countries. This may be the reason why customers of other telecommunications providers may not value information support as much as ISP customers do.

Maintenance support/after-sales service. Wang and Xu (2016) iterated that after-sales support and customer value have a high correlation. For the telecommunications industry, after-sales support is synonymous with maintenance support or technical support (Anjum *et al.*, 2017; Shafei & Tabaa, 2016; Al-Weshah, Al-Manasrah, & Al-Qatawneh, 2019). This technical support provides touch points between the company and its customers and is a critical dimension of service quality in the telecommunications industry (Saafein, 2014). Quick response and a ready-to-serve customer support team is the measure of excellence and service standards (Zhao & di Benedetto, 2013). It constitutes a means to uncover customer needs and a strategic driver for customer retention. Jönke (2012) concluded that the more customers use the Internet on a regular basis, the more they need and appreciate instant support. Adusei and Tweneboah-Koduah (2019) revealed that after-sales services influenced customer satisfaction in a positive direction so that the level of technical support activities employed by a business organization to a large extent determines the level of profit margin to be made and the level of customer patronage (Mahmood & Manzoor, 2021; Visnjic, Wiengarten, & Neely, 2016).

Price. Junoh and Yaacob (2011) stated that with regards to price perception, although Internet broadband users are willing to pay more for better service, they will consider changing to another provider because of the price factor. Several studies confirmed that lower cost-per-engagement pricing, cheaper broadband software and hardware and low-cost, reliable broadband interconnection among communities are priorities for expanding broadband penetration and usage (Subekhi & Hadibrata, 2020; Puspita, Sihab, & Barata, 2022; Nerjaku & Spaho, 2021). Nerjaku and Braimllari (2021) supported the idea that customers of Internet services are sensitive to price, and the higher price level could lead to low demand.

Data cap and lock in periods. In countries with limited network bandwidth, a data cap is usually implemented in which when the subscriber reaches a certain amount of data consumed, the automatic configuration will reduce the Internet speed (Wang, Ma, & Xu, 2017). Flat-rate pricing was widely embraced since it was simple for ISPs to implement and liked by consumers because of its ease of use and convenience. However, there are also

drawbacks to the flat-rate model because of the fast growth of data-heavy services like online video streaming and cloud-based apps that are becoming increasingly popular (Labovitz, Iekel-Johnson, McPherson, & Jahanian, 2011). As a result, an unreasonable amount of bandwidth is subsidized by regular users, and ISPs cannot earn enough revenue to repay their expenditures, particularly for mobile carriers (Nabipay, Odlyzko, & Zhang, 2011).

Urama and Ogbu (2018) show that data plans that allow more data transfer are more expensive than those with strict data caps. These results demonstrate that consumers value the ability to use more data at zero marginal cost. Lock-in periods in telecommunications services are a common practice employed by telecommunication providers to ensure that they cover the significant capital costs. This may hurt consumers because they reduce their freedom to change telecommunications providers (Yang, de Matos, & Ferreira, 2020).

Calvo-Porral, Faíña-Medín and Nieto-Mengotti (2017) mentioned in their study that it is a common practice for companies or providers to offer low-priced plans when they subscribe to a long-term contract or long-term subscription. This type of subscription is also called a lock-in contract since these long-term contracts establish the length of time required to switch providers where switching costs are constructed by mobile operators strategically to retain customers, even when customers are not satisfied (Czajkowski & Sobolewski, 2015).

Value for money. Value for money in any service industry is not about the cost but about the benefits that the customer receives in exchange for such costs (Franklin, Lomas, & Richardson, 2020). In view of Internet service, Thaichon and Quach (2015) found out that consumers select their network operator on the basis of the value-added services they offer overall. The empirical findings from exploratory factor analysis support the claim that perceived value for money is one of the significant predictors of patronage loyalty with respect to mobile and Internet network services (Ghorban & Tahernejad, 2012; Thaichon *et al.*, 2014; Mostafa, 2020). These findings reveal that perceived value for money is the most decisive factor that influences consumers' cross-usage behavior where value proposition, latest quality services and a wide assortment of services are regarded as good value for money.

For one, Thaichon *et al.* (2014) discovered that the exchange between what customers receive and what they must provide to purchase a service is frequently referred to as customer value. In the telecommunication service setting, perceived monetary value has a positive and significant effect on customer satisfaction and has a significant positive effect on customer loyalty intention towards their ISPs (Kar & Singh, 2012). In this study, monetary value is subscribing to a provider that is deemed to be reasonably priced, good value for money and economical. Moreover, based on the study by Ezeh, Ekemezie and Okafor (2021), it is concluded that value for money should be the first on the list of Internet bundles list.

Methodology

Research design and statistical methods

The researchers utilized an exploratory research design. This form of research is typically used to discover patterns among the responses of the research participants (Makri & Neely, 2021; Kandiero & Makuwatsine, 2022). In this study, the researchers discovered customer groups of Internet service based on their level of preferences on Internet service attributes. As stated by Ebrahim, Ghoneim, Irani and Fan (2016), exploratory findings provide insights into the relative importance of consumer perceptions on different brand knowledge factors in shaping brand preferences. It also demonstrates the significance of consumers' experiential responses toward products in developing their preferences.

Cluster analysis is used in discovering clusters or homogenous groups of subscribers based on their preferences on the attributes of Internet service. Cluster analysis works by partitioning a data set into groups (clusters) in such a way that all the data are contained

within each cluster (Kosasih, Laricha Salomon, & Hutomo, 2017). K-means clustering approach is used for the following reasons: (1) simplicity; (2) the data comes from survey responses treated as a ratio or continuous scale (Wu, Wang, & Wu, 2022) and (3) if the dataset is not large (Yuan & Yang, 2019). Hartigan-Wong K means employed since, compared to other available algorithms, it first allocates all data points to random centroids (Almanza-Ortega, Pérez-Ortega, Zavala-Díaz, & Solís-Romero, 2022).

To verify if these clusters are significantly different from each other, an analysis of variance is applied to the formed clusters.

To find if there is a significant relationship between the profile of the subscribers and the clusters formed, the chi-square test was used since, in this stage, both variables are categorical in nature. Cramers' V is also generated to serve as an effect size of these symmetrical relationships.

Participants of the study and sampling method

The participants of the study consist of 275 WFH employees that have an existing subscription to an ISP. Respondents are from Metro Manila and Cavite. Participants were over 18 years of age and above. This is above the minimum sample size of 120, as suggested by Dalmaijer, Nord, and Astle (2022), which concluded that the sample size for K-means cluster analysis is computed by 30 multiplied by the number of expected clusters (K), which is 4. 30 multiplied by four is 120. Based on this assumption, the sample size gathered is sufficient to conduct the K-means clustering.

A stratified sampling design was applied in this endeavor since their respondents should be representatives of homogenous groups of age, income, educational attainment and the number of household members.

Respondents of the study are from different ISPs in the Philippines. Here is the frequency distribution of the respondents arranged according to their ISP.

In Table 1, it can be viewed that most of the respondents are subscribers of PLDT, followed by Converge. Small samples are subscribers of Sky cable.

Instrumentation and procedure

The researchers conducted a Google form survey from April 21 to May 30, 2022, which contains five-point Likert-type questions for each of the Internet service attributes and profiles of the respondents. The survey was promoted through social media posts and with the help of referrals. Respondents were approached with a request to participate in the study and were promised that the information gathered would be utilized solely for academic purposes. Respondents were invited to take part in the study by filling out an online survey questionnaire that will be answered by the work from home employee with an existing Internet subscription.

Results and discussions

Presented herein are the tabulation, presentation and analysis of data gathered from the respondents of the study.

Table 1.
Response frequency based on ISP

Levels	Counts	% of total	Rank
PLDT	91	33	1
Converge	81	29	2
Globe	72	26	3
Sky	31	11	4
Total	275	100	

Results presented in Table 2 show that Internet subscribers give more preference to value for money (M = 4.23, SD = 1.1) amongst all Internet service attributes. This finding supports those of Thaichon and Quach (2015), Ghorban and Tahernejad (2012), Thaichon *et al.* (2014) and Mostafa (2020) that perceived value for money is the most decisive factor that influences consumers' cross-usage behavior. Maintenance/after-sales support is the second concern of the respondents among Internet service attributes (M = 4.19, SD = 1.22). It particularly augments the results Wang and Xu (2016), Anjum *et al.* (2017), Shafei and Tabaa (2016) and Al-Weshah *et al.* (2019) that the after-sales support and the maintenance services that a firm provides will give them the ultimate competitive advantage. Network quality is the third most preferred attribute of Internet subscribers (M = 4.11, SD = 1.17). This solidifies the claims of Nerjaku and Braimllari (2021) and Thaichon, Lobo, and Mitsis (2012) that network quality is one of the most important drivers of overall service quality. This leads to customer satisfaction in the context of telecommunication. Customers' first concern when reviewing an ISP's service is usually the network's strength and stability.

The least concern of Internet subscribers is the lock-in period (rank 8), data cap (7) and price (6). It seems that the respondents do not give too much importance to the attributes related to the Internet service contract. The results contradict the findings of Junoh and Yaacob (2011) that broadband users are willing to pay more for better service. It seems that the contract attributes are not given too much importance in switching Internet service. This undermines the results of Nerjaku and Braimllari (2021) that are sensitive to price, and the higher price level could lead to low demand. The study of Liu *et al.* (2018) is also challenged in which they found out that data plans that allow more data transfer is more expensive than those with strict data caps. Furthermore, the results dispute the claims of Yang *et al.* (2020) that lock-in or contract is important to the respondents to have a shorter lock-in period or contract when purchasing Internet service packages.

Cluster analysis

The results of the K-means clustering analysis performed using the Hartigan-Wong algorithm is shown below:

Table 3 exhibits the results of the cluster analysis performed. There are four clusters that have been detected by the analysis. The cluster analysis is formed through the mean responses for each attribute shown in the succeeding columns. Cluster names are devised only by the researchers based on the preferences given by respondents grouped in each cluster as indicated by the level of their mean responses for each attribute.

The first cluster is given the name "service value expecters" because their high mean points show that they give utmost preference to the attributes of network service, after-sales support and value for money. It seems that the consistency of network service and the value for money are the only important considerations for this cluster. There are 44 respondents who are grouped under this cluster.

Attributes	Mean	SD	Rank
Speed	3.85	1.1	5
Network quality	4.11	1.17	3
Customer service	4.04	1.18	4
Maintenance/after-sales support	4.19	1.22	2
Price	3.68	1.1	6
Data cap	3.57	1.03	7
Lock-in period	3.38	1.02	8
Value for money	4.23	1.1	1

Table 2. Level of preferences on Internet service attributes

The second cluster is given the name "average expecters" because they possess the middle points in their level of preference on the Internet attributes compared to the rest. These average expecters suppose that Internet service will be at least of standard service and package. There are 67 respondents in this cluster.

The third cluster is given the name "low expecters" because they give minimal consideration to all attributes of internet service packages. They are the subscribers who can be easy to satisfy since they only have marginal expectations. There are only 26 respondents in this cluster.

The fourth cluster is named "high expecters" since they have high expectations for each of the Internet attributes. They put high importance on each of the attributes when they consider Internet service. There are 138 respondents under this cluster, the highest among the sample data.

Figure 1 shows an illustration of the levels of preference of each cluster based on the variables of Internet service attributes.

To validate if there is a significant difference among these clusters, an analysis of variance is performed, and the results are shown in Table 4.

The result of ANOVA shows that each of the mean responses for each of the attributes is statistically different from each other. Hence, the clusters formed by the K-means cluster analysis are statistically significant. Therefore, H1, which states that there are significant clusters based on their preference for Internet service attributes, is accepted.

Table 3.
Market clusters of Internet service subscribers in terms of the mean responses to attributes of Internet data service

Cluster no.	Cluster name	Count	Speed	Network service	Customer service	After-sales support	Price	Data cap	Lock in	Value for money
1	Service value expecters	44	1.334	4.291	1.917	4.418	1.708	1.833	2.04	4.876
2	Average expecters	67	4.045	3.91	3.911	3.816	3.508	3.513	3.428	3.985
3	Low expecters	26	1.795	1.398	1.59	1.436	1.783	1.743	1.667	1.668
4	High expecters	138	4.28	4.706	4.693	4.877	4.239	4.049	3.761	4.8

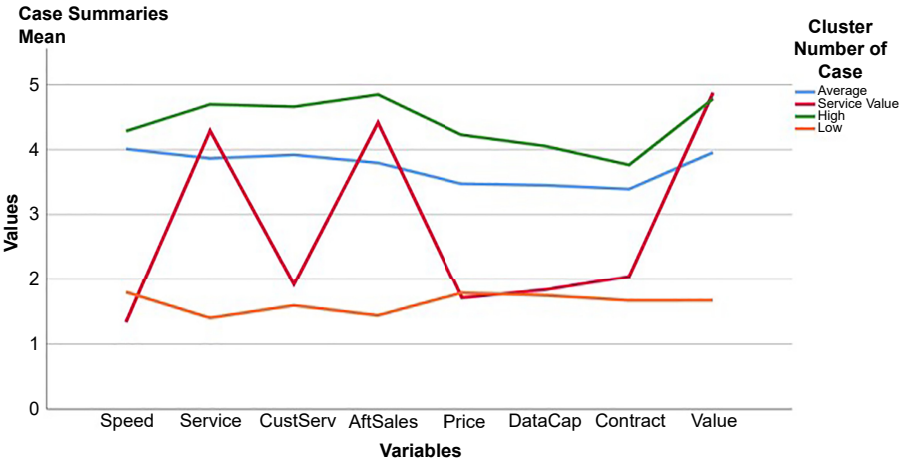

Figure 1.
Graph of market clusters of Internet service subscribers in terms of the attributes of Internet service attributes

Symmetric tests

The following tables present the chi-square tests and the Cramer's V results to show if the clusters have a significant relationship with each of the demographic variables. The chi-square results indicate whether or not there is a significant relationship between the demographic profile of the respondents and clusters formed. The Cramer's V results show the effect size of such a relationship.

Table 5 shows how much each of the respondents is distributed according to their age groups. Most of the respondents are under 18 to 28 years old ($n = 100$), followed by 27-38 years old ($n = 83$). It can be noticed that most of the age groups are under the high expecter cluster ($n = 138$). Furthermore, moving along from the youngest to the oldest age group, the number of high expecters seems to decrease. It probably means that the older the subscriber is, the fewer expectations he/she has about the Internet service. This trend can also be observed across average and service value expecters. By analyzing the column of the low expecters, this trend is also supported as many of the low expecters are from the older age groups.

Table 6 presents how the clusters are related with age. The chi-square value is significant ($X = 26.571$; $p = 0.013$), which means that the age of the respondents has a significant relationship with the clusters. The effect of this relationship is about 0.195. This supports the acceptance of H2, which states that there is a significant relationship between the age group and the clusters. We can conclude that as age increases, fewer expectations can be observed from Internet subscribers.

The number of respondents based on their income groups and cluster group they belong to is shown in Table 7. Most of the respondents earn around P11k to P20k monthly ($n = 80$)

Attributes	*F*	*p*
Speed	193.2	<0.001
Service	580.8	<0.001
Customer service	264.3	<0.001
After-sales support	504	<0.001
Price	166.8	<0.001
Data cap	132.6	<0.001
Lock-in period	83.4	<0.001
Value for money	209.6	<0.001

Note(s): df = 3

Table 4. Analysis of variance of the Internet service attributes

Groups	Average expecters	Service value	High expecters	Low expecters	Total
18–28 years old	32	13	54	1	100
27–38 years old	21	14	46	2	83
39–48 years old	11	9	34	9	63
49–58 years old	3	8	4	14	29
Total	67	44	138	26	275

Table 5. Crosstab of clusters against age groups

Symmetric tests	Value	df	Asymptotic significance (2-tails)
Pearson chi-square	26.571	9	0.013
Cramer's V	0.195		

Table 6. Chi-square and Cramer's V – age group

and P21k to P30k ($n = 83$) monthly. It can be noticed across all clusters that the general trend is that as the income of subscribers increases, their expectations of the Internet service attributes also decreases. Consequently, low-income groups (from below P10k to P30k) can be seen as having high expectations of each of the attributes across all clusters except in case of High Expecters.

