

# **The Role of Speed on Customer Satisfaction and Switching Intention: A Study of the UK Mobile Telecom Market**

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# The role of speed on customer satisfaction and switching intention: A study of the UK mobile telecom market

## **Abstract**

This study examines Internet speed as a factor that influences customers' switching intention in the UK mobile telecom market. A theoretical framework, developed from the academic literature, is tested via an extensive survey. The findings suggest that speed, along with other network service quality variables such as call quality and customer service, has a direct influence, and brand image an indirect influence on perceived value which in turn influences customer satisfaction and discourages switching intention.

**Key Words:** Mobile Telecom, Switching Intention, Service Quality, Brand Image, Switching Cost, Perceived Value and Customer Satisfaction

## **1. Introduction**

Mobile phones are ubiquitous with much advanced capabilities shifting the use of desktop computers to mobile phones (Al-Debei & Al-Lozi, 2014), hence, creating immense opportunities in the mobile telecom industry. The growth in mobile services has quadrupled around the world with more than 65% mobile network providers in Western Europe (Garrido & Whalley, 2013). Mobile services market has gained immense momentum and has created hypercompetition amongst mobile operators, offering wide range of services to enhance customer recruitment, satisfaction and retention (Shukla, 2010). Mobile telecom is a highly competitive and 'differentiated' industry where each operator's products are seen as only partial substitutes for other providers' products. Mobile operators try to retain their existing customers and acquire new customers through differentiated products/services which have multiple attributes. As a result, a wide range of factors may influence customers' assessment of mobile telecom services and in turn impact on their decision to remain or switch. It is important for operators and policy makers to know which factors influence customers' decision to remain with and switch from existing provider as the cumulative effect of this particular type of decision will

have a major impact on competitive dynamics (Calvo-Porrall and Lévy-Mangin, 2015; Corrocher and Lasio, 2013). As a result the industry is both mature and saturated.

With the wide use of smartphones and increasing subscription to high speed data networks, there is a predictive trajectory of customers' growing reliance on Internet-mediated services and facilities. A recent Ofcom report on 'coping in the connected world' suggests that nine in ten adults in the UK go online every day and indicates that smartphones and tablets offer the most convenient means for being connected with the Internet world<sup>1</sup>. In addition to basic product features such as quality of voice calls and text messaging services, customers are likely to value other features such as data network coverage and speed of Internet access. However, it is not clear from the existing literature whether or not internet speed on mobile telephones have any influence on customers' service satisfaction and subsequent switching decision. Internet speed is also an indicator of service quality. Recent incident with mobile telephone operator O2's technical failure in parts of the UK caused customer dissatisfaction as many subscribers did not have expected Internet speed on their mobile devices due to what the network provider (O2) attributed to "faulty software"<sup>2</sup>. Hence, it has become important for operators to assess the influence of speed as a variable on customers' assessment of mobile telecom service provision.

In order to address the above issue, in this paper we take a marketing perspective to analyse customers' switching intention. In so doing, the paper explores customer switching behaviour literature. The extant literature identified multifaceted factors of customers switching behavioural intention such as poor service quality, perceived product quality, brand personality, brand identification, low perceived commitment, unfair pricing, relationship termination, awareness etc. (Bansal, Taylor, & James, 2005; Nikhashemi et al., (2017); Srivastava and Sharma (2013). Moreover, they have also shown an agreement that customer switching intention, retention, and loyalty are related terms (Bansal & Taylor, 1999; Jaiswal & Niraj, 2011; Thaichon and Quach, 2016). Although consumers' switching intention has received significant research attention, there is paucity of research that identifies and analyses the factors that influence UK customers' intention to switch mobile operators. Hence, further investigation will not only contribute to mobile telecom literature, but will also advance customer satisfaction and switching intentions scholarship. Therefore this paper seeks to provide more in depth understanding on various technical features (with particular emphasis on speed) that influence UK customers' intention to switch from one mobile operator to another. It seeks to examine how

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<sup>1</sup> [http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr16/uk/CMR\\_UK\\_2016.pdf](http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr16/uk/CMR_UK_2016.pdf)

<sup>2</sup> <https://www.bbc.co.uk/news/business-46464730>

these factors relate to service quality, brand image, perceived value as well as customer satisfaction which in turn influence customers' switching intention.

In order to achieve the above, this paper examines the causal relationships between various aspects of mobile operators' service quality (e.g. speed, reliability of network coverage and call and text quality), brand, and customer satisfaction. It further deepens understanding by looking into the interrelationship between customer satisfaction and customers' switching intention. Hence, the aim is to assess the role of speed in influencing consumers' satisfaction and switching intention.

This study proposes a conceptual framework incorporating antecedents and customer satisfaction towards mobile switching intention through SEM (structural equation modelling). This paper contributes by providing empirical support that speed, network quality and call quality have a positive and significant influence on service quality and brand image which in turn influences perceived value. Perceived value, customer service and service quality have a positive and significant influence on customer satisfaction. More specifically, this study develops and empirically tests the conceptual framework incorporating factors of customer satisfaction, switching costs, perceived value and customer service on customers' switching intention.

This paper is structured as follows. First section presents the literature review. Second section develops a conceptual framework followed by the description of the research methodology. Subsequently, data analysis, results, discussion of results and finally major conclusions, implications and future research directions are delineated.

## **2. Literature Review and hypotheses development**

### **2.1 Network performance indicators**

The current telecommunication networks are becoming increasingly dense and complicated. A major factor contributing to this is the growing number of fixed and mobile broadband users, data-hungry applications like HD video and online gaming, special services (i.e. Tbps data transfer) as well as an ever-increasing number of network-connected everyday objects and machines and this number is expected to increase in the coming days (Agiwal et al., 2016). However, these pose entirely new challenges related to the transmission rate of data communication, known as speed. In such a context, speed becomes a significant technical feature impacting customers' experience and assessment of service quality. Speed, with its

requirement to transport multiple signals and traffic types, imposes a requirement on telecom operators for a certain level of infrastructure investment that meets or exceeds the appropriate quality levels from existing services. That is, customer satisfaction or dissatisfaction is determined mainly by network performance, with speed being a major factor (British Chambers of Commerce -BCC, 2003; Walsh and Norton, 2004). The next section discusses various aspects of customer satisfaction by reviewing consumer behaviour literature.

