THE IMPACT OF NETWORK PERFORMANCE AND PERCEIVED VALUE ON HSDPA BROADBAND CUSTOMER SATISFACTION AND LOYALTY

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Abstract: - This research aims to identify the impact of network performance and perceived value on HSDPA broadband customer satisfaction and loyalty. A research model was developed and four dimensions of HSDPA broadband network performance were identified. These dimensions were speed, connectivity, mobility and accessibility. Perceived value dimensions are economic value, emotional value and social value. The network performance dimensions had direct and indirect effects on economic, emotional and social value, and on loyalty through satisfaction. One dimension of perceived value, specifically emotional value had significant influences on customer satisfaction, and then, on loyalty intention. In particular, each dimension of HSDPA broadband network performance appeared to have different impacts on perceived economic, emotional and social values, level of satisfaction, and loyalty.

Key-words: Network performance; Customer satisfaction; Customer loyalty; HSDPA

1 Introduction

In the new millennium, the main goal of marketers is to obtain loyal customers through satisfied customers. Marketers have invested a great amount of their resources to develop loyalty programs. To develop an effective loyalty program, it is imperative to understand the process of consumers’ satisfaction and loyalty decisions.

Now, internet plays an important role for data, video and voice communication. Therefore, broadband is the solution for transmission of interactive high-quality full-motion video, data and voice applications simultaneously via one pipe [7]. There are two types of broadband, which include wired and wireless broadband. Wired broadband consists of Asynchronous Digital Subscriber Line (ADSL) and Synchronous Digital Subscriber Line (SDSL), while wireless broadband includes High Speed Downlink Packet Access (HSDPA), Wireless Fidelity (WiFi), Wireless Local Area Network (WLAN) and Satellite [15].

HSDPA broadband is gaining popularity in the market nowadays and it offers significantly higher data capacity and data-user speeds on the downlink.

Out of 360,000 wireless broadband subscribers in Malaysia, 16.75 percent of wireless broadband subscribers (60,300 subscribers) are HSDPA broadband users [15]. Therefore, this study focuses on HSDPA broadband users only. The objectives of this study are firstly, to investigate the impact of network performance on perceived value, to investigate the impact of network performance on customer satisfaction, to investigate the impact of perceived value on customer satisfaction, to investigate the impact of customer satisfaction on customer loyalty.

2 Literature Review

2.1 Network Performance

Service performance in high-speed Internet services consists of network performance and customer-service performance. In high-speed Internet service context, network performance is considered about four times more important than customer-service performance [8]. That is, customer satisfaction or
dissatisfaction is determined primarily by network performance.

Dimensions of network performance are adapted from various sources. Four distinct dimensions of HSDPA broadband network performance, which include speed, connectivity, mobility and accessibility, were identified.

Speed is an important attribute for high-speed Internet service [3],[17]. In addition, [14] found that speed is an important aspect that leads to customer satisfaction. Another study by Kim et al.,[8], found that the effect of the upload speed on the customer satisfaction is about twice larger than that of the download speed. In the past, downloading was the main use for the Internet service. Nowadays, uploading is becoming popular due to new-fashioned applications such as blogs and instant messengers [8]. Connectivity is important for high-speed broadband because broadband is defined as an ‘always on’ network [17]. Connectivity, which includes ease of log-in, is an important aspect that leads to customer satisfaction [14]. Mobility is another important attribute for mobile broadband. One can surf the Internet anytime and anywhere at super speeds with wide coverage without wires and cords [4]. Accessibility is also an important aspect for high-speed broadband. High-speed Internet service gives users direct access to entertainment, games, videos, etc. with no downloading or minimum buffering required as the data is transmitted over the network [4].

2.2 Perceived Value
In this study, multi dimensions of perceived value are based on Sweeney et.al work ,[16], which originally included economic, emotional, social, and quality value. This study adopts the three values dimension that are most relevant to HSDPA broadband service experience – economic, emotional, and social value.

Economic value is the utility derived from the product due to the reduction of its perceived short term and longer term costs. [16]. Economic value is related to perceived economic benefits received in comparison to a monetary cost of the service. McDougall et.al.,[11], found a significant role of consumers’ perceived monetary value in satisfaction and future.

