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## *Full Length Research Paper*

# Exploring influencing factors for the selection of mobile phone service providers: A structural equation modeling (SEM) approach on Malaysian consumers

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The aim of this paper is to assess the factors that have played significant role to select telecommunication service providers. A survey instruments were employed on Malaysian mobile phone operator's consumers' included by demographic background, price, service quality, service availability and promotion. Data were collected from the consumers' of three mobile phone operator's from major cities in Malaysia. To determine the factors and examining their relationship of those factors towards the consumer's perception in selecting an operator's services. This research has applied exploratory factor analysis, confirmatory factor analysis and structural equation modeling for testing hypotheses. From the result it is revealed price or call rate is the most important factor followed by service quality, service availability and promotion. It is hoped that the findings of this study will assist the mobile phone industry of Malaysia in what they can produce in their services and how they want to promote their services as well. The findings of this study also assist mobile phone operator's managers to invest their resources more efficiently, making changes to crucial quality attributes that elicit the consumer's satisfaction level. However, the findings of this study may provide needed feedback and contribute to the improvement of players' strategy and their marketing program. The study only included information of limited variables and from few cities in Malaysia with limited sample size. However, further research should be considered to gather more information regarding the brand image, corporate image, and customers' satisfaction dimensions in context of the Malaysian mobile phone operators with larger sample.

**Key words:** Mobile telecom service provider, consumer perception, price, service quality, promotion.

## INTRODUCTION

In a competitive market, service providers are expected to compete on both price and quality of services and also it is necessary for the service providers to meet the consumers' requirements and expectations in price and service quality (Melody, 2001). Telephone, for example, provides ubiquitous social interactions between and among individuals, groups, organizations, and the

governments alike and that subsequently makes and operates a broadly networked international environment tying nations, cultures, casts, creeds, national identities and businesses. Worth noting is that the telecommunication industry in Malaysia has also been a fastest growing sector keeping appropriate pace with global advancements, especially the mobile telecom market. This development has become a catalyst for the growth of the nation's commercial and industrial sectors. This telecommunication sector contributed much to the nation's economic growth and development which is consistent with the National Vision 2020. The growth rate

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in the use of telecommunication facilities has increased dramatically, especially in the rank of increasing number of telephone subscribers. The number of telephones for every 100 persons increased from 6.5 in 1985 to 12 in 1993 (Government Report, 1995). The fixed line penetration ratio had risen to 16.6 per 100 population and 21.0 per 100 populations respectively by 1995 and 2000 (Lee, 2001). Now Government of Malaysia plans to have a telephony penetration rate of 50% for the whole country and 25% for the rural areas by year 2020 (State of Hawaii Government, 2002). Scrutinizing the background of Malaysian telecommunication sector, competition can be seen as main factor by the telecommunication service provider companies. Companies like Sapura Digital Sdn. Bhd., Celcom and Mobikom Berhad have gone through a market evaluation stating the fact that their companies either should be merged with giant and more competitive companies or to be gone through potential bankruptcies. This reflects a fact as how the market is being penetrated and flooded by the competitors. Only Telekom Malaysia (TM) Sdn. Bhd., with its TM Touch services has managed to maintain its credible presence in the industry. TM has been ranked as one of the leading telecommunication service providers in the entire Asia with significant investments in overseas. Beside TM, three other major companies have been operating in Malaysia namely Celcom, Digi and Maxis. These three service providers usually cover the following segments of the Malaysian telecommunication market traditional telecommunications, IP services, wireless and mobile markets and technologies, broadband markets and technologies. They also provide most sophisticated mobile services with an expanding number of value added services such as Short Message Service (SMS), Wireless Application Protocol (WAP), Subscription Services (SS), General Packet Radio Services (GPRS), and Third Generation Services (TGS). To modernize and to enhance telecommunications service growth rate, a competitive element was introduced in stages. The first step involved the incorporation of TM in 1987 as a government-owned company. Later, new companies were licensed to provide certain services such as mobile cellular telephones, pagers, trunked radio, two-way radio system and other value-added services (Government Report, 1995).

This research focuses particularly on consumer in the cell phone industry in Malaysia. Moreover the proposed research also builds on existing consumer behavior literature by exploring the role of perception that ultimately influence for the selection of an operator's services. The overall objective in this research is to understand the influencing factors for the selection of mobile phone service providers in Malaysian mobile telecom market by the customers.

Meanwhile Deutsch (1953) states this trend as "a web of nations". Today's development of communication technology ignores the global border and makes the world as "global village" (McLuhan, 1964). This reform of

the communication technology since been expanded to include the transformation of the traditional voice telecom network into an expanded and enhanced information infrastructure, which is capable of communicating all forms of information content (Melody, 2003). The growth rate in the use of telecommunication facilities has increased dramatically, especially in the rank of increasing number of telephone subscribers. The number of telephones for every 100 persons increased from 6.5 in 1985 to 12 in 1993 (Government Report, 1995). The fixed line penetration ratio had risen to 16.6 per 100 population and 21.0 per 100 populations respectively by 1995 and 2000 (Lee, 2001). Now Government of Malaysia plans to have a telephony penetration rate of 50% for the whole country and 25% for the rural areas by year 2020 (State of Hawaii Government, 2002). The telecommunication system has been a fastest growing medium of communication rejuvenating global interface interactions. Since, currently telecommunication sector is experiencing phenomenal global change with the liberalization and privatization of the sector (Beard and Hartmann, 1999), which in turn, widens a fierce competition. The system has opened an ocean of opportunities for the potential consumers to enjoy versatile choices among the service providers. Now days, due to breathtaking competition, the telecommunication service providers tend to offer innovative services as well as competitive prices just to attract handful magnitude of customers. The nature of the competition today in the global telecommunications industry seems to centre on market activities that aim at gaining competitive advantages through strategic combinations of resources and presences in multiple products and geographical areas (Chan-Olmsted and Jamison, 2001). The success of telecommunication industry depends on prudent efforts and feasible investments. As a result, Cassey Lee, (2001) indicated that Malaysia has been reforming the restructuring the telecommunication sector since 1987. The participation of the private sector in the transformation and development of the country's communication infrastructure has ensured the necessary information infrastructures and work on wiring the country have been carried out for the last 10 years.