## **2.2 Brand image's relationship with speed, network coverage and call and text quality**

It is said that a product is created in the factory, but a brand is born in customers' minds. Brands can be conceptualised as a bundle of tangible and intangible features which increase product attractiveness beyond the functional attributes (Farquhar, 1989). Keller (1993) defines brand image as perceptions of a brand as reflected by brand associations in the consumer's memory. These associations and perceptions can vary in strength, favourability and uniqueness in the customer's mind (Keller, 1993; Aaker, 2010). The value of brand image to the customer and the firm is that it helps in the processing of information, differentiation, encouraging purchase intention, generating positive feelings and providing a base for product extension (Aaker, 2010).

In the high-speed service context, network performance is considered about four times more important than customer-service performance (Kim et al., 2007). However, network performance and service quality could also define the brand image of a mobile telecom operator (Lai et al. 2009). For mobile telecom operators, the corporate brand image can potentially differentiate one operator from another. This further adds on to Selen's (1993) classic work that suggests the performance quality have positive influence on brand image. As mentioned above, for telecom operators the performance quality can be divided into two broad categories – reliability of network coverage and call and text quality.

Based on the aforementioned scholarly works the following three hypotheses can be developed:

***H1: Brand image is positively associated with speed***

***H2: Brand image is positively associated with reliability of network coverage***

***H3: Brand image is positively associated with call and text context***

## **2.3 Service quality's relationship with speed, network coverage and call and text quality**

Service metrics which are used to assess the quality of networks can include network speeds, network coverage, call quality, connectivity and mobility. However, customers are likely to

recognise and assess network quality through the aspects that they consider as important attributes for the service performance (Laaveri, 2010). Network service performance is defined as the ability of a network to provide services to the end-users and it can be assessed through the Quality of Service (QoS) (Gómez, and Sánchez, 2005). Although QoS is argued to have influence on building strong brand image (Telemanagement Forum, 2004), this does not entirely explicate the network service attributes from customers' perspectives.

Quality of Experience (QoE) on the contrary is applied to assess network service quality from customers' point of view. QoE is the particular quality attributes that determine end-user' experience and hence has implications on the customer satisfaction and subsequent customer loyalty (Soldani, et al., 2006). Therefore, telecom operators ought to assess and examine the service quality attributes from customers' point of view (Vuckovic and Stefanovic, 2006).

We have already highlighted the importance of network service quality to be perceived and assessed from the customers' point of view. Service quality has also been defined and analysed from customers' perspectives in marketing and consumer behaviour literature. However, factors determining service quality can vary depending on the nature of the product/industry. While Parasuraman et al's (1988) seminal work on service quality defines fundamental constituents and measurement of the quality of service provision, subsequent service provision in digital era warrants renewed perspective toward this notion. As such, Parasuraman et al. (2005) developed new measurement scale for assessing electronic service quality that incorporated consumers' response to network service quality which subsequently gained currency in the research on electronic services (Dwivedi et al. 2010).

For mobile telecom network providers, extant literature suggests an array of factors such as call quality, pricing structure, value added service (Kim et al., 2004), functional and technical aspects and Internet service facilities (Malhotra and Kuwicz Malhotra, 2013). In this paper we are considering the technical aspects of the mobile telephone services and thereby assessing the comparative influences of technical features such as speed, reliability of network coverage and call and text quality on the overall service quality. Hence, we aim to hypothesise the interrelationship between various technical features such as speed, network coverage and voice and call quality with consumers' service quality experience.

Ickin et al. (2012) particularly emphasised on speed having influence on overall service quality and service experience. Although speed is not the only determinant of the technical quality of a service, it can be stated that speed is one of the most important characteristics and is often

positively correlated with other indices of service quality. The following hypotheses have been developed on the bases of above discussion.

***H4: Service quality is positively associated with speed***

***H5: Service quality is positively associated with reliability of network coverage***

***H6: Service quality is positively associated with call and text context***

#### **2.4 Service quality, brand image, customer satisfaction and perceived value**

Perceived value is defined as the difference between perceived utility and perceived risks (Kotler et al., 2008; Ziethaml, 1988). Perceived value involves quality value, emotional value, financial value and social value. Perceived value has influence on customer satisfaction (Kuo et al., 2009) and thereby encourages repurchase intention (Dölarslan 2014). From mobile telecom providers' perspective, it is important to understand the importance of customers' perceived value and the factors that constitute and enhance the same.

The concept of perceived value also rationalises the relative nature of price vis-à-vis quality and underscores the fact that customers not only look at the price of a product, but also assess the price against perceived quality, competitors' offers, their own opportunity costs and other issues such as convenience and social/psychological factors. Thereby, more recent consumer studies (Dey et al., 2016; Grönroos and Voima, 2013) tend to consider perceived value as a more holistic factor than 'price' in determining consumers' assessment of a product/service.

Academic literature also identifies brand image as an important tool in this mix as customers' perceptions of services and their subsequent decision to remain with and/or switch from the provider is influenced by brand image (Aghekyan-Simonian et al., 2012; Kwon and Lennon 2009; Lai et al., 2009). Next section sheds light on brand image.

Service quality is viewed as an antecedent to customer satisfaction (Amin et al., 2013; Parasuraman et al., 1985, 1988; McDougall and Levesque, 2000) which is a key determinant for customer churn and loyalty. We can therefore assume that by providing quality service, mobile telecom operators can discourage customer churn and enhance customer loyalty.