Emotional value is the utility derived from the feelings or affective states that a product generates [16]. Emotional value is the strongest predictor of consumers’ purchase intention in a particular store [2], [6]. In turn, social value is the utility derived from the product’s ability to enhance social self-concept. In the use of technology-driven products or services, social image can be an important factor that affects consumers’ decision making [10]. Hence, social value is expected to play an important role in the context of HSDPA broadband usage.

2.3 Customer Satisfaction and Loyalty
Customer satisfaction is defined as a customer’s overall judgment on disconfirmation between the expected and perceived service performances [1]. If the perceived performance meets or exceeds the expectation, the customer is satisfied; otherwise, dissatisfied [8].

Customer loyalty is defined as a customer’s attitude to the services provided. It is formed by a customer’s cumulative experience with the service over time, not by a specific service encounter. It is widely accepted that customer loyalty has a strong relationship with customer satisfaction [5], [8],[9],[10].

2.4 Hypotheses Development
This paper aims to identify the impact of network performance and perceived value on HSDPA broadband customer satisfaction and loyalty. Network performance is characterized by speed, connectivity, mobility and accessibility. Perceived values are judged base on economic, emotional, and social values.

Based on a review of the past studies mentioned in Section 2, the following hypotheses were constructed:
H1: Network performance positively affects perceived value.
H3: Perceived value positively affects customer satisfaction.
H4: Customer satisfaction positively affects customer loyalty.

3 Methodology

3.1 Data Collection
A personal (face-to-face) and web-based survey was conducted to collect the data. Samples are consumers who currently subscribe to HSDPA broadband services. Convenience sampling was employed for this survey. A questionnaire with 26 items was developed and since this study uses structural equation modelling, a minimum of 10 respondents
for each item is needed [12]. Therefore, a minimum sample size of 260 respondents is required. Finally, 420 questionnaires were distributed to HSDPA broadband subscribers. However, only 358 questionnaires were suitable for analysis.

4 Results

4.1 Sample Characteristics
The analysis of respondents’ demographic information reveals that 66.5 percent of respondents were male. Approximately 79.3 percent reported an age of 15-24, 15.4 percent was aged 25-34, 3.9 percent was aged 35-44, and 0.6 percent was aged 45-54.

The monthly income of major respondents was less than RM1000 because most respondents were students. 69.3 percent of respondents were Maxis HSDPA broadband subscribers. Majority of the respondents were using HSDPA broadband service for seven days a week. Besides, 31 percent of respondents use HSDPA broadband for 3-6 hours.

4.2 Confirmatory Factor Analysis
Prior to building a measurement model, confirmatory factor analysis were conducted to identify dimensions of network performance, perceived value, customer satisfaction and loyalty for HSDPA broadband service. Indicator variables are selected on the basis of prior theory and factor analysis is used to see if they load as predicted on the expected number of factors [13].

CFA using structural equation modelling (SEM) approach was employed in this research. Therefore, AMOS 5.0 software was used for CFA analysis. Goodness-of-fit statistics shown in this study include p value, goodness-of-fit index (GFI), adjusted goodness-of-fit index (AGFI), comparative fit index (CFI) and root mean square error of approximation (RMSEA).

Based on the results of confirmatory factor analysis for network performance of HSDPA broadband, all items were acceptable. The fit of indices for CFA’s network performance are acceptable. However, the p value increases after the item was excluded. The fit of indices for CFA’s perceived value are acceptable, although the p value is slightly low. Based on the results of confirmatory factor analysis for customer satisfaction and loyalty, one item from loyalty was excluded because of low factor loading (0.393). Our p value increases from 0.001 to 0.187 after the item was excluded. The fit of indices for CFA’s customer satisfaction and loyalty are acceptable.

4.3 Model Development
The measurement model established for this study is a combination of two models from previous study by Kim et al., [8] and Lim et al. [10]. Lim et al., [10], investigates drivers of satisfaction and loyalty in the US mobile cell phone market. The fit indices for Lim et al.’s model were: GFI = 0.86, CFI = 0.96, RMSEA = 0.06.

Model from Lim et al., [10], was illustrated in Fig.1. On the other hand, Kim et al., [8] identify the causal relationship among network performance, customer satisfaction and customer loyalty in the high-speed Internet service context. The fit indices for Kim et al., [8] model were: p value = 0.046, GFI = 0.993, AFGI =0.981, CFI = 0.982. Model from Lim et al., [10], was illustrated in Figure 2.