In a competitive market like Malaysia, service providers are expected to compete on both price and quality of services and also it is necessary for the service providers to meet the consumers' requirements and expectations in price and service quality (Melody, 2001). Customers' need fundamental information about the mobile telecommunication service providers before they intend to purchase a certain operator's line. Thus, it seems extremely important that a company competing in the sector must recognize the needs, wants, tastes, criteria and the perceptions of their consumers in the first place. As competition has been escalating among the telecom operators', it is ardently necessary for them to learn about the consumers' perception about the price, promotion,

service quality and other important factors that may have been playing a vital role in selecting the telecommunication service providers.

Therefore, the major objective of this study is to cautiously examine the factors that have been affecting the consumers' perception to select mobile telecommunication service, particularly in the context of Malaysian environment. Malaysia has been among the most modern telecommunications networks in the region with fiber optic trunks in Peninsular Malaysia, satellite, Very Small Aperture Terminal (VSAT) and Integrated Subscriber Digital Network (ISDN) services. The digitization of the network is far advanced covering about 80% of the transmission lines with over 96% of the main lines connected to the digital exchanges (Sectoral Studies Report, 1999). This physical and structural transformation has gone through during the past fifteen years. The penetration rate of telephone in Malaysia rose up to 540% between 1985 and 2000 (Lee, 2001). Particularly, privatization and liberalization of the sector greatly helped the nation to reform the telecommunication and ancillary sectors and also admirably increased its competition among the service providers.

Especially, in today's market, the mobile technology has been extremely competitive and service providers are moving aggressively to attract versatile customers by offering some meaningfully attractive promotions and services. According to Eu (2010) said the year started with uncertainties. Mobile operators were worried that the global economic slowdown would hurt consumer spending, and eventually, their earnings. In the first half, most telecom's chief executive officers were reluctant to provide forecasts on concerns over the severity of the recession. For example, DiGi.Com Bhd recorded a quarter-on-quarter net profit and revenue decline for the quarter ended 30th June, 2009. But the industry kept on adding customers. Slowing growth used to be the worry for industry players but this did not appear to be the case as other smaller telecom's entered the market (Eu, 2010). In this turn around situation, it is therefore, notably important to know the consumers' overall perceptions about the service providers in Malaysian telecom market on which service delivery would largely depend on their future success. In this study the researchers have tried to pin down the Malaysian consumers' perceptions and their rejuvenating ideologies about the mobile telecommunication service providers and their services. The outcome of the study would deliberately assist the Malaysian mobile telecom service providers to take passionate actions towards enriching customers' service experience.

## LITERATURE REVIEW

The telecommunication has been part of a larger class of industries, public utilities, with similar technological, economic and public service characteristics by tradition. According to Melody (2001) public utilities is derived from

the law in any country. Where the demand for a good or service is considered a common necessity for the public at large and the supply conditions are such that the public may not be provided with reasonable service at reasonable prices. This is a condition that a government takes state initiative to make smooth supply and delivery of utilities under the public overhead expenditure schemes just to provide an example of government's sympathy toward common citizen.

## SERVICES QUALITY

According to Leisen and Vance (2001) service quality helps to create the necessary competitive advantage by being an effective differentiating factor. Service quality was initiated in the 1980s as the worldwide trend when marketers realized that only a quality product could not be guaranteed to maintain competitive advantage (Wal et al., 2002). However, competitive advantage by firms is a value-creating strategy, simultaneously which is not implemented by any existing or potential competitors (Barney, 1991). As a result, service quality can be used as a competitive advantage which is related to customers' satisfaction and also leads to consumer loyalty and future purchase (Johnson and Sirikit, 2002). In particular consumers prefer service quality when the price and other cost elements are held constant (Boyer and Hult, 2005). It has become a distinct and important aspect of the product and service offering (Wal et al., 2002). Moreover, according to them, a competitive advantage also sustained when other companies are unable to duplicate the benefits of this strategy. Service quality is essential and important for a telecommunication service provider company to ensure the quality service for establishing and maintaining loyal and profitable customer (Zeithaml, 2000; Leisen and Vance, 2001). Conversely, Johnson and Sirikit (2002) state as service delivery systems have the ability to allow managers of company to identify the real customer feedback and satisfaction on their telecommunication service. Since, quality reflects the customers' expectations about a product or service. Lovelock (1996) stated that this customer driven quality replaced the traditional marketing philosophies which was based on products and process. Service quality is different from the quality of goods. Since, services are intangible, perishable, produced and consumed simultaneously and heterogeneously (Zeithaml and Bitner, 2000). So, it sounds as a major problem for the telecommunication service providers, especially for the mobile telecommunication service providers to deliver quality service consistently as changes in market compositions and competing characteristics have been surfacing incessantly. According to Wang and Lo (2002), marketing and economics quality often depends on the level of product attributes. They also state that there are two primary dimensions for quality in operations management. At first, fitness of use, which refers to product or services that is

supposed to do and possess features to meet the customer needs. The other one is reliability, which represents the product that is free from deficiencies. Accordingly, it is important for a company to understand how customers perceive their service quality.

