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Annex 4 – Three response to Ofcom PSSR auction consultation January 2017

FACTORS INFLUENCING CUSTOMER SATISFACTION AND SWITCHING INTENTION

A study of the UK mobile telecom market

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Executive Summary

In this study we investigate the factors that make UK customers' **consider switching** to another mobile operator. We find out that customers would consider switching if they are not satisfied with their current mobile operator.

Our analysis shows that while customers' satisfaction is a product of various factors, these are **grounded either directly or indirectly** to elements constituting network quality. These elements – network speed, reliability of network coverage, call & text quality - are the **foundation of customer satisfaction**. The reasons for this are twofold. Firstly, taken together, they all contribute *directly* to customer satisfaction. Secondly, they all *indirectly* affect customer satisfaction, but this time by enforcing brand image and perceived value. We estimate that of the three elements of network quality, **speed has the highest impact** on brand image and that customers **value network speed** almost as much as call & text quality – an element that can be largely considered a hygienic.

Based on our analysis we conclude that switching intention is a result of a *complex* but *structured* interaction among a number of factors with differing degrees of importance. The **further back in the "structure"** these factors are, **the more foundational** they are. Therefore the ability of a mobile operator to manage the foundational factors is a crucial asset that influences its ability to retain and grow its customer base. Moreover, we argue that network **speed is emerging** as the most important element of network quality and therefore is the most important foundational factor.

Our analysis is the output of a model we developed, founded on **published scientific research** and tested via an extensive **quantitative survey**. We used a structural equation model to *analyse* the survey data and *test the rigour* of the results it generates.

1.0 Introduction

1.1 Background

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.

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[1]. 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. Hence, it has become important for operators to assess the influence of speed as a variable on customers' assessment of mobile telecom service provision.

Understanding the influence of speed is also important for policy makers. The distribution of spectrum allowance, for instance needs to take into consideration the speed factor. If speed is a significant determining factor for customers' switching, asymmetric distribution of spectrum could potentially lead to competitive disparities[2].

In this report we aim to analyse the factors that influence UK customers' intention to switch mobile operators. 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

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[1] http://stakeholders.ofcom.org.uk/binaries/research/cmr/cmr16/uk/CMR_UK_2016.pdf

[2] The asymmetry leads to a number of potential disadvantages: lower network capacity, leading to congestion, i.e. very low speeds in congested areas; lower 'peak' or 'average' speed across the network (i.e. outside congested areas); and less flexibility in network deployments (e.g. having to share spectrum between macro-cells and small cells).

customer satisfaction are examined. We have then looked into the interrelationship between customer satisfaction and customers' switching intention. The interrelationships are tested through an extensive survey conducted with UK mobile customers.

1.2 Objectives:

This report aims to identify the critical factors influencing customers' satisfaction and switching intention and to assess their interrelationships. Attention has been given to the impact and importance of speed as a factor influencing the analysed variables. Therefore, the report sets forth to achieve the following objectives:

1. To develop and test a conceptual framework involving key relevant factors which determine and influence customers' switching intention in the context of the UK mobile telecom industry.
2. To present key conclusions and recommendations for mobile operators and telecom policy makers based on scientific principles and the findings of the research.
3. To evaluate the importance of speed as a key component of network service quality perceptions and its influence on other key variables such as perceived value and brand image.

1.3 Key findings of the study

1. Switching intention is a result of a complex but structured interaction among a number of factors with differing degrees of importance.
2. Customer satisfaction is a proxy for switching intention.
3. Network service quality is the foundation of customer satisfaction.
4. Speed is emerging as the most important element of network service quality. Customers value speed almost as much as call & text quality and of all network service quality elements it has the highest impact on brand image.

2.0 Theoretical background

## 2.1 Conceptual framework and key academic literature

We have developed a conceptual framework from an extensive and systematic review of the academic literature that selected the relevant studies 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 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.

The following diagram exhibits the conceptual model and hypothesised interrelationships[3] between factors.

Figure 1: Conceptual framework and hypotheses
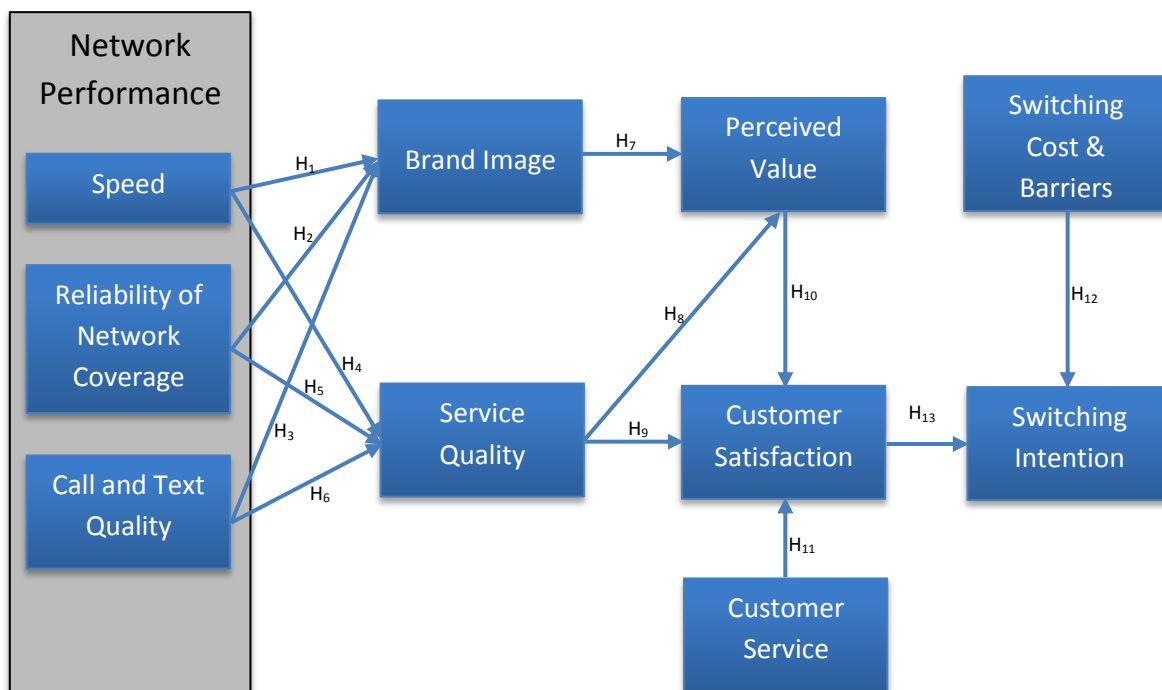
The conceptual framework is based on factors found in the relevant scholarly works. Although the posited interrelationships between these factors appeared in some literature, the conceptual framework in its entirety arose from factors identified and/or tested across the existing literature. This is reflective of both the objectives and the multidisciplinary perspective of this study. As a result, the study has developed a holistic conceptual framework.

The interrelationships set out in the conceptual framework arise from the following academic publications:

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[3] Further discussion on the hypotheses provided in Table-2

- The interrelationship between speed, network quality and call quality to service quality has been suggested by Ickin et al. (2012) and Kim et al. (2007), Kim et al. (2004) and Kang and James (2004).

- The interrelationship between service quality, perceived value and customer satisfaction has been identified and verified by Dölarslan (2014), Edward and Sahadev (2011), Shin and Kim (2008), Kim et al. (2013) and Wu (2014) and Kuo et al. (2009).

- The interrelationship between brand image and perceived value has been discussed by Aghekyan-Simonian et al. (2012), Kwon and Lennon (2009); Lai et al. (2009).

- The relationship between customer service and customer satisfaction has been tested in many research articles including Shin and Kim (2008).

- 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).

The following section elaborates on the key conceptual underpinnings.

2.2 Synopsis of literature review

2.2.1 Network performance indicators

Service metrics which are used to assess the quality of networks can include network speed, 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) (G´omez, and S´anchez, 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). The next section looks into the key element of network service quality that customers consider as important.

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 years (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.

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. In the high-speed service context, network performance is considered about four times more important than customer-service performance (Kim et al., 2007). 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.

2.2.2 Service quality, customer satisfaction and perceived value

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. 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).

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.

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 decisions 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.

2.2.3 Brand image's relationship with service quality and perceived value

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). For mobile telecom operators, the corporate brand image can potentially differentiate one operator from another and hence, can influence customers' choice.

2.2.4 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.

3.0 Methodology

The empirical study is based on a survey of 1,254 UK adults conducted by the authors among mobile telecom subscribers in the UK using OnLineBus, an Internet omnibus survey. The survey was commissioned by Three. A self-administered online survey questionnaire was completed by a total of 1,254 adults aged 16+ years old between 29 September and 03 October 2016. The sample was weighted to represent the adult population (16+) of the UK.

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. To facilitate cumulative research, operationalisations tested by previous research have been used as much as possible (as presented in Table 1). After operationalising the constructs, they were utilised to design a list of carefully structured questions, aided by online survey tools. Table 1 shows how each construct has been operationalized and lists more detailed definitions.

Table 1: Operationalisation of constructs

Construct	*Indicator code*	*Indicators*	*Scale*	*Source*	
Speed	SQ1	Do you access the internet using your mobile handset?	Yes/No	Ofcom,	2015
	SQ2	I have fast internet browsing speeds (e.g. loading web pages) with my current mobile network provider	(1~5)	Isabona, Goudarzi,	2014; 2008
	SQ3	I have fast internet download speeds (e.g. steaming videos or music) with my current mobile network provider	(1~5)	Isabona, Goudarzi,	2014; 2008
	SQ4	I have fast internet upload speeds (e.g. how quickly emails with attachments send) with my current mobile network provider	(1~5)	Isabona, Goudarzi,	2014; 2008
Reliability of Network coverage	NQ1	I have good network coverage everywhere I go with my current mobile network provider	(1~5)	Ofcom, Isabona,	2015; 2014
	NQ2	I have good indoor network coverage with my current mobile network provider	(1~5)	Isabona, Goudarzi,	2014; 2008
	NQ3	I have reliable network coverage with my current mobile network provider	(1~5)	Isabona, Goudarzi,	2014 2008
Call and Text quality	TQ1	I have good call quality with my current mobile network provider	(1~5)	Goudarzi,	2008

Construct	Indicator code	Indicators	Scale	Source	
	TQ2	I do not experience dropped calls (i.e. calls that unexpectedly hang up) with my current mobile network provider	(1~5)	Ofcom,	2015
	TQ3	I do not experience problems sending and receiving text messages with my current mobile network provider	(1~5)	Ofcom,	2015
Customer Service	CQ1	I get good customer service from my current mobile network provider	(1~5)	Shin and Kim,	2008
	CQ2	My current mobile network provider keeps me informed about things that matter to me such as my bill, out of bundle charges, etc.	(1~5)	Shin and Kim,	2008
	CQ3	My current mobile network provider is easily accessible through a variety of channels such as shops, call centres, their website, etc.	(1~5)	Shin and Kim,	2008
Perceived Value	VQ1	I get good value for money from my current mobile network provider	(1~5)	Dölarslan,	2014
	VQ2	I find it easy and convenient to deal with my current mobile network provider	(1~5)	Dölarslan,	2014
Service Quality	SQ1	I get good quality products and services from my current mobile network provider	(1~5)	Edward and Sahadev	2011
Brand Image	BA1	Which of the following statements do you associate with your current mobile network provider brand? (check as many as apply): fast network, reliable network, good network coverage, high quality products and services, good customer service, good value for money, low cost, widely recommended	#	Aaker,	2010
	BA2	My current mobile network provider brand is different to the other providers	(1~5)	Aaker,	2010
Customer Satisfaction	OQ1	Overall, I am satisfied with my current mobile network provider	(1~5)	Shin and Kim,	2008
Switching Costs and Barriers	YQ1	There are loyalty benefits for staying with my current mobile network provider	(1~5)	Shin and Kim,	2008
	YQ2	I don't know enough about the services of other mobile network providers in order to make an informed decision about switching	(1~5)	Shin and Kim,	2008
	YQ3	If I switch to a new mobile network provider, it may not be as good as I expect	(1~5)	Shin and Kim,	2008
Switching Intention	XQ1	I want to change my mobile network provider	(1~5)	Shin and Kim,	2008
	XQ2	Please select the mobile network provider you would be most likely to change to in the future: Three, EE, Giffgaff, O2, Talk Mobile, Tesco Mobile, Vodafone, Virgin Mobile, BT Mobile, Other (please specify)	#	Constructed	

Construct	Indicator code	Indicators	Scale	Source
Switching Behaviour	FQ1	When was the last time you switched mobile network provider? (Check one): Less than 2 years ago, 2 – 4 years ago, 4 + years ago, I have never switched provider	#	Constructed
	FQ2	Which of the following mobile network providers did you last switch from? (Check as many as apply): Three, EE, Giffgaff, O2, Talk Mobile, Tesco Mobile, Vodafone, Virgin Mobile, BT Mobile, Other (please specify)	#	Constructed
	FQ3	What were the reasons you switched from your previous mobile network provider to your current provider? (Check as many as apply): faster network, more reliable network, better network coverage, higher quality products and services, better customer service, better value for money, lower cost, I was recommended it, other (please specify)	#	Constructed

Note. #, continuous variable; Y/N, Yes or No dummy variables; 1~5, a five-point Likert scale; **Constructed – designed purposefully for this study – not collected from existing scholarly works.

Hence, the questionnaire involves both nominal and ordinal variables. The frequencies of the nominal variables can be found in the appendix-1.

3.1 Interrelationships among the conceptual model's constructs examined using factor analysis and regression

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 model 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 model 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 (CB-SEM). First, PLS is preferred for theory development (Chin, 1998; Lee et al., 2011). Second, PLS does not place a high requirement on sample size or normal distribution of source data (Chin, 1998; Gefen and Straub, 2005). Hence, PLS-SEM has been considered as an appropriate analytical tool for this study.

A robust scientific method has been followed. The questions and measurement scales reflect the key conceptual constructs of relevant theories, the data collection method follows a rigorous approach to avoid bias, and the analysis method is based on an appropriate and robust system to test existing notions and develop new theories.

3.2 The study's hypotheses

The following hypotheses[4] have been developed in light of the relevant academic theories and concepts discussed earlier in this section, and tested via the survey data:

Table 2: List of Hypotheses

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

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[4] The hypotheses are also presented in Figure-1.

H13: Switching intention is negatively associated with customer satisfaction

4.0 Data analysis and results

4.1 Two-step procedure to analyse the data

This study conducts two steps of multivariate data analysis (Hair et al., 2014 a & b). The first step assesses the measurement model by performing several runs of confirmatory factor analysis (CFA) and refinement for reflective measurement. The second step tests the hypotheses by fitting the structural model. To specify the model, all constructs are modelled on the basis of previous studies. When indicators are used to examine an underlying construct (latent variable), and it is the construct that causes the indicators, the indicators can be referred to as reflective indicators. Based on those definitions and the set of decision rules proposed by Jarvis et al. (2003), the research has classified the nature of each construct as presented in Appendix 2 (Petter et al., 2007).

A pre-test with five researchers was conducted to get an initial indication of the scales' conceptual validity. 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. One item (YQ2) was deleted from switching costs and barriers with low average variance extracted (AVE); since this is for reflective constructs, there was no impact on the research results and the questionnaire maintains its conceptual integrity. After this assessment, all the scales were further refined and then all other indicators were retained for the final measurement model and structural model evaluation. The Smart Partial Least Squares (PLS) statistical tool 3.0 is used to evaluate the measurement and structural models. This research follows the minimal necessary reporting required of SEM research suggested by Gefen et al. (2011).

4.2 Step one – quality of the measurement model

For the assessment of the measurement model, different analyses are performed based on the nature of the constructs, which are all reflective. Following the guidelines of Henseler et al. (2009) and Gefen et al. (2011), the reflective measurement model assessment is performed for internal consistency, indicator reliability, convergent validity and discriminant validity.

4.3 Step two – estimating the model

Appendix 3 provides correlations between various factors (Spearman's RHO). Nevertheless, this study also applies structural model to assess the psychometric properties. After establishing that the measurement model holds good psychometric proprieties, the structural 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 5,000 random samples of 868 cases. The results are reported in Figure 2, which shows that only the path between switching costs, barriers and switching intention present non-significant path coefficients.

The coefficient of determination (R2) is reported to assess model fit in Figure 1, which indicates how well the exogenous (independent) constructs can explain the endogenous (dependent) constructs. Apart from the brand image and switching intention, R2 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 model fit, as shown in Figure 2. The structural model explains 23% and 17% of the variance for the brand image and switching intention respectively. However, all R2 for all endogenous constructs are highly significant (P ≤ 0.001). Based on the suggestion by Hair et al (2014 a & b), it is difficult to provide rule of thumb for acceptable R2 values, as this depends on the model complexity and the research discipline. This research suggests that the more paths there are pointing towards a target construct, the higher the R2 will be.

Figure 2: Structural model results (n=868)
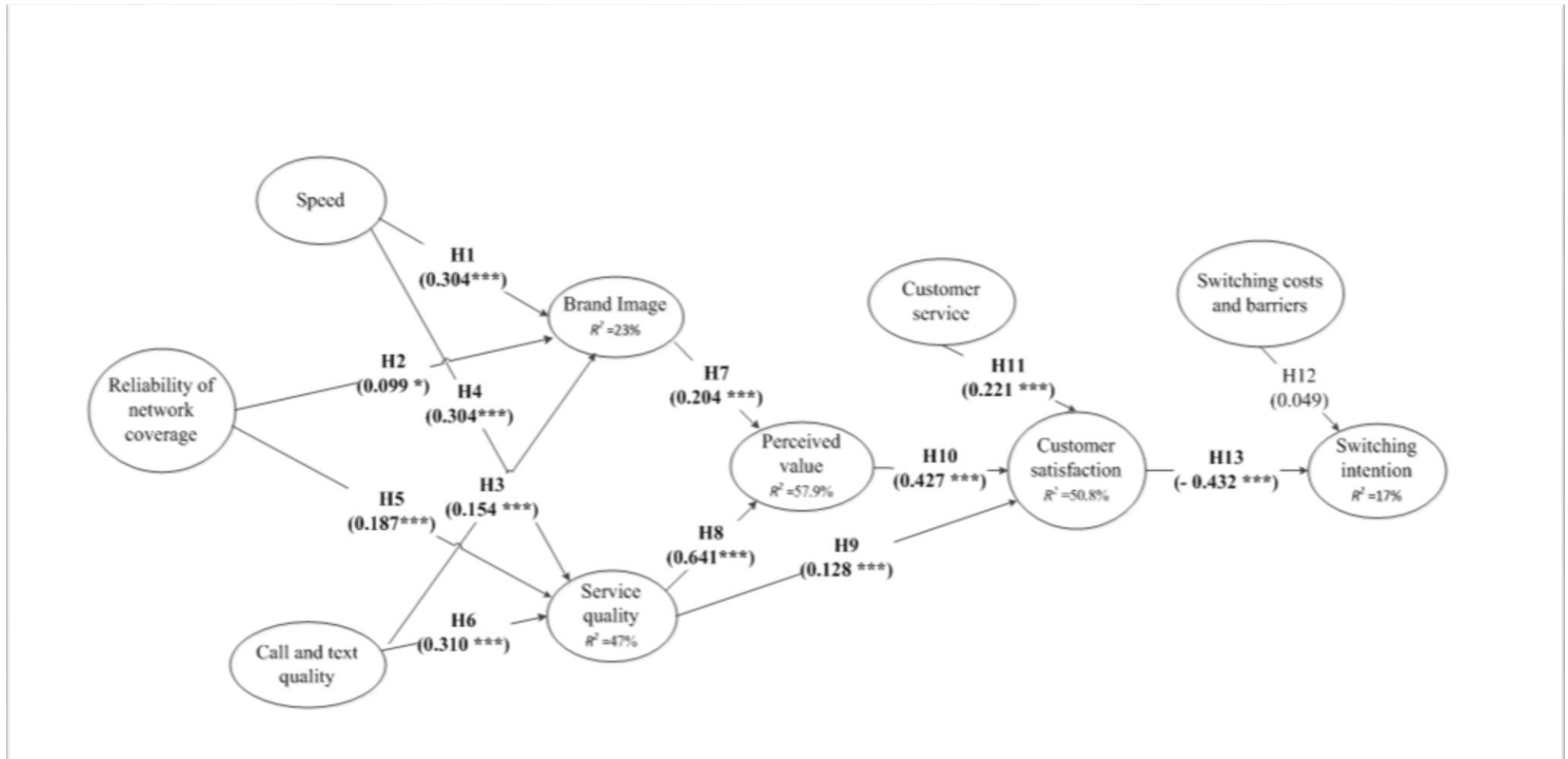
*** p<0.001, **P<0.01, P<0.05

5.0 Discussion

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

H1: Brand image is positively associated with speed – accepted
H2: Brand image is positively associated with reliability of network coverage – rejected
H3: Brand image is positively associated with call and text quality – accepted

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 does not appear to have significant 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

H4: *Service quality is positively associated with speed – accepted*
H5: *Service quality is positively associated with reliability of network coverage – accepted*
H6: *Service quality is positively associated with call and text quality – accepted*

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

H7: *Perceived value is positively associated with brand image – accepted*
H8: *Perceived value is positively associated with service quality – accepted*

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.

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

H9: *Customer satisfaction is positively associated with service quality– accepted*
H10: *Customer satisfaction is positively associated with perceived value – accepted*
H11: *Customer satisfaction is positively associated with customer service – accepted*

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 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.

6.0 Conclusions

This report 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 (please see Figure 3). Modelling of the key interrelationships feeding into customer satisfaction and the resultant

statistical data provide insights into the constitution of variables such as brand image and perceived value. The data demonstrates 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. Switching costs and barriers had a negative association with switching intentions.

Figure 3: Impact of speed on customer satisfaction
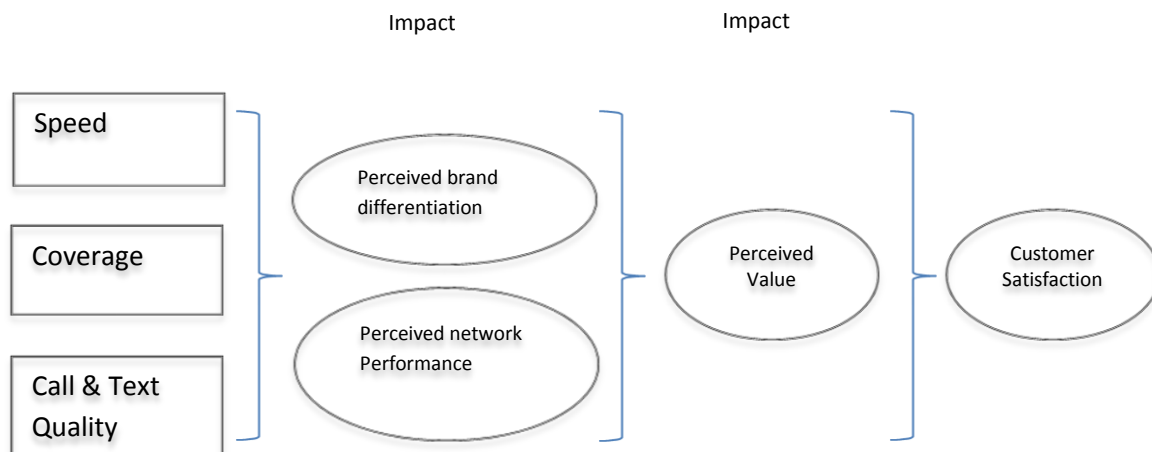
We can identify the following managerial and policy implications for mobile operators:

1) Mobile operators can pull various levers to manage customer satisfaction and switching intention but their efforts will be diminished if they can't effectively manage the speed factor.

2) A mobile operator with an ability to offer higher speed will outperform competitors, keeping factors under operators' control equal (e.g. customer service, price level, distribution network, etc.).

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 model 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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Appendix-1 Frequencies of nominal variable:

AQ1: Usage

Q1.Please select the mobile network provider you currently use most often for personal use.	Frequency	Percent	Valid Percent	Cumulative Percent
BT Mobile: Q1.Please select the mobile network provider you currently use most often for personal use.	28	3.2	3.2	100
EE: Q1.Please select the mobile network provider you currently use most often for personal use.	210	24.4	24.4	100
Giffgaff: Q1.Please select the mobile network provider you currently use most often for personal use.	47	5.4	5.4	100
O2: Q1.Please select the mobile network provider you currently use most often for personal use.	180	20.9	20.9	100
Talk Mobile: Q1.Please select the mobile network provider you currently use most often for personal use.	22	2.5	2.5	100
Tesco Mobile: Q1.Please select the mobile network provider you currently use most often for personal use.	62	7.2	7.2	100
Three: Q1.Please select the mobile network provider you currently use most often for personal use.	103	11.9	11.9	100
Virgin Mobile: Q1.Please select the mobile network provider you currently use most often for personal use.	61	7.1	7.1	100
Vodafone: Q1.Please select the mobile network provider you currently use most often for personal use.	127	14.8	14.8	100
Other, namely... : Q1.Please select the mobile network provider you currently use most often for personal use.	3	0.4	0.4	100
I do not have a personal mobile phone: Q1.Please select the mobile network provider you currently use most often for personal use.	0	0	0	100
Asda Mobile: Q1.Please select the mobile network provider you currently use most often for personal use.	5	0.6	0.6	100
ID Mobile: Q1.Please select the mobile network provider you currently use most often for personal use.	4	0.5	0.5	100

Lyca Mobile: Q1.Please select the mobile network provider you currently use most often for personal use.	5	0.6	0.6	100
Orange: Q1.Please select the mobile network provider you currently use most often for personal use.	1	0.2	0.2	100
T-Mobile: Q1.Please select the mobile network provider you currently use most often for personal use.	1	0.1	0.1	100
Talk Talk: Q1.Please select the mobile network provider you currently use most often for personal use.	3	0.4	0.4	100
Don't know: Q1.Please select the mobile network provider you currently use most often for personal use.	0	0	0	100

AQ2.

Q2.Which type of payment plan do you have on your main personal phone?	Frequency	Percent	Valid Percent	Cumulative Percent
Monthly contract (phone included)	467	54.3	54.3	54.3
Pay monthly – SIM only (no phone included) – 1 month rolling contract	129	15	15	69.3
Pay monthly – SIM only (no phone included) – 12 month contract	81	9.4	9.4	78.7
Pay as you go / Pre-pay	184	21.3	21.3	100

AQ3

Q3.How would you rate your current mobile network provider in comparison to other network providers?	Frequency	Percent	Valid Percent	Cumulative Percent
Much better than other network providers	244	28.4	28.4	28.4
Slightly better than other network providers	265	30.7	30.7	59.1

About the same as other network providers	308	35.7	35.7	94.8
Slightly worse than other network providers	33	3.8	3.8	98.6
Much worse than other network providers	12	1.4	1.4	100

Brand Image (BQ1)	Frequency	Percent	Valid Percent	Cumulative Percent
Fast network: Q8.Which of the following statements do you associate with your current mobile network provider brand?	274	31.8	31.8	100
Reliable network: Q8.Which of the following statements do you associate with your current mobile network provider brand?	429	49.8	49.8	100
Good network coverage: Q8.Which of the following statements do you associate with your current mobile network provider brand?	422	49	49	100
High quality products and services: Q8.Which of the following statements do you associate with your current mobile network provider brand?	216	25.1	25.1	100
Good customer service: Q8.Which of the following statements do you associate with your current mobile network provider brand?	302	35.1	35.1	100
Good value for money: Q8.Which of the following statements do you associate with your current mobile network provider brand?	455	52.9	52.9	100
Low cost: Q8.Which of the following statements do you associate with your current mobile network provider brand?	296	34.4	34.4	100
Widely recommended: Q8.Which of the following statements do you associate with your current mobile network provider brand?	205	23.8	23.8	100
None of the above: Q8.Which of the following statements do you associate with your current mobile network provider brand?	79	9.2	9.2	100

Switching Intention (XQ2)	Frequency	Percent	Valid Percent	Cumulative Percent
BT Mobile: Q12.Please select the mobile network provider you would be most likely to change to in the future	14	1.7	5.8	100
EE: Q12.Please select the mobile network provider you would be most likely to change to in the future	41	4.8	16.5	100
Giffgaff: Q12.Please select the mobile network provider you would be most likely to change to in the future	28	3.2	11.1	100
O2: Q12.Please select the mobile network provider you would be most likely to change to in the future	54	6.2	21.6	100
Talk Mobile: Q12.Please select the mobile network provider you would be most likely to change to in the future	11	1.3	4.4	100
Tesco Mobile: Q12.Please select the mobile network provider you would be most likely to change to in the future	14	1.6	5.5	100
Three: Q12.Please select the mobile network provider you would be most likely to change to in the future	26	3	10.3	100
Virgin Mobile: Q12.Please select the mobile network provider you would be most likely to change to in the future	17	1.9	6.7	100
Vodafone: Q12.Please select the mobile network provider you would be most likely to change to in the future	35	4.1	14.1	100
Other, namely... : Q12.Please select the mobile network provider you would be most likely to change to in the future	5	0.6	2.1	100
None: Q12.Please select the mobile network provider you would be most likely to change to in the future	4	0.4	1.5	100
Don't know: Q12.Please select the mobile network provider you would be most likely to change to in the future	1	0.1	0.4	100

Switching behaviour (FQ1)

Q13.When was the last time you switched mobile network provider?	Frequency	Percent	Valid Percent	Cumulative Percent
Less than 2 years ago	228	26.4	26.4	26.4
2 – 4 years ago	204	23.7	23.7	50.1
4 + years ago	231	26.8	26.8	76.9
I have never switched provider	199	23.1	23.1	100

Switching behaviour (FQ2)	Frequency	Percent	Valid Percent	Cumulative Percent
BT Mobile: Q14.Which of the following mobile network providers did you last switch from?	14	1.6	2	100
EE: Q14.Which of the following mobile network providers did you last switch from?	104	12	15.6	100
Giffgaff: Q14.Which of the following mobile network providers did you last switch from?	19	2.2	2.9	100
O2: Q14.Which of the following mobile network providers did you last switch from?	140	16.2	21.1	100
Talk Mobile: Q14.Which of the following mobile network providers did you last switch from?	22	2.5	3.3	100
Tesco Mobile: Q14.Which of the following mobile network providers did you last switch from?	28	3.2	4.2	100
Three: Q14.Which of the following mobile network providers did you last switch from?	53	6.2	8.1	100
Virgin Mobile: Q14.Which of the following mobile network providers did you last switch from?	58	6.7	8.7	100
Vodafone: Q14.Which of the following mobile network providers did you last switch from?	110	12.8	16.6	100

	Frequency	Percent	Valid Percent	Cumulative Percent
Other, namely… : Q14.Which of the following mobile network providers did you last switch from?	9	1.1	1.4	100
Asda Mobile: Q14.Which of the following mobile network providers did you last switch from?	4	0.5	0.6	100
Orange: Q14.Which of the following mobile network providers did you last switch from?	60	6.9	9	100
Sainsbury's: Q14.Which of the following mobile network providers did you last switch from?	1	0.2	0.2	100
T-Mobile: Q14.Which of the following mobile network providers did you last switch from?	28	3.3	4.3	100
Talk Talk: Q14.Which of the following mobile network providers did you last switch from?	3	0.3	0.4	100
None: Q14.Which of the following mobile network providers did you last switch from?	5	0.6	0.8	100
Don't know: Q14.Which of the following mobile network providers did you last switch from?	5	0.6	0.7	100

Switching behaviour (FQ3)	Frequency	Percent	Valid Percent	Cumulative Percent
Faster network: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	102	11.8	15.4	100
More reliable network: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	128	14.8	19.3	100
Better network coverage: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	142	16.5	21.5	100
Higher quality products and services: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	67	7.8	10.2	100
Better customer service: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	99	11.5	15	100
Better value for money: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	299	34.7	45.1	100

Lower cost: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	278	32.3	41.9	100
I was recommended it: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	128	14.8	19.3	100
Other, namely...: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	11	1.2	1.6	100
I was offered a good deal: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	5	0.5	0.7	100
I have a company phone: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	2	0.2	0.2	100
Network / company closed: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	4	0.4	0.5	100
Company was bought out / taken over by another company: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	8	0.9	1.2	100
New phone: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	10	1.1	1.4	100
Part of a bundle: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	4	0.4	0.5	100
Wanted 4G: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	4	0.4	0.6	100
Moved back to the UK / moved country: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	3	0.4	0.5	100
Switched from PAYG to contract: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	6	0.7	0.9	100
Family members were with this company: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	1	0.2	0.2	100
Phone broken: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	1	0.1	0.1	100
None: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	2	0.3	0.4	100
Don't know: Q15.What were the reasons you switched from your previous mobile network provider to your current provider?	2	0.3	0.4	100

Appendix-2 Ordinal variables

Constructs	*Indicators*	*Descriptive Statistics/Ordinal Variables*	N		*Mean*	*Median*	*Std. Deviation*	*Minimum*	*Maximum*
			Valid	Missing					
Customer satisfaction	OQ1	Q4a.Please indicate how strongly you agree or disagree with the following statement - Overall, I am satisfied with my current mobile network provider:	861	0	1.81	2	0.928	1	5
Reliability of network coverage	NQ1	Q4b.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider - I have good network coverage everywhere I go with my current mobile network provider:	861	0	2.05	2	1.048	1	5
	NQ2	Q4b.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider - I have good indoor network coverage with my current mobile network provider:	861	0	2	2	1.107	1	5

Constructs	*Indicators*	*Descriptive Statistics/Ordinal Variables*	*N* Valid	Missing	*Mean*	*Median*	*Std. Deviation*	*Minimum*	*Maximum*
	NQ3	Q4b.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider - I have reliable network coverage with my current mobile network provider:	861	0	1.91	2	1.005	1	5
Speed	SQ2	Q6.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider - I have fast internet browsing speeds (e.g. loading web pages) with my current mobile network provider:	861	0	2.14	2	0.973	1	5
	SQ3	Q6.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider - I have fast internet download speeds (e.g. steaming videos or music) with my current mobile network provider:	861	0	2.27	2	0.976	1	5
	SQ4	Q6.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider - I have fast internet	861	0	2.2	2	0.99	1	5

Constructs	Indicators	Descriptive Statistics/Ordinal Variables	N Valid	N Missing	Mean	Median	Std. Deviation	Minimum	Maximum
		upload speeds (e.g. how quickly emails with attachments send) with my current mobile network provider:							
Call and Text quality	TQ1	Q7a.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider - I have good call quality with my current mobile network provider:	861	0	1.79	2	0.89	1	5
	TQ2	Q7a.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider - I do not experience dropped calls (i.e. calls that unexpectedly hang up) with my current mobile network provider:	861	0	2.07	2	1.095	1	5
	TQ3	Q7a.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider - I do not experience problems sending and receiving text messages with my current mobile network provider:	861	0	1.98	2	1.05	1	5

Constructs	*Indicators*	*Descriptive Statistics/Ordinal Variables*	*N* Valid	Missing	*Mean*	*Median*	*Std. Deviation*	*Minimum*	*Maximum*
Perceived value	VQ1	Q7b.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider. - I get good value for money from my current mobile network provider:	861	0	1.98	2	1.033	1	5
	VQ2	Q7b.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider. - I find it easy and convenient to deal with my current mobile network provider:	861	0	1.97	2	0.954	1	5
Service quality	QS1	Q7c.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider. I get good quality products and services from my current mobile network provider:	861	0	2.09	2	0.917	1	5
Customer service	CQ1	Q7d.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider. - I get good customer service from my current mobile network provider:	861	0	2.07	2	0.984	1	5

Constructs	Indicators	Descriptive Statistics/Ordinal Variables	N Valid	N Missing	Mean	Median	Std. Deviation	Minimum	Maximum
	CQ2	Q7d.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider. - My current mobile network provider keeps me informed about things that matter to me such as my bills and product information.	861	0	2.07	2	0.988	1	5
	CQ3	Q7d.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider. - My current mobile network provider is easily accessible through a variety of channels such as shops and call centres.	861	0	1.98	2	0.94	1	5
Brand Image	BA2	Q9.Please indicate how strongly you agree or disagree with the following statement - My current mobile network provider brand is different to other network provider brands.	861	0	2.41	2	0.973	1	5

Constructs	Indicators	Descriptive Statistics/Ordinal Variables	N Valid	N Missing	Mean	Median	Std. Deviation	Minimum	Maximum
Switching costs and barriers	YQ1	Q10.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider. - There are loyalty benefits for staying with my current mobile network provider:	861	0	2.72	3	1.161	1	5
	YQ2	Q10.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider. - I don't know enough about the services of other mobile network providers in order to make an informed decision about	861	0	2.59	3	1.065	1	5
	YQ3	Q10.Please indicate how strongly you agree or disagree with each of the following statements about your current mobile network provider. - If I switch to a new mobile network provider, it may not be as good as I expect':	861	0	2.16	2	0.841	1	5
Switching intention	XQ1	Q11.Please indicate how strongly you agree or disagree with the following statement I want to change my mobile network provider.	861	0	3.25	3	1.313	1	5

Appendix-3 Correlations

Correlations			SQ2	SQ3	SQ4	NQ1	NQ2	NQ3	TQ1	TQ2	TQ3
Spearman's rho	SQ2	Correlation Coefficient	1.000	.786**	.808**	.555**	.530**	.571**	.527**	.454**	.497**
		Sig. (1-tailed)	.	.000	.000	.000	.000	.000	.000	.000	.000
		N	942	942	942	942	942	942	942	942	942
	SQ3	Correlation Coefficient	.786**	1.000	.795**	.485**	.500**	.513**	.480**	.386**	.434**
		Sig. (1-tailed)	.000	.	.000	.000	.000	.000	.000	.000	.000
		N	942	942	942	942	942	942	942	942	942
	SQ4	Correlation Coefficient	.808**	.795**	1.000	.502**	.523**	.548**	.502**	.435**	.480**
		Sig. (1-tailed)	.000	.000	.	.000	.000	.000	.000	.000	.000
		N	942	942	942	942	942	942	942	942	942
	NQ1	Correlation Coefficient	.555**	.485**	.502**	1.000	.726**	.779**	.618**	.550**	.590**
		Sig. (1-tailed)	.000	.000	.000	.	.000	.000	.000	.000	.000
		N	942	942	942	942	942	942	942	942	942
	NQ2	Correlation Coefficient	.530**	.500**	.523**	.726**	1.000	.804**	.633**	.521**	.572**
		Sig. (1-tailed)	.000	.000	.000	.000	.	.000	.000	.000	.000
		N	942	942	942	942	942	942	942	942	942
	NQ3	Correlation Coefficient	.571**	.513**	.548**	.779**	.804**	1.000	.677**	.541**	.613**
		Sig. (1-tailed)	.000	.000	.000	.000	.000	.	.000	.000	.000
		N	942	942	942	942	942	942	942	942	942
	TQ1	Correlation Coefficient	.527**	.480**	.502**	.618**	.633**	.677**	1.000	.633**	.714**
		Sig. (1-tailed)	.000	.000	.000	.000	.000	.000	.	.000	.000
		N	942	942	942	942	942	942	942	942	942
	TQ2	Correlation Coefficient	.454**	.386**	.435**	.550**	.521**	.541**	.633**	1.000	.664**

Correlations			SQ2	SQ3	SQ4	NQ1	NQ2	NQ3	TQ1	TQ2	TQ3
		Sig. (1-tailed)	.000	.000	.000	.000	.000	.000	.000	.	.000
		N	942	942	942	942	942	942	942	942	942
	TQ3	Correlation Coefficient	.497**	.434**	.480**	.590**	.572**	.613**	.714**	.664**	1.000
		Sig. (1-tailed)	.000	.000	.000	.000	.000	.000	.000	.000	.
		N	942	942	942	942	942	942	942	942	942

**. Correlation is significant at the 0.01 level (1-tailed).