Overall based on the scholarly works of Dölarslan (2014), Edward and Sahadev (2011), Shin and Kim (2008), Kim et al. (2013) and Wu (2014) and Kuo et al. (2009) the interrelationships between service quality, perceived value and customer satisfaction can be hypothesised – as stated below:

***H7: Perceived value is positively associated with brand image***

*H8: Perceived value is positively associated with service quality*

*H9: Customer satisfaction is positively associated with service quality*

*H10: Customer satisfaction is positively associated with perceived value*

*H11: Customer satisfaction is positively associated with customer service*

## **2.5 Satisfaction, switching costs and customer switching intention**

Empirical works (Dölarslan, 2014; Edward and Sahadev, 2011; Shin and Kim, 2008; Kim et al., 2013) suggest that service quality and perceived value can discourage switching intention by influencing customer satisfaction. It has been found that when there are high switching costs/barriers, customers tend not to switch even if they are dissatisfied with their providers. Given the empirically demonstrated relationships, it is worthwhile to test switching intention and analyse how it is affected by customer satisfaction and switching barriers.

The interrelationship between customer satisfaction, switching intention and switching barriers/costs are presented and analysed by Shin and Kim (2008), Liang et al. (2013); Edward and Sahadev (2011), Malhotra and Kubowicz Malhotra (2013). Based on these scholarly works the following hypotheses can be developed

*H12: Switching intention is negatively associated with switching costs and barriers*

*H13: Switching intention is negatively associated with customer satisfaction*

## **3. Conceptual Framework**

### **3.1 Conceptual framework, Hypotheses Development and key academic literature**

We have developed a conceptual framework from critically analysing the extensive review of the relevant academic literature that selected on consumer behaviour, branding and electronics engineering. Synthesis of the key works leads to the development of a conceptual framework underpinning the empirical data and resultant recommendations.

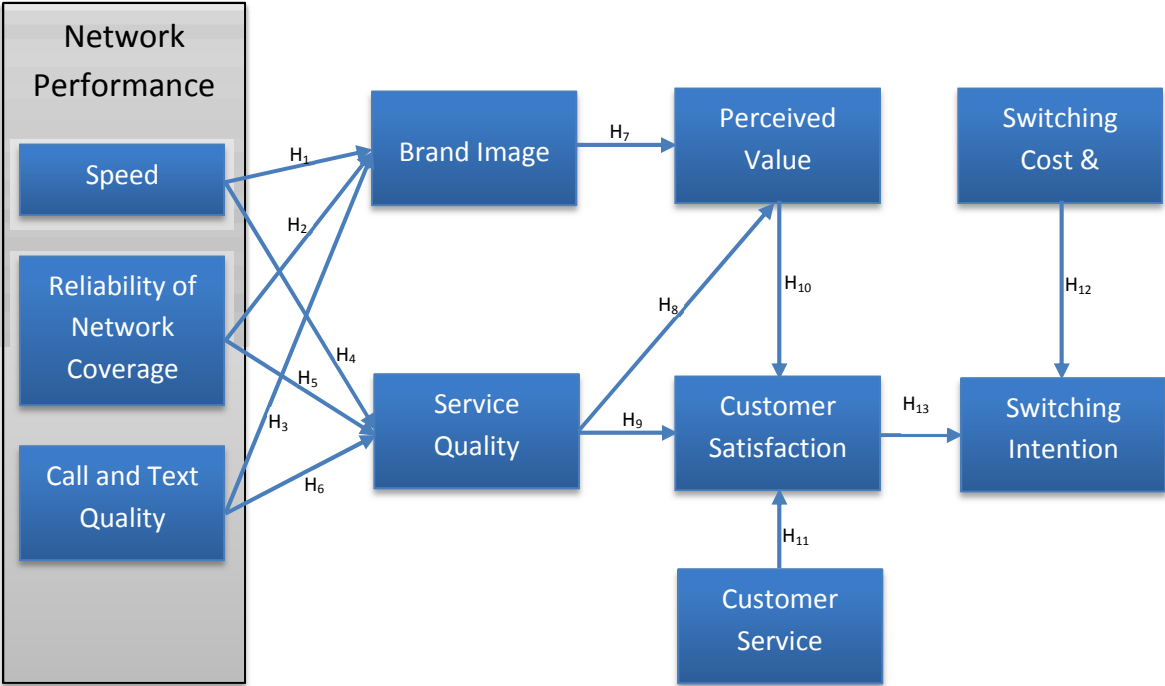
The framework for this study in figure 1, exhibits the hypothesised interrelationships between mobile operators' service quality attributes such as speed, reliability of network coverage and call and text quality, and brand image. Furthermore, the influence of brand image and service quality on perceived value and that of service quality on customer satisfaction are also



highlighted. Extant literature (references provided later in this section) suggests satisfied customers are less likely to switch. Hence, customer satisfaction is hypothesised to have negative relationship with switching intention.

Figure 1 presents the conceptual framework and hypothesised interrelationships between factors and hypothesis are given in Table-2.

**Figure 1 Conceptual framework and hypotheses**



The conceptual framework is based on factors found in the relevant scholarly works. Although the posited interrelationships between these factors appeared in some literature, the conceptual framework in its entirety arose from factors identified and/or tested across the existing literature. This is reflective of both the objectives and the multidisciplinary perspective of this study. As a result, the study has developed a holistic conceptual framework.

The following hypotheses<sup>3</sup> have been developed in light of the relevant academic theories and concepts discussed earlier in this section, and tested via the survey data:

<sup>3</sup> The hypotheses are also presented in Figure-1.

## 4. Methodology

For this study, we adopted a quantitative approach which enabled us to collect the data through a self-administered survey from the adult respondents in the UK. The survey was commissioned and overseen by the telecom company *Three*. The research instrument has been developed by adapting scales from the existing literature. To access the appropriate the sample and collect the data efficiently we launched the survey through a professional marketing agency, OnLineBus. For testing the hypotheses, we have analysed the data using PLS-SEM.

The final survey was launched in the last week of 2016 in the UK through the professional marketing agency. The link of the survey, along with an invitation email, was sent to 3000 randomly chosen target participants in two instances. As a token of appreciation for their time and participation, the respondents were offered a summary of the outcome and a small incentive. Following this a reminder email was sent at the end of first week to boost up the response rate. The survey was completed by 1,254 respondents. The breakdown of sample in relation to their current mobile telephone network providers in provided in Table-1

**Table 1 Breakdown of the sample**

	Total	SEX		AGE					
		Male	Female	18-24	25-34	35-44	45-54	55-64	65+
	<b>1254</b>	<b>609</b>	<b>645</b>	<b>179</b>	<b>220</b>	<b>209</b>	<b>231</b>	<b>188</b>	<b>227</b>
<b>EE</b>	<b>301</b>	144	157	39	48	53	47	44	71
	<b>24%</b>	23%	24%	22%	23%	27%	21%	25%	26%
<b>O2</b>	<b>254</b>	118	136	34	47	43	50	37	43
	<b>20%</b>	19%	21%	19%	22%	22%	23%	21%	16%
<b>Vodafone</b>	<b>171</b>	86	85	19	27	34	34	15	41
	<b>14%</b>	14%	13%	10%	13%	17%	16%	9%	15%
<b>Three</b>	<b>116</b>	74	42	32	33	16	16	8	10
	<b>9%</b>	12%	7%	18%	16%	8%	8%	5%	4%
<b>Tesco Mobile</b>	<b>109</b>	49	59	10	12	10	25	16	36
	<b>9%</b>	8%	9%	6%	6%	5%	12%	9%	13%
<b>Virgin Mobile</b>	<b>99</b>	42	57	10	11	17	19	19	23
	<b>8%</b>	7%	9%	6%	5%	8%	9%	10%	8%
<b>Giffgaff</b>	<b>57</b>	25	32	15	11	11	8	8	4
	<b>5%</b>	4%	5%	8%	5%	5%	4%	4%	2%
<b>BT Mobile</b>	<b>34</b>	25	9	5	9	3	5	5	7
	<b>3%</b>	4%	1%	3%	4%	1%	2%	3%	2%
<b>Talk Mobile</b>	<b>26</b>	12	14	5	4	4	4	4	5
	<b>2%</b>	2%	2%	3%	2%	2%	2%	2%	2%
<b>Asda Mobile</b>	<b>12</b>	7	5	-	-	1	2	6	3
	<b>1%</b>	1%	1%	-	-	*	1%	3%	1%

<b>Orange</b>	<b>9</b>	3	6	-	-	-	-	4	5
	<b>1%</b>	*	1%	-	-	-	-	2%	2%
<b>T-Mobile</b>	<b>7</b>	3	4	-	2	1	-	-	5
	<b>1%</b>	*	1%	-	1%	*	-	-	2%
<b>Talk Talk</b>	<b>7</b>	1	6	-	1	-	-	2	4
	<b>1%</b>	*	1%	-	*	*	-	1%	1%
<b>ID Mobile</b>	<b>6</b>	1	5	1	-	1	1	1	3
	<b>*</b>	*	1%	1%	-	*	1%	*	1%
<b>Lyca Mobile</b>	<b>5</b>	4	1	1	3	1	-	-	-
	<b>*</b>	1%	*	1%	1%	*	-	-	-
<b>Other</b>	<b>4</b>	1	3	2	1	1	-	-	1
	<b>*</b>	*	*	1%	*	*	-	-	*
<b>I do not have a personal mobile phone</b>	<b>38</b>	18	20	5	2	2	6	8	15
	<b>3%</b>	3%	3%	3%	1%	1%	3%	4%	5%

The respondents' database was thoroughly checked to eliminate the responses with an unusually short completion time (Marescaux et al., 2012). Moreover, those respondents, who provided the same response to a series of questions and had a standard deviation of less than 0.50, were eliminated from the database (Loughry et al., 2007). Thus, the final sample size yielded 861 complete responses with a usable response rate of 28.7%.

#### ***4.1 Measurement development and collection of data***

The survey questions were developed based on prior literature, with measurement items developed on the basis of a comprehensive review of scholarly works as well as expert opinions. A pre-test with five researchers was conducted to get an initial indication of the scales' conceptual framework validity. To measure the indicators in this study we have applied five point scale which is still a frequently used in the business research (Aranyossy, Blaskovics and Horváth, 2018; Dwivedi et al., 2013; Kumar and Pansari, 2016). To facilitate cumulative research, operationalisations tested by previous research have been used as much as possible (as presented in Table 2). After operationalising the constructs, they were utilised to design a list of carefully structured questions, aided by online survey tools.

Table 2 shows how each construct has been operationalized and lists more detailed definitions. Speed has been measured using a five point scale adopted from Isabona (2014) and Goudarzi (2008). Reliability of Network coverage was measured using items adapted from Ofcom report (2015) and Isabona (2014). Call and Text quality was measured by Ofcom report (2015) and Goudarzi (2008). For measuring Customer Service we adopted a three item scale of Shin and Kim (2008). Adopting the two item scale from Dölarıslan (2014) we measured Perceived Value.

For this study we found a single item scale of Service Quality, adapted from Edward and Sahadev (2011), is more appropriate. Brand Image was measured using the scale of Aaker (2010). Switching Intention and Switching Costs and Barriers were measured adapting scales from Shin and Kim (2008).

**Table 2: Operationalisation of constructs**

<b>Constructs and indicators</b>	<b>Mean</b>	<b>Std. Dev.</b>	<b>Loadings</b>
<b>Speed</b> (Cronbach's alpha 0.925, Composite reliability 0.952)			
SQ2: I have fast internet browsing speeds (e.g. loading web pages) with my current mobile network provider	2.14	0.97	0.932***
SQ3: I have fast internet download speeds (e.g. steaming videos or music) with my current mobile network provider	2.27	0.98	0.932***
SQ4: I have fast internet upload speeds (e.g. how quickly emails with attachments send) with my current mobile network provider	2.20	0.99	0.933***
<b>Reliability of network coverage</b> (Cronbach's alpha 0.909, Composite reliability 0.943)			
NQ1: I have good network coverage everywhere I go with my current mobile network provider	2.05	1.05	0.907***
NQ2: I have good indoor network coverage with my current mobile network provider	2.00	1.11	0.913***
NQ3: I have reliable network coverage with my current mobile network provider	1.91	1.01	0.940***
<b>Call and Text quality</b> (Cronbach's alpha 0.843, Composite reliability 0.905)			
TQ1: I have good call quality with my current mobile network provider	1.79	0.89	0.884***
TQ2: I do not experience dropped calls (i.e. calls that unexpectedly hang up) with my current mobile network provider	2.07	1.10	0.842***
TQ3: I do not experience problems sending and receiving text messages with my current mobile network provider	1.98	1.05	0.890***
<b>Perceived value</b> (Cronbach's alpha 0.801, Composite reliability 0.909)			
VQ1: I get good customer service from my current mobile network provider	1.98	1.03	0.913***
VQ2: My current mobile network provider keeps me informed about things that matter to me such as my bill, out of bundle charges, etc.	1.97	0.95	0.913***
<b>Customer service</b> (Cronbach's alpha 0.843, Composite reliability 0.905)			
CQ1: My current mobile network provider is easily accessible through a variety of channels such as shops, call centres, their website, etc.	2.07	0.98	0.890***
CQ2: I get good value for money from my current mobile network provider	2.07	0.99	0.877***
CQ3: I find it easy and convenient to deal with my current mobile network provider	1.98	0.94	0.849***
<b>Service quality</b> (Cronbach's alpha N/A, Composite reliability N/A)			
QS1: I get good quality products and services from my current mobile network provider	2.09	0.92	NA
<b>Customer satisfaction</b> (Cronbach's alpha N/A, Composite reliability N/A)			
OQ1: Overall, I am satisfied with my current mobile network provider	1.81	0.93	NA
<b>Brand Image</b> (Cronbach's alpha N/A, Composite reliability N/A)			
BA2: There are loyalty benefits for staying with my current mobile network provider	2.41	0.97	NA
<b>Switching costs and barriers</b> (Cronbach's alpha 0.706 , Composite reliability 0.788)			
YQ1: I don't know enough about the services of other mobile network providers in order to make an informed decision about switching	2.72	1.16	0.717***
YQ3: If I switch to a new mobile network provider, it may not be as good as I expect	2.16	0.84	0.889***
<b>Switching intention</b> (Cronbach's alpha N/A, Composite reliability N/A)			

XQ1: I want to change my mobile network provider	3.25	1.31	NA
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*Note: NA refers to single-item constructs where the values are not applicable*

#### **4.2 Data analysis**

Multivariate analysis is used in this study to analyse the data collected from the questionnaire survey. Multivariate techniques are “all statistical techniques that simultaneously analyse multiple measurements on individuals or object under investigation” (Hair et al., 2010, p.4). This study uses structural equation modelling (SEM), which is “a multivariate technique that combines the aspects of factor analysis and regression to examine the interrelationships among constructs” (Hair et al., 2010, p.5). Structural equation modelling is chosen to analyse this data set for four main reasons (Byrne, 2013). First, the assumptions of SEM underlying the statistical analyses are clear and testable, giving the researcher full control and enabling further understanding of the analyses. Second, it emphasises the overall variance-covariance matrix and the overall model fit, and tests the individual parameter estimates simultaneously. Third, it improves the statistical estimation of relationships between constructs by incorporating latent variables, which reduces measurement errors. Fourth, the measurement and the structure models can be presented using a graphical interface, which boosts creativity and facilitates rapid model retrieval.

The variance-based partial least squares method for structural equation modelling (PLS-SEM) is appropriate for validating the framework and testing the hypotheses as discussed and presented in the previous paragraphs. This is confirmed by previous studies based on the research context in which the theoretical framework of this study is developed. PLS is also a powerful SEM technique that has been used extensively in management research (Gefen and Straub, 2005). There are several advantages of using PLS-SEM compared with covariance-based SEM which have propelled us to adopt the PLS-SEM for this study, as pointed out by Hair et al (2014). In this study we have tested a very complex structural model consisting of ten variables and for which PLS deemed suitable for its capability of dealing with structurally complex models. PLS also generates path coefficients that explain the relationships and can be applied similarly to conventional regression coefficients. Moreover, with larger data sets (n=250+) since both PLS—SEM and CB—SEM provide very similar results, considering the normality nature of the data and suitable features of PLS—SEM has been considered as an appropriate analytical tool for this study (Chin, 1998; Gefen and Straub, 2005; Hair et al, 2014; Lee et al., 2011).

#### **4.3 Construct and measurement scale validation**

This research follows Henseler et al.'s (2009) suggestions to assess the measurement model in terms of its internal consistency, convergent validity, and discriminant validity. The Cronbach's alphas of all constructs range from 0.71 to 0.93 showing an evidence of good reliability. As depicted in Table 1, all items in the model have loaded significantly ( $p < 0.001$ ) on their designated first-order constructs (standard factor loadings ranged from 0.72 to 0.93) and there was no evidence of cross-loadings (Fornell and Larcker, 1981). A potential pitfall with SEM-PLS is that some measures may have to be dropped due to weighting issues. One item (YQ2) is deleted from switching costs and barriers with low AVE; since this is for reflective constructs, there is no impact on the research results and the questionnaire maintained its conceptual integrity. After this assessment, all the scales are further refined and then all other indicators are retained for the final measurement model and structural model evaluation and. Detailed reliability analysis assured that no deviations from internal consistency and external consistency happened (Anderson and Gerbing, 1988). The composite reliabilities (CR) for all the constructs exceeded 0.70, and all average variances extracted (AVE) are higher than the recommended level of 0.50 (Fornell and Larcker, 1981; Hair et al., 2014). Although PLS estimation does not rely on formal indices to assess overall goodness-of-fit (GoF), Tenenhaus et al. (2005) have provided a GoF measure that takes the square root of the product of the variance extracted of all constructs and the average  $R^2$  value of the endogenous construct(s). In this model, the GoF measure is 0.56, which indicates a good fit.

The discriminant validity is tested with two criteria: The first criterion is the cross loadings of the indicators (Hair et al., 2011). Based on this method, all indicators loadings on the associated construct should be greater than of its loadings on other constructs. The second criterion is the Fornell-Larcker (1981) (AVEs should be greater than the squared correlations and each indicator should have a higher correlation to the assigned latent variable than to any other latent variable) and the cross loadings analysis. As can be seen in Tables 3 and Table 4, both criteria are satisfied for all constructs and their underlying indicators, which indicate that the constructs have good discriminant validity.

**Table 3 Discriminant validity: Cross Loadings**

	<b>Customer Service</b>	<b>Reliability of network coverage</b>	<b>Speed</b>	<b>Call and Text quality</b>	<b>Perceived value</b>	<b>Switching costs and barriers</b>
<i>CQ1</i>	<b>0.890</b>	0.447	0.456	0.506	0.727	0.462
<i>CQ2</i>	<b>0.877</b>	0.501	0.497	0.533	0.624	0.386
<i>CQ3</i>	<b>0.849</b>	0.448	0.499	0.486	0.582	0.403
<i>NQ1</i>	0.471	<b>0.907</b>	0.519	0.65	0.521	0.377
<i>NQ2</i>	0.476	<b>0.913</b>	0.515	0.63	0.482	0.347

<i>NQ3</i>	0.522	<b>0.940</b>	0.553	0.687	0.542	0.344
<i>SQ2</i>	0.532	0.558	<b>0.932</b>	0.505	0.505	0.388
<i>SQ3</i>	0.492	0.514	<b>0.932</b>	0.463	0.441	0.395
<i>SQ4</i>	0.518	0.536	<b>0.933</b>	0.497	0.476	0.399
<i>TQ1</i>	0.576	0.661	0.492	<b>0.884</b>	0.6	0.317
<i>TQ2</i>	0.443	0.569	0.409	<b>0.842</b>	0.51	0.276
<i>TQ3</i>	0.502	0.634	0.467	<b>0.890</b>	0.548	0.32
<i>VQ1</i>	0.641	0.513	0.44	0.573	<b>0.913</b>	0.416
<i>VQ2</i>	0.72	0.511	0.489	0.587	<b>0.913</b>	0.423
<i>YQ1</i>	0.455	0.336	0.365	0.289	0.429	<b>0.717</b>
<i>YQ3</i>	0.354	0.306	0.335	0.286	0.343	<b>0.889</b>

**Table 4 Discriminant validity: Fornell-Larcker Criterion**

	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>1. Call and Text quality</b>	<b>0.872</b>					
<b>2. Customer Service</b>	0.583	<b>0.872</b>				
<b>3. Perceived value</b>	0.635	0.745	<b>0.913</b>			
<b>4. Reliability of network coverage</b>	0.714	0.533	0.561	<b>0.920</b>		
<b>5. Speed</b>	0.524	0.552	0.509	0.575	<b>0.932</b>	
<b>6. Switching costs and barriers</b>	0.350	0.480	0.459	0.387	0.422	<b>0.808</b>

## 5.0 Results and Discussion

After establishing that the measurement model holds good psychometric proprieties, the structural equation model is assessed. Based on the guidelines by Henseler et al. (2009) and Hair et al. (2011), the significance of paths is calculated by means of a bootstrapping procedure generating 5000 random samples of 861 cases. The results are reported in Figure 2, which shows that only the path between switching costs and barriers and switching intention present non-significant path coefficients.

The coefficient of determination ( $R^2$ ) is reported to assess framework fit in Figure 2, which indicates how well the exogenous (independent) constructs can explain the endogenous (dependent) constructs. Apart from the brand image and switching intention,  $R^2$  for customer satisfaction, perceived value and service quality are greater than 0.33 (0.508, 0.579 and 0.470 respectively), and there is moderate and substantial framework fit, as shown in Figure 2. The structural equation model explains 23% and 17% of the variance for the brand image and switching intention respectively. However, all  $R^2$  for all endogenous constructs are highly significant ( $P \leq 0.001$ ). Based on the suggestion by Hair et al. (2014 a and b), it is difficult to

provide rules of thumb for acceptable  $R^2$  values, as this depends on the framework complexity and the research discipline. This research suggests that the more paths there are pointing towards a target construct, the higher the  $R^2$  will be.

### 5.1 Speed has the highest impact on brand image of all network quality elements

<i>H1: Brand image is positively associated with speed – accepted</i>
<i>H2: Brand image is positively associated with reliability of network coverage – rejected</i>
<i>H3: Brand image is positively associated with call and text context – accepted</i>

The product and corporate brands are attached together in the case of large service providers such as mobile telecom operators (e.g. Three, Vodafone, O2 and EE). In effect, in most cases, product categories (i.e. pay as you go, contract, mobile Internet services) do not have separate brand names and are promoted with corporate brands. As a result, the image of the company, although it appears to be holistic and monolithic, is rooted in certain specific attributes of the products/services. The current study identifies that the three major components of network service quality influence brand image, with speed and call quality in particular being very significant.

One of the major objectives of this study is to examine the importance of speed on customer switching intention. Hence, the analysis particularly considers the influence of speed on variables such as brand image that may influence customer satisfaction and subsequent switching intentions. This means that other non-technical factors, for example product bundling and their impact on brand image are not considered in this study.

When it comes to assessing the quality of network and technical issues, speed ( $b=0.304$ ,  $p<0.001$ ) and call quality ( $b=0.154$ ,  $p<0.001$ ) are clearly shown to have a significant and positive impact on the brand image of a mobile operator. Reliability of network coverage also has a significant and positive influence in this regard ( $b=0.099$ ,  $p<0.05$ ). Furthermore, the impact of speed on brand image is substantially higher than that of call quality. One should be mindful of the fact that with the inception of 4G technology and the fast-expanding uptake of smartphones, Internet services such as Internet-based voice calls and messaging, video



streaming and social media are increasingly being embodied in mobile devices. In the near future, this phenomenon is expected to become even more significant. Hence, there will be more demand for and importance placed on speed in comparison with call quality and other technical features.

**5.2 Speed emerges as the most significant component of service quality**

<i>H4: Service quality is positively associated with speed – accepted</i>
<i>H5: Service quality is positively associated with reliability of network coverage – accepted</i>
<i>H6: Service quality is positively associated with call and text context – accepted</i>

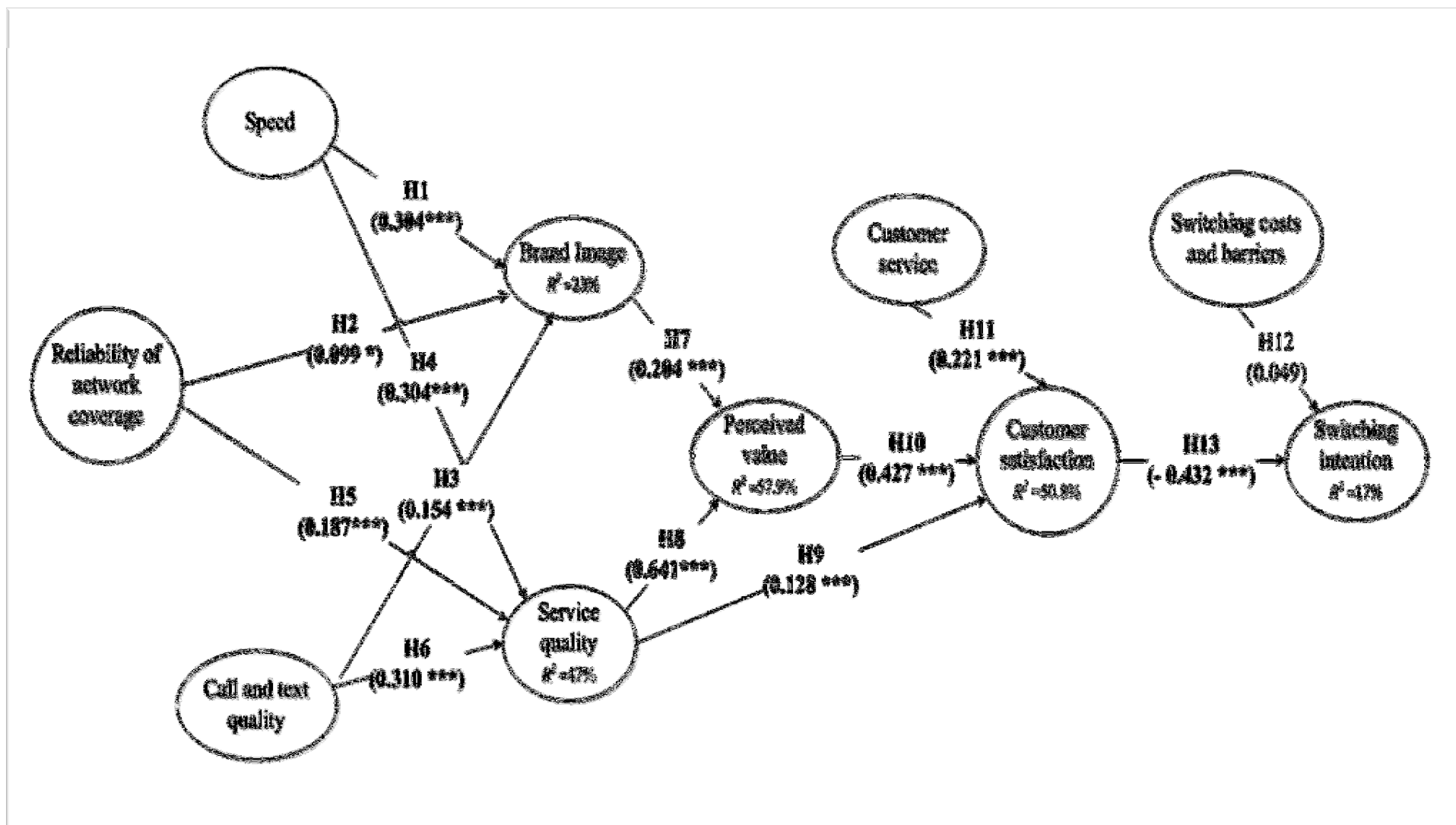
All three components hypothesised for good service quality have been found to have a significant and positive influence. Call quality has the most significant influence (b=0.310, p<0.001) with speed being the second most significant (b=0.304, p<0.001). The difference between the significance of call quality and speed is very minimal and it can be predicted that in the near future, speed will emerge as the most significant component of service quality.

**5.3 Perceived value goes far beyond financial value, it is influenced by brand image**

<i>H7: Perceived value is positively associated with brand image – accepted</i>
<i>H8: Perceived value is positively associated with service quality – accepted</i>

As discussed in the theoretical background (section 2), perceived value is an effective, useful and relevant construct for this study. It is central to customers’ assessment of service performance. By assessing perceived value, one can understand customers’ perceptions of the service experience in relation to associated costs.

Figure 2: Structural equation model (SEM) results (n=861)



\*\*\* p<0.001, \*\*P<0.01, P<0.05

This study provides evidence that service quality is an antecedent to perceived value. From the data analysis, it is understood that service quality has a positive and highly significant path leading to perceived value ( $b=0.641$ ,  $p<0.001$ ).

This research provides statistical evidence to conclude that brand image has a positive and highly significant influence on perceived value ( $b=0.204$ ,  $p<0.001$ ). It is nonetheless logical to assume that a positive and strong brand image would contribute to perceived value.

#### **5.4 Perceived value has a much higher impact on customer satisfaction than customer service**

<i>H9: Customer satisfaction is positively associated with service quality– accepted</i>
<i>H10: Customer satisfaction is positively associated with perceived value – accepted</i>
<i>H11: Customer satisfaction is positively associated with customer service – accepted</i>

Customer satisfaction as a driver and determinant of business success is the core of the conceptual framework of this study. Conceptually and practically, it is accepted that customer satisfaction is a function of the quality of the product/service and overall value. Hence, it is not unusual to find that customer satisfaction is significantly influenced by service quality and perceived value. According to the current study, perceived value ( $b=0.427$ ,  $p<0.001$ ) and service quality ( $b=0.128$ ,  $p<0.001$ ) have positive and significant paths leading to customer satisfaction. Customer service also appears to have a significant and positive influence on customer satisfaction ( $b=0.221$ ,  $p<0.001$ ). This explains how customers' assessment of overall performance of a company and/or their service experience is influenced by various aspects and components of customer service – including billing and product-related information, and in-store and call centre services.

However, it is interesting to note that perceived value has the most significant influence on customer satisfaction. Service quality and brand image both have a positive and significant influence on perceived value. Speed therefore, being a significant factor for brand image and service quality, is an important part of perceived value.

## 5.5 Switching intention – a direct outcome of customer satisfaction and indirectly driven by satisfaction with network speed

*H12: Switching intention is negatively associated with switching costs and barriers – rejected*

*H13: Switching intention is negatively associated with customer satisfaction – accepted*

As part of the conceptual framework (Figure 1), it can be understood that customer satisfaction has a relationship with switching intention. However, such a relationship is negative. Hence, if there is a higher level of customer satisfaction, there will be a lower intention to switch. The data fully support this general notion of the relationship between customer satisfaction and switching intention. Customer satisfaction negatively and significantly leads to the path of switching intention ( $b=-.432$ ,  $p<0.001$ ). Hence, it can be claimed that in an ideal world, if a customer is satisfied with the product or service, they would be less likely to switch.

This interrelationship between customer satisfaction and switching intention is not very linear by nature. Switching costs and barriers discourage customers from switching from one supplier to another. Switching barriers cause anxieties, tension and difficulties due to perceived risks, lack of information and opportunity costs, in addition to a lock-in state resulting from contractual obligations to the current provider.

Generally, a switching barriers/cost is hypothesised to have a negative and significant impact on switching intention, although this may vary for contextual reasons (i.e. the nature of the market/industry, the competitive environment etc.). In this study, switching barriers and costs appear not to have any significant influence on switching intention ( $b=-.049$ ,  $p>0.001$ ). One of the plausible explanations behind this revelation could be the very nature of the competitive environment and the service provider-customer relationship in the UK mobile operator industry. Customers with access to Internet-based and communal networks are considerably more empowered these days. Hence, they are able to minimize perceived risks and are less likely to have tension and uncertainties regarding opportunity costs, product/price deals etc.

## 5.6 Theoretical contribution

In light of the findings, the paper makes the following contribution to existing literature:

- 1) First of all the paper identifies speed as a significant component for service quality. Ickin et al. (2012) in the existing literature have emphasised on the importance of speed. However, our paper makes further advancement by assessing speed's role in comparison with other technical features such as network coverage and quality of voice calls and text messaging. In doing so the paper also complements other literature on internet services (Dwivedi et al. 2010; Malhotra and Kuwicz Malhotra, 2013; Kim et al. 2004) by establishing the role of speed in constituting service quality.
- 2) Furthermore, speed is also strongly associated with brand image. While existing literature (Lai et al. 2009) suggests service quality has influence of brand image, our work reveals the comparative influences of three major technical features of service quality on brand image.
- 3) We have also found that perceived value has a mediating role in determining brand image and service quality's influence on customer satisfaction. As such, this model captures consumers' subjective assessment of the quality and brand association in relation to the price they pay for and thereby explains that consumers make a rational assessment of their service experience that leads to their satisfaction/dissatisfaction.
- 4) Although the paper corresponds to existing literature (Shin and Kim (2008; Liang et al. 2013; Edward and Sahadev, 2011; Malhotra and Kubowicz Malhotra, 2013) in relation to customers satisfaction's interrelationship with switching intention, it is important to note that mobile telephone consumers pay attention to technical features of their operators and thereby their switching intention can be influenced by various technical features including speed – which has not been properly highlighted in the existing literature.

## 6.0 Conclusions

This paper placed customer satisfaction at the core of the conceptual framework. The data provide a strong rationale for considering speed as an important factor influencing customer satisfaction and switching intention in the UK mobile telecom industry. The data demonstrate that call quality and speed are key considerations used by customers for

assessing the service quality of mobile operators and they also have significant influence on the brand image. These two factors are significant drivers in the creation of perceived value, with such value underpinned by service quality and brand image. We can identify the following managerial and policy implications from this study:

**Implications for mobile operators:**

- 1) Mobile telephone operators should try to achieve faster speed and better call and text quality to enhance customers perceived value and brand image which in turn will contribute to their satisfaction and discourage to switch.
- 2) Mobile operators should also emphasise the issue of speed and call and text quality in their marketing communications to acquire new customers.

**Implications for statutory bodies such as Ofcom:**

- 1) There should also be parity and symmetry in the distribution of spectrum. If certain operators are provided with higher spectrum they will enjoy advantageous position and competitive edge with higher speed. Contrarily, the operators with lower spectrum may not be able to offer higher speed to their customers and experience customer dissatisfaction and churn.
- 2) Ofcom should allow the mobile operators to compete on the basis of the degree of speed and quality of call so that customers can make an informed decision on remaining with or switching from their current providers.

As with any studies, the methodologies and underpinning assumptions give rise to limitations. For example, some aspects of customer psychology, such as how customers perceive speed could be investigated via robust qualitative data triangulated with the quantitative survey. Furthermore, changes in market dynamics may lead to changes in customers' perceptions and opinions. For instance, innovation and the entrance of new providers may change the market environment and drivers, as exemplified by the introduction of the iPhone in 2007 which changed the whole competitive dynamics of the mobile telephone industry. Hence, longitudinal survey research on a larger group of respondents could provide further insights into the factors and dynamic nature of the market. Nevertheless, this study provides an instructive understanding of customers' opinions and

perceptions at a given point in time and indicates some key aspects of the major drivers that would help both researchers and practitioners.

Future research could be conducted on the customers of mobile operators to further refine the framework developed and validated in this report, with the aim to gain further insights into the key interrelationships and variables. As suggested above, practitioners and researchers would be well advised to find out how speed is perceived by customers by conducting qualitative research in the form of focus group discussion and in-depth interviews. There is also scope for a comparative analysis of what companies actually achieve in terms of speed and what consumers perceive.

It can be argued that this report provides a strong, reliable justification and a valid foundation for assessing customer satisfaction and switching intention.

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