Consequently, Rust and Oliver (1994) pointed out that companies need to measure consumers' satisfaction with their products and services. Generally, service and product quality always lies in the minds of the consumers depending on individual buying capacity, buying behavior, demand, taste, and fashion criteria and obviously the competitive markets that provide significant differentiation strategies. Therefore, it seems a downright necessity for the mobile telecommunication service provider to communicate directly with the potential consumers for measuring possible quality attributes. According to Wal et al. (2002), quality reflects the extent to which a product or service meets or exceeds consumers' expectations. Wang and Lo (2002) studied on comprehensive integrated framework for service quality, customer value, and customer satisfaction and behavioral intentions of customers in China's mobile phone sector. They conceptualized factors with service quality as antecedents to customers' overall evaluation of service quality rather than dimensions or components of the construct. Herein, they found that the competition between two mobile phone service providers is more intense than ever. This competition is not only in ensuring network quality by a large amount of investment in network extension and upgrading but also in customer acquisition and retention by direct and indirect price reduction efforts.

Customer perceptions of the quality of a service are traditionally measured immediately after the person has consumed the service. In fact, consumer's perception of service quality at the time he or she next decides whether or not to buy the service may better explain repeats buying behavior (Plamer and O'Neill 2003). Quality has been defined as a characteristic that goods or services must possess in order to be perceived as useful. Hence, what is a quality product to one demographic may not necessarily be a quality product to another (Praxiom, 2005). Crosby et al. (2003) examined how perceptions of quality are created and maintained in the minds of consumers. Phusavat and Kanchana (2008) described quality represented the most important competitive priority. Quality was given the highest weight of 36.4%, while service provision, customer-focus, and know-how were at 20.4, 12.9 and 12.5%, respectively. The remaining weights were 9.8% for costs, and 8.0% for flexibility. The impact of perceived quality on the attitude toward the extension can be unambiguously positive. In spite of that, Omotayo and Joachim (2008) attempted to find the relationship between customers' services on customer retention in telecommunication industry in Nigeria. They reached that if retention is not managed, customer's loyalty may be lost. The hypotheses of their

research were supported indicating strong relationship between customer service, satisfaction and retention in the communication industry in Nigeria. The findings of the study showed strong support for the application of customer service to enhance customer retention. The results further showed that the respondents in this study have a positive impression towards their telecom company's ability to meet their changing needs. This demonstrates that the respondents would likely stay with their telecom companies as long as the companies are able to satisfy their changing needs. Besides that, in hypercompetitive environments like the wireless industry, keeping existing customers is one of the most effective ways to drive profitability, as it is more costly to attain a new customer than to retain an existing one (Mobile, 2005). So the following hypothesis can be tested based on the above literature.

H<sub>1</sub>: Service quality has a significant influence on consumer perception in selecting mobile telecommunication service provider.

## PRICE

Price plays a vital role in telecommunication market especially for the mobile telecommunication service providers (Kollmann, 2000). It includes not only the buying price but also the call and rental charges. Generally, a price-dominated mass market leads to customers having more choices and opportunities to compare the pricing structures of diverse service providers. A company that offers lower charges would be able to attract more customers committing themselves to the telephone networks, and hence, significant number of "call minutes" might be achieved. According to Kollmann (2000), income from the number of call minutes determine the basic commercial success for the network providers. He also added that the success of the telecommunication sector in a market place largely depends on continuing usage and pricing policies, which need to be considered on several levels. Draganska and Jain (2003) stated that a common strategy for a company extending their product or service is to differentiate their offerings vertically. In this era of information age, price competition has become cutthroat in mobile telecommunication industry. Trebing (2001) mentioned that there are three sets of strategies for pricing behavior. The first is limit entry pricing, which is used for protection of the market position of the firm; second is the high access charges for new entrants, and the third one is tie-in sales to write off old plant or standard investment against captive customers. According to the author, limit entry pricing involves setting low prices in highly elastic markets to attract or retain large customers with monopolistic buying power, while maintaining high prices in inelastic markets.

Consumer research over the past three decades has

documented the persistent impact that price has on consumer perceptions of a product (Janakiraman et al., 2006; Vanhuele et al., 2006). Customers in telecommunication industry have preconceived notions about the price and value of telecommunications services. Customers have historically complained about the level of local charges, more than they have about long distance; although, local service is frequently offered at a price lower than actual cost. When long-distance service is priced well over cost, and local service is generally priced well under cost, customers expect to pay very low prices for local services and apparently do not mind that long-distance could be less expensive but is not (Strouse, 1999). Munnukka (2008) indicated that a significant and positive relationship exists between customers' price perceptions and their purchase intentions, and that the formation of price perceptions is significantly influenced by satisfaction with pricing and services. Munnukka (2005) also explained that in mobile services sector business practitioners are facing problems in pricing decisions as they are short of knowledge on their customers' price sensitivity levels and dynamics. It was discovered that mobile service customers differ significantly in their price sensitivity levels; customers with moderate usage of mobile services are least price sensitive, while intensive and low-end users are most sensitive to price changes. From the consumer's perspective, price is what is given up or sacrificed to obtain services. The following hypotheses can be drawn which will be tested latter on.

H<sub>2</sub>: Price has a significant influence on consumer perception in selecting mobile telecommunication service provider.

## SERVICE AVAILABILITY

Consumer's perception of product quality is always an important aspect of a purchasing decision and market behavior. Consumers regularly face the task of estimating product quality under conditions of imperfect knowledge about the underlying attributes of the various product offers with the aid of personal, self-perceived quality criteria (Bedeian, 1971 adapted by Sjolander, 1992). According to Sjolander (1992) the consumer behavior in modern market is different from the theoretical case of consumer decision making in free markets. Generally, free and competitive markets are composed of buyers and sellers each of whom must possess perfect information about all possible products and their respective utilities; a well defined and explicit set of performances; the ability to determine optimal combination of various products given their budget constraints; a knowledge of prices, which does not affect the subjective wants or satisfaction of the consumer (Monroe and Petroschius, 1973 adapted by Sjolander, 1992). Notwithstanding the

facts, it is necessary to define quality in the first place before it can be measured. Although, there is no global definition of quality exists (Sebastianelli and Tamimi, 2002), it can be defined in a varieties of ways. Yoon and Kijewski (1997) pointed out that quality can be categorized into two perspectives. One is the marketer's perspective, which is typically product-based or manufacturing-based and the other one is consumer's perspective, which is typically user-based or value-based. Generally, product quality from the marketer's perspective is associated with specific feature, function or performance of a product. On the other hand, product quality from the consumer's perspective is associated with the capacity of a product to satisfy consumer needs (Archibald et al., 1983). According to Lambert (1980), consumers often attribute quality to branded products on the basis of price, brand reputation, store image, market share, product features and country of manufacture. So, price is an indicator to measure the product quality, which is based on the theory that quality is a measure of the utility, or the want-satisfying capacity of products (Sjolander, 1992). The author has also added that the more the quality a product possesses, the more the utility it contains, and the higher the price it will obtain in an open market exchange. This means that similar products offered to the market at different prices, contain different amounts of utility, and that there is a direct relationship between quality and price. The actual price-quality relationship is a complex interaction between price, brand name, store image, product features, and brand awareness (Lambert, 1980; Gerstner, 1985).

Oliver (1993) identified a few major elements that differentiate between service quality and satisfaction. It was suggested that, the dimensions that comprise quality judgments are quite specific to the service delivered. As for satisfaction, it can be determine by a broader set of factors including those which are outside the immediate service delivery experience (e.g. a mobile phone subscribers satisfaction depend with his/her mobile phone operators may be influenced by whether his/her need; mood on that particular day when that consumer want to purchase a line). Ting (2004) indicated that perceptions on service quality do not depend on experiences with the service environment or service providers, while judgments for satisfaction depend on past experiences. He also mentioned that quality is believed to be determined more by external cues (e.g. price, reputation) whereas satisfaction is more driven by conceptual cues (e.g. equity, regret). Based on this evidence from the service literature, service quality and satisfaction will be viewed as two different constructs that are unique but related. As the analysis suggests, service quality is the antecedent towards satisfaction.

Overall, the quality of a product is also related to the availability of the product's main functional features on one hand and the consumer's experience-in-use of the other auxiliary features on the other hand (Yoon and

Kijewski, 1997). A product's main functional features are the sources of the primary benefits that the consumers expect to obtain when purchasing a product. In general, consumers' evaluations of a product's overall quality are related to the availability of these features in comparison with the competition (Lambert, 1980; Nowlis and Simonson, 1996). Hence, it is necessary for the telecommunication service providers to effectively communicate with the consumers for measuring the quality. Quality reflects the extent to which a product or service meets or exceeds consumers' expectations (Wal et al., 2002). Therefore, the success of the telecommunication sector in the market place significantly depends on product quality and availability. The following hypothesis has been deliberated for further studies.

H<sub>3</sub>: Service availability has a significant influence on consumer perception in selecting mobile telecommunication service provider.

## PROMOTION

Promotion is one of the medium which is used by organization to communicate with consumers with respect to their product offerings (Rowley, 1998). It is an important part for all companies, especially when penetrating new markets and making more or new customers (Kotler et al., 1999). The authors also state that promotion is the activities that communicate about the products or services and its potential merits to the target customers and eventually persuade them to buy. Generally, promotion is concerned with ensuring that consumers are aware about the company/firm and its products that the organization makes available to those consumers (Root, 1994). More specifically, the objectives of any promotional strategy are: increase sales; maintain or improve market share; create or improve brand recognition; create a favorable climate for future sales; inform and educate the market; create a competitive advantage, relative to competitor's products or market position; improve promotional efficiency (Rowley, 1998).

Research on the use of marketing tools in Malaysia is very scanty at best, hence, little is understood about the Malaysian customers and their purchase behaviors, especially with regards to how they respond to the various promotional strategies practiced by marketers. Malaysian consumers respond more to free sample, price discount, in-store display, and bonus pack than coupon (Ndubisi and Moi, 2006). Promotion is when companies inform, persuade, or remind customers and the general public of its products (Kotler and Armstrong, 2003). Promotions impact consumers' purchasing behavior and decisions towards that particular brand, especially during the sales promotion period (Freo, 2005).

According to Alvarez and Casielles (2005), promotion is a set of stimuli that are offered sporadically, and it reinforces publicity actions to promote the purchasing of

a certain product. Promotional offer consists of several different objects to create a better sale impact, for example, coupons, samples, premiums, discounts, contests, point-of-purchase displays and frequent-buyer programs. Each of the promotion techniques is intended to have a direct impact on buying behavior and perception about the company or service providers. The objectives of promotion will be reached to a greater extent when it is done sporadically, when the consumer does not expect it. Promotional actions must be well planned, systematically organized, and commonly integrated into the subject corporation's strategic marketing plan. Based on the literature review, hypothesis four can be drawn as:

H<sub>4</sub>: Promotion has a significant influence on consumer perception in selecting mobile telecommunication services provider.

## METHODOLOGY

Since the major purpose of the study is to learn the consumers' perceptions towards the mobile telecommunication service providers in Malaysia, a self-structured questionnaire was developed to collect the required primary data from the consumers. The survey questionnaire consisted of 5 distinct sections, each of which contained relevant questions pertaining different parts of the study. Questionnaires were systematically distributed utilizing a convenience sampling from walk-in customers at market places, educational institutions, pedestrians' walk-ways (footpaths), government and private institutions. Data collection process went through rigorous real-life impediments for the intention of taking a large number of samples of mobile telecom operators' users in Malaysia. Even though the sampling method adopted in this study was convenience sampling method which contained some limitations in terms of generalisability as compared to other probability methods of sampling, it was logically assumed that the sample in this study represented the whole population of mobile telecommunication services users in Malaysia. There was enough similarity amongst the elements within the population to conclude that a few of the elements (the sample) was adequately represented with the characteristics of the total population (Page and Meyer, 2000). Primary data was collected randomly from the consumers as a convenience sample from Kuala Lumpur, Gombak, Cyberjaya, Putrajaya, Serdang, Subangjaya, Penang, Johor, Melaka, Pahang, and Perlis. The survey was conducted mainly through face-to-face customer survey. Apart from the ability to reach a large number of respondents and an inexpensive way to conduct the survey, the survey through e-mailing process also enabled us to collect the data, despite insignificant responses. Respondents were asked to assess the items on different constructs such as factors viewed as antecedents of service quality, price, and product quality in terms of their perceptions based on seven point's scales. The descriptors range from very strongly disagree, strongly disagree, disagree, somewhat agree, agree, strongly agree, very strongly agree.

A total of 400-sample sizes found valid and though distributed among the potential respondents for this study was 600 questionnaires. After having the screening process completed, only 400 responses were considered complete and valid for data analysis. This represents a success rate of 66%, which is considered to be extremely good in view of time, cost, certainty and geographical constraints. Factor analysis was used in the study to identify the salient attributes that have impact on consumers'

perception to evaluate the mobile telecommunication services providers. Since, factor analysis represents an analytical process of transforming statistical data (as measurements) into linear combinations of variables, it is a meaningful statistical method used for combining a large number of data into a considerably smaller number of factors with a minimum loss of information (Hair et al., 1992). In addition, Structural equation modeling (SEM) was carried out to investigate the relationship among the variables which influence the consumers' perception choice in selecting the telecommunication services providers.

## RESULTS AND DISCUSSION

### Reliability coefficient

Reliability coefficient tested by using Cronbach's alpha ( $\alpha$ ) analysis. In order to measure the reliability for a set of two or more constructs, Cronbach alpha is a commonly used method where alpha coefficient values range between 0 and 1 with higher values indicating higher reliability among the indicators (Hair et al., 1992). Hence, 1 is the highest value that can be achieved. In accordance with the Cronbach's alpha test, the total scale of reliability for this study varies from 0.9778 to 0.9974, indicating an overall higher reliability factors. The reliability of this study is substantial in every perspective (Table 1), as the highest reliability value that can be achieved is 1.0.

### Factor analysis

The results obtained from 400 respondents had been thoroughly analyzed and the outputs of the results have been clearly explained in this section. Applying SPSS, the Principal Component Analysis (PCA) was carried out to explore the underlying factors associated with 21 items. The constructs validity was tested applying Bartlett's Test of Sphericity and the Kaiser–Mayer–Olkin (KMO) measure of sampling adequacy analyzing the strength of association among variables. The KMO measure of sampling adequacy was first computed to determine the suitability of using factor analysis. It helps to predict whether data are suitable to perform factor analysis. KMO is used to assess which variables to drop from the model due to multicollinearity problem. The value of KMO varies from 0 to 1, and KMO overall should be 0.60 or higher to perform factor analysis. If this does not have achieved, then it is necessary to drop the variables with lowest anti image value until KMO overall rises above 0.60. Result of the Bartlett's test of sphericity and the KMO revealed that both were highly significant and eventually concluded that these variables was suitable for the factor analysis (Table 2). Deciding upon the number of factors that can be retained is difficult but initial runs-based on eignenvvalues showed 4 factors. To determine the minimum loading necessary to include an item in its respective constructs, Hair et al. (1992) suggested that variables with loading greater than 0.30 is

considered significant, loading greater than 0.40 more important, and loading 0.50 or greater are very significant. For this study, the general criteria were accepted items with loading of 0.60 or greater. Not a single factor had been dropped out under this circumstance which means the factor analysis ran on an ultimate success. The result of Table 3 highlighted the amount of variance explained by this four factors (97.443%).

The values of the following Table 4 indicate the affiliation of the items to a factor. Generally, the factor is the natural affinity of an item for a group. The higher loading (factor) indicates the stronger affiliation of an item to a specific factor. The findings of this study indicate that each of the four dimensions (service quality, price, service availability and promotion) was homogeneously loaded to the different factors. That means each of the items that loaded into four different factors, all have proven as significantly related to the consumers' need.

### Validity, reliability and unidimensionality

Before a latent variable model analysis is conducted, the validity and reliability of the constructs must be assessed. The unidimensionality and reliability of the scales must also be established before their convergent and discriminant validity are assessed (Anderson and Gerbing, 1982). Unidimensionality measures the extent to which the items in a scale all measure the same construct (Venkatraman, 1989). Confirmatory Factor Analysis (CFA) can be used to assess unidimensionality. A CFA was conducted for each of the five constructs to determine whether the 21 indicators measured the construct they were assigned to adequately. Maximum likelihood estimation was employed to estimate the eight CFA models. The SEM program AMOS was used throughout the study to conduct the analyses. Empirical evidence in CFA (and SEM in general) is generally assessed using criteria such as the Comparative Fit Index (CFI), the Root Mean Square Residual (RMSR), Goodness-of-Fit Index (GFI), Adjusted Goodness-of-Fit Index (AGFI). Table 5 summarizes the results of these tests.

**CFI:** This index compares a proposed model with the null model assuming that there are no relationships between the measures. CFI values close to 1 are generally accepted as being indications of well-fitting models (Raykov and Marcoulides, 2000). A CFI value greater than 0.90 indicates an acceptable fit to the data (Bentler, 1992). The CFI values for the eight CFAs are displayed in Table 5. An analysis of the table reveals that all the CFI values are very high ranging from 0.98 to 0.99, which suggests very good model fits.

Table 5 shows the reliability which explains the degree of consistency of a measure is referred to as its reliability or internal consistency. The reliability coefficient, Cronbach's  $\alpha$  (Cronbach, 1951), is generally used to test

**Table 1.** Reliability analysis.

	Mean	Std. Deviation
<b>Service quality (alpha = 0.97)</b>		
Tangibles	3.76	1.04
Reliability	3.67	1.05
Responsiveness	3.30	1.07
Assurance	3.30	1.01
Empathy	3.38	1.02
<b>Price (alpha = 0.98)</b>		
Satisfactory price charge	3.73	1.34
Price does not has impact	3.73	1.32
Services are desirable than price	3.76	1.29
Price plays vital role	3.77	1.27
<b>Service availability (alpha = 0.97)</b>		
Product outlets available	2.44	1.52
Product outlets hardly reachable	2.55	1.44
Product offer best solution to need	2.55	1.43
Product offer best technology	2.53	1.38
<b>Promotion (alpha = 0.97)</b>		
Attractive promotional offer	3.60	1.18
Promotional offer does not attract	3.54	1.22
Real need than promotional offer	3.55	1.22
Consider services at the time of same promotional offer	3.58	1.18

**Table 2.** KMO and Bartlett's test.

<b>Kaiser-Meyer-Olkin measure of sampling adequacy</b>		<b>0.972</b>
Bartlett's test of sphericity	Approx. chi-square	10063.963
	Df	347
	Sig.	0.000

the reliability of a scale, a values of 0.70 or greater are deemed to be indicative of good scale reliability (O'Leary-Kelly and Vokurka, 1998). The Cronbach's  $\alpha$  for the five factors range from 0.78 to 0.99, suggesting that they are all reliable.

**Content (internal) validity:** Content validity depends on how well the researcher created measurement items using the relevant literature to cover the content domain of the variable that is being measured (Bohrnstedt, 1983). The selection of items in this study was based on an extensive review of the literature, giving a strong content validity to the variables being measured.

**Convergent validity:** The Bentler-Bonett Normed Fit Index (NFI) obtained from CFA can be used to assess

convergent validity. This index measures the extent to which different approaches to measuring a construct produces the same results (Ahire et al., 1996). According to a rule of thumb, NFI values of 0.90 or greater indicate an adequate model fit (Bentler, 1995).

**GFI:** The goodness of fit index, tells you what proportion of the variance in the sample variance-covariance matrix is accounted for by the model. This should exceed 0.9 for a good model.

**AGFI:** Adjusted GFI is an alternate GFI index in which the value of the index is adjusted for the number of parameters in the model. Few numbers of parameters in the model relative to the number of data points (Table 5).



**Table 3.** Total variance explained.

Component	Initial Eigenvalues			Extraction sums of squared loadings		
	Total	% of variance	Cumulative (%)	Total	% of variance	Cumulative (%)
1	14.539	53.848	53.848	14.539	53.848	53.848
2	4.084	15.125	68.973	4.084	15.125	68.973
3	3.558	13.179	82.152	3.558	13.179	82.152
4	1.002	3.711	97.443	1.002	3.711	97.443
5	0.146	0.540	97.983			
6	0.112	0.415	98.398			
7	0.068	0.251	98.671			
8	0.046	0.223	98.923			
9	0.022	0.172	99.146			
10	0.011	0.123	99.318			
11	0.009	0.102	99.441			
12	0.007	0.080	99.543			
13	0.006	0.032	99.623			
14	0.004	0.022	99.936			
15	0.004	0.015	99.959			
16	0.002	0.008	99.988			
17	0.001	0.004	100.000			

**Table 4.** Factor loading matrices following oblique rotation of four-factor solutions.

Descriptions	F1	F2	F3	F4
<b>Service quality</b>				
Tangibles		89		
Reliability		84		
Responsiveness		87		
Assurance		88		
Empathy		82		
<b>Price</b>				
Satisfactory Price charge			71	
Price does not has impact			76	
Services are desirable than price			86	
Price plays vital role			82	
<b>Service availability</b>				
Service outlets available	88			
Service outlets hardly reachable	89			
Service offer best solution to need	87			
Services offer best technology	90			
<b>Promotion</b>				
Attractive promotional offer				87
Promotional offer does not attract				89
Real need than promotional offer				86
Consider services at the time of same promotional offer				90

Extraction method: principal component analysis. Based on four factors specification (not on eigenvalue > 1). Rotation Method: oblique (oblimin – SPSS) with Kaiser Normalization. All numbers in the table are magnitudes of the factor loadings multiplied by 100. Loadings that are 0.60 or less are not shown.

**Table 5.** The results of model fit.

<b>Factor indicator</b>	<b>X2</b>	<b>df</b>	<b>P value</b>	<b>GFI</b>	<b>AGFI</b>	<b>CFI</b>	<b>Alpha</b>
<b>Service quality</b>	18.43	5	0.00	0.96	0.90	0.98	0.977
SVQ1							
SVQ2							
SVQ3							
SVQ4							
SVQ5							
<b>Price</b>	11.48	2	0.00	0.98	0.85	0.99	0.99
PRI1							
PRI2							
PRI3							
PRI4							
<b>Service availability</b>	6.32	2	0.04	0.98	0.93	0.99	0.98
PRQ1							
PRQ2							
PRQ3							
PRQ4							
<b>Promotion</b>	7.54	2	0.02	0.99	0.91	0.98	0.99
PRO1							
PRO2							
PRO3							
PRO4							
<b>Perception</b>	6.33	2	0.04	0.98	0.92	0.98	0.78
CP1							
CP2							
CP3							
CP4							

## Hypotheses testing

The structural equation model was examined to test the relationship among the constructs. For the whole model the statistical result shows that chi-square/df = 0.892, GFI = 0.987, AGFI = 0.957, CFI = 0.990, RMSR = 0.022 (Table 6). Figure 1 depicts the full model of the four paths hypothesized in the model; all the paths were significant at  $p < 0.05$ . Service quality directly effects customers' perceptions in selecting mobile telecom. Therefore  $H_1$  is not rejected at 0.5 level of significance  $p > 0.000$ .

Regarding the  $H_2$ : Price has the direct effect on customers' selection process in telecom service, the statistical findings also revealed that price has a positive effect on consumer perception in selecting telecom service. Therefore, this hypothesis is accepted at  $p < 0.000$ .

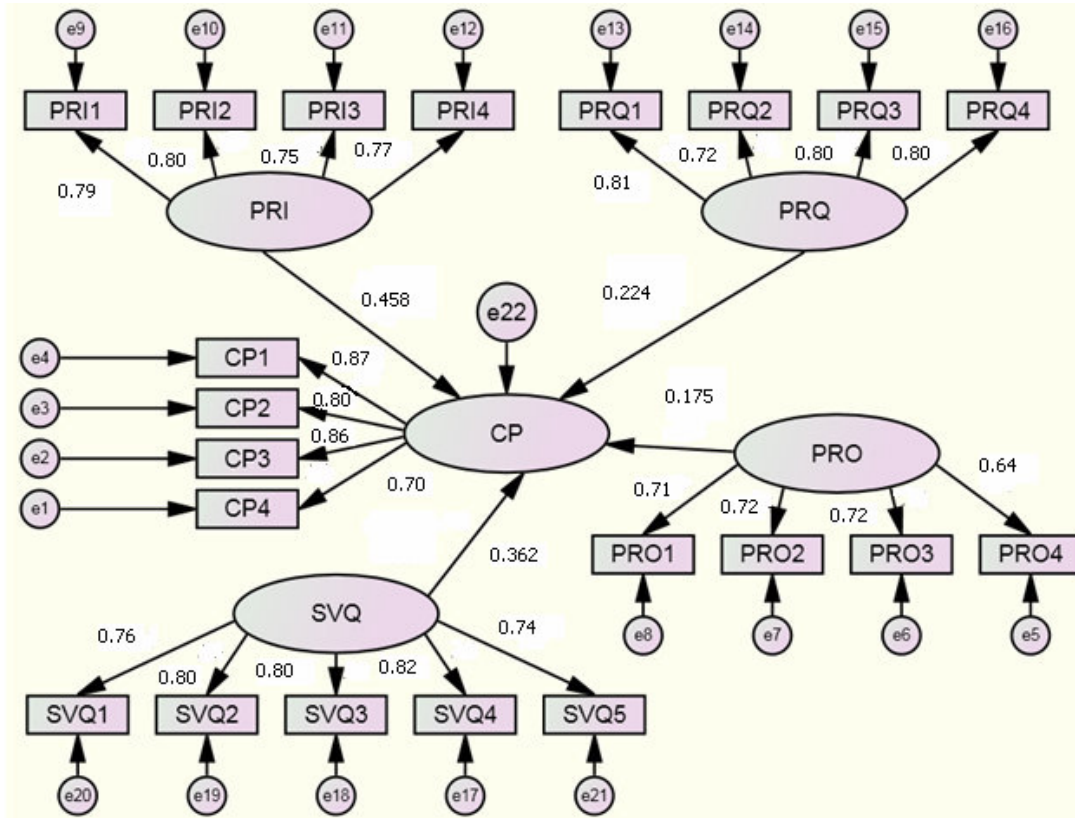
The study showed that service availability has a positive impact on the customers' perceptions. Therefore,  $H_3$  is accepted as  $p > 0.000$ .

**Table 6.** Fit measures.

<b>Fit measures</b>	<b>Main model</b>
X2	8.922
Degree of freedom (df)	10
Root mean square residual (RMSR)	0.022
Goodness-of-fit index (GFI)	0.987
Adjusted Goodness-of-fit index (AGFI)	0.957
Comparative fit index	0.990

Results also indicates that for  $H_4$  (promotion affects customers' intention in buying telecom service) promotion has a positive impact on the customers' perceptions thus  $H_4$  is also accepted where  $p > 0.002$ .

Among all the significant variables, from the study, Malaysian telecom customers' perceived that price or call rate is the most important followed by service quality, service availability and promotion. This research finding



**Figure 1.** Degree of relationship between consumer perceptions towards service quality (SVQ), price (PRI), product or service availability (PRQ), promotion (PRO), customers perception (CP).

**Table 7.** Standard estimation of the main model.

	Standardized regression weight	Estimate	S.E.	C.R.	P value	
H1	Service quality	Perception	0.362	0.077	4.698	0.000
H2	Price	Perception	0.458	0.072	6.326	0.000
H3	Service availability	Perception	0.224	0.063	3.254	0.001
H4	Promotion	Perception	0.175	0.056	3.142	0.001

is quite similar to the study of Wal et al. (2002) which measured service quality at cellular retail outlets in the South African environment. Wal et al. (2002) categorically focused on perception and expectation of service quality from the consumer’s perspective. Results in this study also showed that a significant relationship exists between the importance of a dimension to the customers’ and the perception about service quality in Malaysia’s cellular telecom industry. So, based on this, the positive coefficient of service quality is seen in Table 7.

Success in the telecommunication industry depends not only on sales, purchase price, but also on call charges. The special significance of the price for the decision to purchase is as undisputed in the telecommunications sector as it is elsewhere. This is particularly true in the mobile telecommunication sector as available

studies suggest. Here, the choice of the telecommunication service provider is often connected with purchasing a new end-user set, for example, consumers consider the fixed connection costs and variable call charges (Kollmann, 2000). Hence, from the result of this study, researchers can deliberately conclude that price has significant positive impact on consumer perception choice in selecting telecommunication service provider in Malaysia. Hence, service quality from the marketer’s perspective is associated with specification, feature, function or performance of a product.

In general, consumer’s post-purchase or after-use evaluation of a product’s overall quality is positively related to the availability of the product’s main functional features on one hand and the consumer’s experience-in-use of other auxiliary features on the other hand. A prod-

uct's main functional features are the sources of the primary benefits that the consumers expect to obtain when purchasing a product. (Yoon and Kijewski, 1997) According to Quelch and Hoff (1986), consumer response to product quality also changes dynamically as experience builds up, information accumulates, and the cost of quality changes. Moreover, Nowlis and Simonson (1996) and Zeithaml (1988) show the consumers' evaluations of a product's overall quality are related to the availability of these features in comparison with the competition.

However, this research showed that service availability has a significant impact on consumer perception choice in selecting mobile telecommunication service provider and supported. Promotion has significant impact on consumer perception choice in selecting mobile telecommunication service provider since; it is used to communicate with the consumers with respect to product offerings. Promotion possesses a significant key role in determining profitability and market success. According to the study of Alvarez and Casielles (2005), promotional offer of a product states at the moment of purchase as an explanatory element of the process. Promotion is a tool that can help manufacturers and/or retailers in the achievement of their objectives (try the brand, help to decide what brand to buy, etc.). Immediate price reduction is a desirable technique that wields greatest influence on the brand choice process.

## CONCLUSION AND IMPLEMENTATION

This study was undertaken to examine and understand the consumers' behavioral perception choice in selecting mobile telecommunication service providers. As a general notion, consumers' perception is widely varied in accordance with the service quality, price, availability of product, and promotion, etc. Hence the service provider companies are characterized by the engagement in competition with each other to attract and acquire the potential consumers. Historically, the competition among the mobile phone service providers in Malaysia is more intense now than ever before. They compete not only for networking quality by a large amount of investment in network quality, network extension and upgrading, but also for the acquisition of new customers and retention of old customers by direct and indirect price reduction. Network quality is one of the important factors of overall service quality. According to our study, product quality, availability, and promotion are also significantly important factors to influence the consumers in Malaysia's vast mobile phone market.

The findings of this study can help mobile phone operators in their operation and strategic plan of marketing. The attributes that are discussed above under the category of price or call rate, brand image, customers'

satisfaction, service quality, advertising and promotion used and developed in the survey scale of this study can be considered reliable indicators of customers perception and can be a training guideline for mobile phone operators' services in Malaysia. In addition, mobile phone operators should train their employees to be sensitive to the special needs and wants of customers. Corporate image was not found to be an important factor affecting customers' perception towards an operator because customers' are more sensitive in brand image rather than corporate image. Therefore, this research recommends that providers enhance their brand name by using various activities. To successfully compete in today's value-conscious environment, mobile phone operators in Malaysia must establish the value of their offers as superior to others. One strategy used by the operators can apply to the consumers' perception of the services value through reference price or price comparison.

## Limitation of the study and direction to future research

The outcome of this research showed a comprehensively integrated framework for managers of mobile phone operators in Malaysia to understand the vibrant relationships among several dimensions of service quality, price, service availability, and promotion to have handful ideas on the consumers' perception. However, this research still predict that further research efforts are being needed to examine additional variables (customers' satisfaction, corporate image; brand image) with the current research variables in Malaysian mobile phone market with larger samples before generalization can be made.

The other concern is that this study's results cannot be compared directly with those of other research studies, as there is virtually no previous research into measuring all these factors combine on consumers' perception of mobile phone operators sectors at once. In addition, factors affecting consumers' perception in the telecom sectors were measured, making it difficult to draw comparisons due to a lack of related literature. This study examined only few factors taken from theories and literatures that influence customers' perception towards the mobile phone operators of prepaid customers. Post paid customers' were not included in this study. On the other hand several other factors such as consumers' learning, memory, demographic variable like consumers' age, ethnicity, education, income level, gender effect could also influence consumers' perception towards service providers.

Moreover, it is also needed to extend full-scale behavioral intensions of consumers upon mobile telecommunication service providers in order to match consumers' overall behavioral patterns with the decision making criteria of the mobile telecommunication services providers.

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