Table 8 confirms that income has a significant relationship with the clusters ($X = 30.530$, $p = 0.002$). The difference is at 0.206. This enables us to propose the acceptance of H3, which states that there is a significant relationship between income and the clusters formed. Deducing from the cross-tabulation, we can infer that as their income increases, the subscribers also tend to lower their expectations of Internet service attributes. This can be a counterintuitive result in which, normally, we can presume that as the income of a subscriber increases, he/she will have more reason to demand the quality of the Internet service deal (see Tables 9 and 10).

Reviewing Table 9, it can be realized that most of the respondents are college graduate ($n = 138$), followed by high school graduate ($n = 62$) and vocational graduate ($n = 30$). Most of the respondents across all clusters are at the college level. However, a defining trend between the number of educational attainment groups across clusters cannot be obviously defined.

Table 7.
Crosstab of clusters against income groups

Groups	Average expecters	Service value expecters	High expecters	Low expecters	Total
Below P10k	21	13	13	10	57
P11k to P20k	20	11	42	7	80
P21k to P30k	16	9	53	5	83
P31k to P40k	3	5	22	4	34
More than P40k	7	6	8	0	21
Total	67	44	138	26	275

Table 8.
Chi-square and Cramer's V – income group

Tests	Value	df	Asymp. sig. (2-sided)
Pearson chi-square	30.530	12	0.002
Cramer's V	0.206		

Table 9.
Crosstab of clusters against educational attainment

Groups	Average expecters	Service value	High expecters	Low expecters	Total
Attended or graduated from grade school	8	9	6	6	29
High school graduate	21	5	33	3	62
Vocational graduate	8	4	15	3	30
College graduate	28	23	73	14	138
Postgraduate degree	2	3	11	0	16
Total	67	44	138	26	275

Table 10.
Chi-square and Cramer's V – educational attainment

Symmetric tests	Value	df	Asymp. sig. (2-sided)
Pearson chi-square	13.673	12	0.322
Contingency coefficient	0.103		

This result shows that educational attainment groups do not define the clusters ($X = 13.673, p = 0.322$). Therefore, this evidences the rejection of H4, which states that market clusters have a significant relationship with the educational attainment of the respondents.

As can be seen in Table 11, most of the research participants come from a household with four to six members ($n = 122$), followed by those with one to three members ($n = 80$). There is no clear trend by just looking at the distribution of numbers across the clusters and the household groups (see Table 12).

The symmetric test results shown in Table 12 supports the claim that there is no significant relationship between the number of household members and the clusters formed ($X = 12.364, p = 0.194$). This causes the rejection of H5, which states that there is a significant relationship between the number of household members and the clusters.

Conclusions, limitations and future recommendations

The result of the cluster analysis has generated four clusters of Internet service subscribers in terms of the attributes, which are named the service value and average, high and low expecters based on their mean responses. Service value expecters are those WFH Internet subscribers that give high preference to three aspects only: Internet service, maintenance, and value for money. Low expecters seem to be indifferent to all the features of Internet usage. Average expecters are those who have medium to high preferences on all Internet attributes. High expecters are those who have high expectations on all items of Internet service packages. It can be noted that most of the subscribers are high expecters who give value to each of the Internet service attributes ($n = 138$), followed by the average expecters ($n = 67$) and service value expecters ($n = 44$). ANOVA results justify and accept the alternative hypothesis that there are significant clusters of Internet service subscribers in terms of the attributes of Internet data service and packages.

Based on the results of the study, the WFH Internet subscribers give importance not just to fast Internet connection but also to reliable and consistent Internet speed during work hours. These subscribers value Internet stability and maintenance rather than Internet speed. The quality of the network service also takes preference over the contractual attributes of an Internet service package. They are willing to accept high prices and be obligated not to switch with other ISPs as long as they the value of what they are paying. Customer service and after-sales support are also considered important service attribute where most of the complaints are about getting a slow response on technical issues. Customer support availability is also important to the respondents.

Therefore, it is important for the ISP to know the attributes of the service that affect the consumer preference for Internet data services. In terms of the attributes of Internet data

Groups	Average expecters	Service value	High expecters	Low expecters	Total
1 to 3	23	5	45	7	80
4 to 6	28	24	62	8	122
7 to 10	11	7	28	8	54
More than 10	5	8	3	3	19
Total	67	44	138	26	275

Table 11. Crosstab of clusters against number of household members

Symmetrical tests	Value	df	Asymp. sig. (2-sided)
Pearson chi-square	12.364	9	0.194
Cramer's V	0.131		

Table 12. Chi-square and Cramer's V – the number of household members

service, it is recommended for a telecommunication company to improve their network quality by providing a stable and consistent Internet speed according to the speed indicated in their data plans. It is very important that ISPs are responsible for providing stable Internet connection so that the employees that work at home can be productive during their working hours. Along with speed, the telecommunication companies should also improve their customer service and after-sales support. They should provide continuous training to maintain the knowledge and competency of their support, and for quick response to the customer's concerns, they can hire additional customer service representatives and have a shifting schedule to accommodate concerns 24 hours. By having these service attributes, the telecommunications company will both retain and gain new customers.

The study shows that price, data cap and lock-in period are not a priority in choosing an ISP deal. The attributes that are given preference are network quality, after-sales support and value for money. So it is recommended that ISP should focus on stabilizing network quality, be very active in troubleshooting network problems and optimize the cost shouldered by the subscribers. It is important to give the telecommunication companies an impression that the market has a high expectation when purchasing Internet data packages to oblige them to provide a better service, and the money being paid to them will be more worth it.

The result of the study shows that there is a significant relationship between the market clusters and the income of the respondents. This study concludes with a counterintuitive result in which WFH subscribers with higher income tend to give less importance to each Internet service attribute. Subscribers with income of around P10k to P30k monthly are those who expect more from each of the features of internet service. Therefore, it is recommended that the telecommunication companies should provide different Internet service and package plans that are reasonable and acceptable to multiple ranges of income, notwithstanding the network quality, highly responsive troubleshooting and value for money.

There is also a significant correlation between age and the formation of market clusters. As the age of the WFH Internet subscribers increase, they show less valuation on each of the Internet service attributes. Based on this result, it can be recommended that marketing strategies may be adjusted based on the age of the Internet subscribers.

Limitations, future recommendations and practical implications

Only individuals who are working from home are the respondents of this study. It does not distinguish the nature of the jobs of the respondents as it is not part of the hypothesis.

Future research is recommended to be pursued with the objective of including other variables that might affect the considerations of home Internet subscribers. It can also be recommended to increase the sampling frame to cover more respondents. Qualitative research for the purpose of discovering possible reasons why as people age and as people increase their income, they become less demanding or indifferent to the Internet attributes.

Practical implications of this study postulate that Internet subscribers are now more concerned with network quality, maintenance support and value for money. Subscribers are willing to pay a high price and are not too much concerned with data caps and lock-in periods as long as they get the value for what they pay for.

Home Internet subscribers can be grouped into four market clusters – low expecters, average expecters, high expecters and service value expecters. Low expecters are those who have minimal demand for Internet service. Average expecters are those who expect a certain standard for the Internet service features. High expecters are those who have a high demand for what the ISP can provide. Service value expecters are those subscribers that are only concerned with network quality, maintenance support and value for money. Most of the subscribers are under the high expecters, followed by the service value expecters.

The age and income of the subscribers are the profile that can affect the formulation of market clusters in the Internet service industry. Those people in the younger age groups can

be seen as more demanding, while older people tend to be content with their Internet service. Counter-intuitively, people with higher income seem to be more easily satisfied with Internet service features, while those people with lower income seem to be more demanding. The educational attainment and the number of households do not have a direct effect on the formulation of the market clusters of Internet subscribers.

The results presented above can be used as reference in coming with improved Internet service packages as a marketing strategy. Internet service packages especially for WFH employees should be crafted from a more stable network quality, responsive maintenance support and value for money. Contractual limitations such as data caps and lock-in periods are accepted by subscribers as long as they get the best value of what they pay for.

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Corresponding author
Emmanuel Posadas Paulino can be contacted at: eppaulino@dlsud.edu.ph