![Fig.1 Research Model: Drivers of Satisfaction and Loyalty in the US Mobile Cell Phone Market.](image-url)
network performance appears to have different effects on perceived value and customer satisfaction.

4.4 Hypotheses Testing

In general, the structural model (Fig. 3) appears to fit the data well (GFI = 0.965, AGFI = 0.931, CFI = 0.990, RMSEA = 0.045). The results of each hypothesis testing is given below.

4.4.1 Hypothesis H1 & H2

Hypothesis H1 stated that network performance positively affects perceived value. Fig. 4 is extracted from Fig. 3 which shows only the significant paths of hypothesis H1. The results reveal that respondents’ perceived value increase with the positive perception of speed. However, the positive relationship between connectivity and perceived value is not statistically significant.

On the other hand, the positive relationship between mobility and perceived value is partially significant. Mobility appears to have significant influences on respondents’ perceived economic value and perceived emotional value. However, the results indicate a negative relationship between mobility and perceived social value.

The positive relationship between accessibility and perceived value is also partially significant. Accessibility appears to have significant influences on respondents’ perceived emotional value and perceived social value. However, the results indicate a negative relationship between accessibility and perceived economic value. Therefore, H1 is partially supported.

Hypothesis H2 stated that network performance positively affects customer satisfaction. Fig. 5 is extracted from Fig. 3, which shows only the significant paths of hypothesis H2. The results of the research model confirm that speed, connectivity and
accessibility have significant direct influences on customer satisfaction.

![Diagram of Hypothesis H2](image)

**Fig. 5 Results of Hypothesis H2**

**4.4.3 Hypothesis H3**
Hypothesis H3 stated that perceived value positively affects customer satisfaction. Fig. 6 is extracted from Fig. 3. Fig. 6 shows only the significant paths of hypothesis H3. The results support hypothesis regarding relationships between perceived emotional value and customer satisfaction. The level of satisfaction increased with improved emotional value. However, the results of the structural model confirm a negative significant effect of perceived economic value and perceived social value. Thus, H3 is partially supported.

![Diagram of Hypothesis H3](image)

**Fig.6 Results of Hypothesis H3**

**4.4.4 Hypothesis H4**
Hypothesis H4 stated that perceived value positively affects customer satisfaction. Fig.7 is extracted from Fig. 3 which shows only the significant paths of hypothesis H4. H4 predicted a positive effect of the level of satisfaction on consumer loyalty. The results reveal that the level of customer satisfaction increased the likelihood of consumer loyalty. (Standardized Estimated Value = 0.908, $R^2 = 0.825$). Thus, H4 is strongly supported.

![Diagram of Hypothesis H4](image)

**Fig.7 Result of Hypothesis H4**

**5 Conclusions**
This paper investigated the impact of network performance and perceived value on customer satisfaction and loyalty. Interestingly, the findings from this study show that each network performance has different effects on consumers’ perceived value, satisfaction and loyalty intention.

In particular, each dimension of HSDPA broadband network performance appeared to have different impacts on perceived value and customer satisfaction. The results reveal that respondents’ perceived value increase with the positive perception of speed. However, the positive relationship between connectivity and perceived value is not statistically significant. Accessibility and mobility appears to have significant influences on respondents’ perceived emotional value and perceived social value. In addition, speed, connectivity and accessibility had direct impacts on customer satisfaction.

The measurement model confirmed distinct dimensions of three value constructs in the context of mobile services – economic value, emotional value, and social value. In the initial structural equation model, emotional value was positively related to customer satisfaction. However, the results of the structural model confirm a negative significant effect of perceived economic value and perceived social value.

Findings of this study draw attention to the role of emotion in consumers’ satisfaction process. Conventionally, researchers tended to investigate consumers’ perceived value in a restricted concept of monetary value [9],[16]. The findings of this study signal the importance of emotional responses in loyalty decisions. The results of this study reveal that the level of customer satisfaction increased the likelihood of consumer loyalty. Therefore, customer satisfaction plays an important role in consumer loyalty.

The major findings from the models are as follows. First, the speed-related network performance of HSDPA broadband measures have highly significant on perceived value and customer satisfaction. Second, the perceived emotional value has large effects on customer satisfaction. Third,
customer satisfaction has strong influences on customer loyalty. In conclusion, consumers’ positive evaluations of HSDPA broadband network performance can arouse positive feelings, which also enhance the level of satisfaction and further behavioral responses.

References: