STUDY OF CUSTOMER CHURN IN THE TELECOM INDUSTRY USING STRUCTURAL EQUATION MODELLING

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Abstract

This study examined the relationships between switching cost (SC), customer satisfaction (CS), trust, communication, value added services (VASs), customer expectations (CEs), customer complaint management systems, brand image, and price perception (PP) with their effects on customer churn (CC) in the Jordanian telecom industry. A structural model was first proposed for mapping the relationships between the model factors. A total of 700 questionnaires were distributed in person and online. The model was then tested regarding all of the survey data from respondents who lived in the Amman area and those who were customers of the Orange mobile service provider (MSP). The results showed that SC and VASs contributed insignificantly to CC. Moreover, CS was the key factor in reducing the churn rate. Finally, satisfying CEs significantly affected CS. In conclusion, to decrease CC,MSPs must enhance their overall service quality, establish a good and trustworthy reputation, create an efficient billing system, offer new VASs at competitive prices, address customer complaints promptly, and conduct professional training courses for frontline employees. The results of this study provide valuable feedback for MSP decision makers regarding approaches to improving their performance and reducing CC.

Keywords: *customer churn, structural equation modelling, telecom industry, switching cost, value added services*

1. INTRODUCTION

The mobile sector is considered the fastest growing sector of the telecom industry (Fasanghari and Keramati, 2011). In Jordan, the telecommunications market is a typical saturated market, in which competition between mobile service providers (MSPs) is intense. Typically, mobile customers are classified according to payment method into prepaid (scratch cards) customers and "pay-as-you-go" (postpaid) customers. Churn customers are defined as customers who discontinue their association with MSPs (Gumucio et al., 2012; Boohene and Agyapong, 2011; Brandusoiu and Toderean, 2014). They are classified into two types based on the initiator of the churn action: voluntary churn (customer-initiated) and involuntary churn.However, a high churn rate is the main problem encountering the telecom industry, in whichmost MSPs have experienced rapidly increasing rates from 20% to 40% (Ahn et al., 2006). These percentages have reached 60% in some African and Asian countries (Olle Olle and Cai, 2014).

To reduce business losses, closely monitoring the problem of high churn is crucial to understanding market dynamics and predicting potential changes in the market. An essential step in solving this problem is to identify the key factors that affect the churn rate. Hence, several studies have been conducted that examine factors affecting customer churn (CC). For example, Balasubramanian and Selvarani (2014) employed a decision tree and data-mining techniques for reducing CC. Olle Olle and Cai (2014) proposed a hybrid learning model for predicting churn in mobile telecommunications companies. Rajeswari and Ravilochanan (2014) adopted an artificial neural network model for examining factors that affected churn in the prepaid segment of the Tamilnadu MSP in India. Bahmania et al. (2013) used a neural network and Cox regression analysis for investigating the effect of customer dissatisfaction, level of service usage, switching cost (SC), and demographic information on CC in an MSP located in Iran. Boateng et al. (2013) identified factors affect the switching-behavior decisions of consumers in the mobile telecommunications segment of Ghana. Adeleke and Aminu

(2012) investigated the effects of service quality, corporate image, price, and customer service on customer loyalty in the mobile telecommunications market of Nigeria. Kouseret al. (2012) employed binomial regression and binary logistic regression to test the relationships between cost, inconvenience, and core service failures and determine the reasons behind customer switching behavior in the mobile telecommunications segment of Pakistan. Using multivariate analysis, Oghojafor et al. (2012) examined the effect of high call rate, an off-beam advertisement medium, poor service facilities, unattractive service plans, and the availability of a superior service provider on CC in Nigeria. Kim and Lee (2010) adopted multiple regression analysis to study the relationships between corporate image, service price, brand awareness, customer support services, and service quality and customer loyalty in South Korean MSPs. Akbar and Parvez (2009) investigated the effects of customers' perceived service quality, trust (TR), and customer satisfaction (CS) on customer loyalty inthe mobile sector of Bangladesh. Ahnet al. (2006) examined factors influencing CC in the mobile sector of South Korea.

Several key factors affecting CC were identified in previous studies, including SC, CS, customer expectations (CEs), customer complaint management systems (CCMSs), brand image (BI), price perception (PP), TR, COM, and value added services (VASs). Structural equation modelling (SEM), a type of multivariate analysis, can be used to classify these factors according to their effect on churn customer. In addition, cluster analysis is a useful data-mining process for discovering groups and identifying interesting distributions. Clustering is identifying groups of individuals or objects that are similar to each other but different from those of other groups. The present study used two types of clustering: hierarchical and non-hierarchical clustering. To provide improvement directions and valuable feedback to decision makers in Jordanian MSPs on how to reduce CC, this study examined the relationships between SC, CS, CEs, CCMSs, BI, PP, TR, COM, and VASs before employing SEM and cluster analysis to assess their effects on the churn rate in the Jordanian mobile sector. The remainder of the paper is organized as follows: Section 2 presents the conceptual framework; Section 3 describes the data collection and analysis; Section 4 summarizes the study results; and Section 5 presents the study conclusions.

2. CONCEPTUAL FRAMEWORK

2.1. Customer churn

CC is considered as serious problem for MSPs, leading to profit losses. Customer loyalty has been defined as a long-term commitment to repurchase and the willingness of customers to build, create, maintain, and sustain a long-term emotional and functional relationship with an MSP or the service offered. Customer loyalty is a strategy that creates benefits for MSPs. With loyal customers, an MSP can maximize their profits. Customer loyalty is highly correlated with CC. Thus, this study assessed CC by using the item measures of loyalty (Ellingeret al., 1999; Khan and Afsheen, 2012).

2.2. Switching cost

In telecommunications, SC refers to all types of psychological, emotional, physical, and financial obstacle encountered by customers when switching from one MSP to another, in addition to the time, information, and money invested to find another MSP (Khurshid, 2013).The SC includes the costs of informing others of the change, acquiring a new line, breaking the relationship with a MSP, learning any new procedures in dealing with the new MSP (Oyeniyi and Abiodun, 2010). In the Jordanian market, changing the mobile number is a main concern for customers because the cost of a new line and breaking the relationship with the MSP is extremely cheap. Studies have shown a negative relationship between SC and CC (Cheng, 2012;Stan et al., 2013). Thus, it was hypothesized:

H1: SC is negatively affected by CC.

2.3. Customer satisfaction

In telecommunications, CS is considered the customer's evaluation of current MSP performance (Hanif et al., 2010). Almossawi (2012) stated that CS encourages the customers to purchase more and

spread positive word-of-mouth advertising; therefore, a negative relationship was assumed between CS and CC(Shi et al., 2011; Bagheria et al., 2014; Gures et al., 2014). Thus, it was hypothesized:

H2: CS is negatively related to CC.

2.4. Trust

TR is defined as the level of reliability guaranteed by one party to another within a given exchange relationship (Nguyen et al., 2013). The level of TR differs significantly among individuals based on their personal decision-making habits and characteristics. TR occurs when a customer believes that the actions of an MSP will result in positive outcomes for them (Roostika, 2011). Both customers and MSPs benefit from exchanging TR. Consequently, TR was assumed to be negatively related to CC (John, 2011;Madjid, 2013). That is:

H_3: Customer TR has a negative effect on CC.

2.5. Communication

Communication (COM) is the exchange of information over significant distances by electronic means (Ahn et al., 2006). COM includes network coverage and signal strength, which is related to voice clarity while transmitting and receiving calls. For a customer, the signal quality and network coverage are the main decision factors when choosing an MSP. It is common for COM to negatively influence CC (Ratnesh and Kansal, 2013). Therefore, it was hypothesized:

H4: COM has a negative influence on CC.

2.6. Value added services

VASs are defined as all services beyond standard voice calls; they can be used with available services at little or no cost, thus promoting the primary business of the MSP (Rengarajan and Kavipriya, 2012). A VAS is related to services introduced by an MSP that may increase the customer's perceived benefits and reduce the constraints, in which increasing customer benefits means adding something new to the service customers for increasing CS and TR and thereby reducing the churn rate. In the mobile sector, VASs include short message services (SMSs), multimedia message services (MMSs), ring tones, and web browsing. The purpose of a VAS is to improve the quality of services and add value to the primary service, thus aiding MSPs to increase their market share and gain a competitive advantage over their competitors. Accordingly, VASs negatively influence CC (Ratnesh and Kansal, 2013). Hence, the following hypothesis was proposed:

H5: VASs have a negative influence on CC.

2.7. Customer expectations

Customer expectations (CEs) refers to the total perceived benefits that a customer expects from MSP services. Customers typically builds their expectations on personal needs, the organization's reputation, past experience, and external COM regarding the customer complaint handling process (Gharaibeh et al., 2012). Therefore, an MSP has to recognize customer needs by accepting customer opinions into the offer design process, thus fulfilling customer expectations and achieving high CS during the customer service experience. Monitoring CS and evaluating service quality serve as major determinants of CE. In a highly competitive and growing telecom industry, an MSP must determine approaches for making their services stand out amongst those of other MSPs. To achieve this, an MSP must understand their customers' needs and endeavor to satisfy (or exceed) those needs. Thus, a positive relationship was assumed between CEs and CS (Mabkhot et al., 2012; Gures et al., 2014). That is:

H6: CEs are positively related to CS

2.8. Customer complaint management systems

A CCMS is a set of activities that entail customer support systems, complaints processing, the speed of the complaints processing, friendliness when receiving complaints, and the ease of reporting complaints (Adjei and Denanyoh, 2014). In the mobile sector, a CCMS includes all of the assistance that an MSP offers to customers directly or indirectly prior to, during, and after purchases to provide a positive customer experience. The system comprises a call center, website, customer care, retail stores, and social media. Customer care is used in a wider sense and continues beyond the traditional role of customer service and support, encompassing all of the functions along the entire service-delivery value chain (Seyyednejad et al., 2013). A CCMS is a useful source of information that aids decision makers in identifying sources of dissatisfaction and allows businesses to respond fairly and effectively when complaints arise (Gharaibehet al., 2012). A CCMS can produce customer behaviors that indicate potential customer churn. The high level of competition among MSPs necessitates adopting various customer service techniques for satisfying and retaining the customer (Adeleke and Aminu, 2012). Thus, a positive relationship was hypothesized between CCMSs and CS (Hanif et al., 2010; Sivesan, 2012). Hence, it was hypothesized:

H7: An effective CCMS is positively related to CS.

2.9. Brand image

BI is a mental setup developed in the customer's mind based on a few selected impressions from the particular services of an MSP (Tu et al., 2012). A customer identifies a brand by its symbol, which is subedited from a customer's consumption experiences (Kim and Lee, 2010). BI is a critical factor in the overall evaluation of an MSP, working as a filter through which the whole operation of an MSP is perceived and reflecting the overall reputation and prestige of the MSP. The main aim of the brand and service management is to build a reputable BI, which in turn generates substantial short- and long-term profit for the MSP.A positive BI facilitates satisfying customer expectations and presenting more benefits to customers, thereby leading to enhanced CS and TR. Consequently, BI is positively and directly related to CS and TR (Bagheria et al., 2014).Hence, it was hypothesized:

H8a: BI is positively related to CS.

H8b: BI is positively related to TR.

2.10. Price perception

PP is the amount of money charged for a service or the sum of the values that customers exchange for the benefits of having or using the service. It includes the price of SIM cards, refill scratch cards, call rates, SMS charges, the Internet bundle charges, and the price of phones (Adeleke and Aminu, 2012). PP is related to the financial value of obtaining a service, in which price has a significant influence on consumer buying behavior. Based on the relationship between the price and quality of a service, certain customers become satisfied or dissatisfied with the service. In the telecommunications market, price is considered a critical factor in customer satisfaction (Virvilaite et al., 2009). Customers typically attempt to maximize value for money spent and demand improved quality at lower prices. Moreover, they are willing to pay more if they really trust the MSP and are satisfied with the service (Malik et al., 2012). An MSP with lower prices has a strong tendency to attract a substantial customer base, leading to an increased market share and improved financial performance. Price is correlated with TR and CS (Jiang and Rosenbloom, 2004; Virvilaite et al., 2009; Uddin and Akhter, 2012). Hence, it was hypothesized:

H9a: PP is positively correlated with CS.

H9b: PP has a direct and positive relationship with TR.

On the basis of the aforementioned key factors, the proposed structural model was constructed (Figure 1). The model hypotheses are shown in Table 1, and the item measures are shown in Table 2.

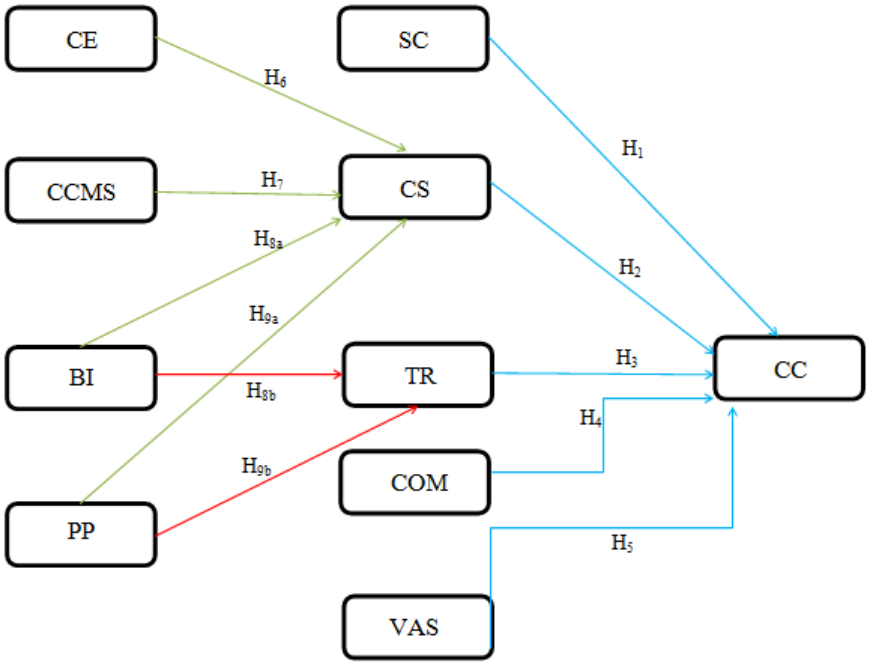


Figure 1. Proposed structural model.

Table 1. Model hypotheses.

	Hypothesis
H_1	Switching cost negatively affects customer churn.
H2	Customer satisfaction is negatively related to customer churn.
H3	Customer trust negatively affects customer churn.
H4	Communication is negatively related to customer churn.
H5	Value added services have negative influences on customer churn.
H6	Customer expectations are positively related to customer satisfaction.
H7	Better customer complaints handling system is positively related to customer satisfaction.
H_{8a}	Positive brand image is positively related to customer satisfaction.
H_{8b}	Positive brand image is positively related to trust.
H_{9a}	Price perception is positively related to customer satisfaction.
H_{9b}	Price perception is positively related to trust.

Table 2. Item measures of the model factors.

Construct	Code	Item Measures	References
CC	CC1	I intend to continue using services from this MSP for a long time.	Denga *et al.* (2010); Almossawi (2012); Alam and Salim (2012); Raza and Rehman(2012) ; Gumucio*et al.* (2013);Gharaibeh*et al.* (2014
	CC2	I will encourage friends to use the services offered by MSP.	
	CC3	To me, this service provider clearly is able to provide the best service.	
SC	SC1	If I change my phone number, I would be concerned if people dial my previous number but could not reach me.	
	SC2	Switching to other service provider would be too expensive.	
	SC3	Even if I have enough information, comparing the service provider with each other takes a lot of energy, time and effort.	
CS	CS1	I am satisfied with the overall service quality and professional competence offered by this service provider.	
	CS2	In general, this service provider offers a satisfactory variety of services.	
	CS3	I did the right thing when I subscribed to this service provider service.	
TR	TR1	The reputation of this service provider is trustworthy.	
	TR2	The billing system of this service provider is trustworthy.	
	TR3	The policies and practices of this service provider are trustworthy.	
COM	COM1	Call drop and call failure disturb me.	
	COM2	Quality calls (call clarity, connection, signal quality, coverage of areas).	
	COM3	MSP has better network coverage than other service providers.	
VAS	VAS1	There are several phone options offered by MSP.	
	VAS2	I am dissatisfied by number of advertising SMS.	
	VAS3	I am using call tunes and alerts offered by this service provider.	
CE	CE1	Offering personalized services to meet customer need.	
	CE2	Keeping me updated when there are new services.	
	CE3	This service provider meets my expectations.	
CCMS	CCMS1	Always handles complaints in a short period of time.	
	CCMS2	Long waiting time at customer care, call center and shops.	
	CCMS3	Lack of staff training at customer care, call center and shops.	
BI	BI1	I consider that MSP's reputation is high.	
	BI2	Delivered a good brand image to its customers.	
	BI3	This service provider widely used among my families and friends.	
PP	PP1	Effective ways to help us know its pricing policies of services.	
	PP2	Offering flexible pricing for various services that meet my needs.	
	PP3	I will continue to stay with this MSP, unless the price is significantly higher for the same service.	

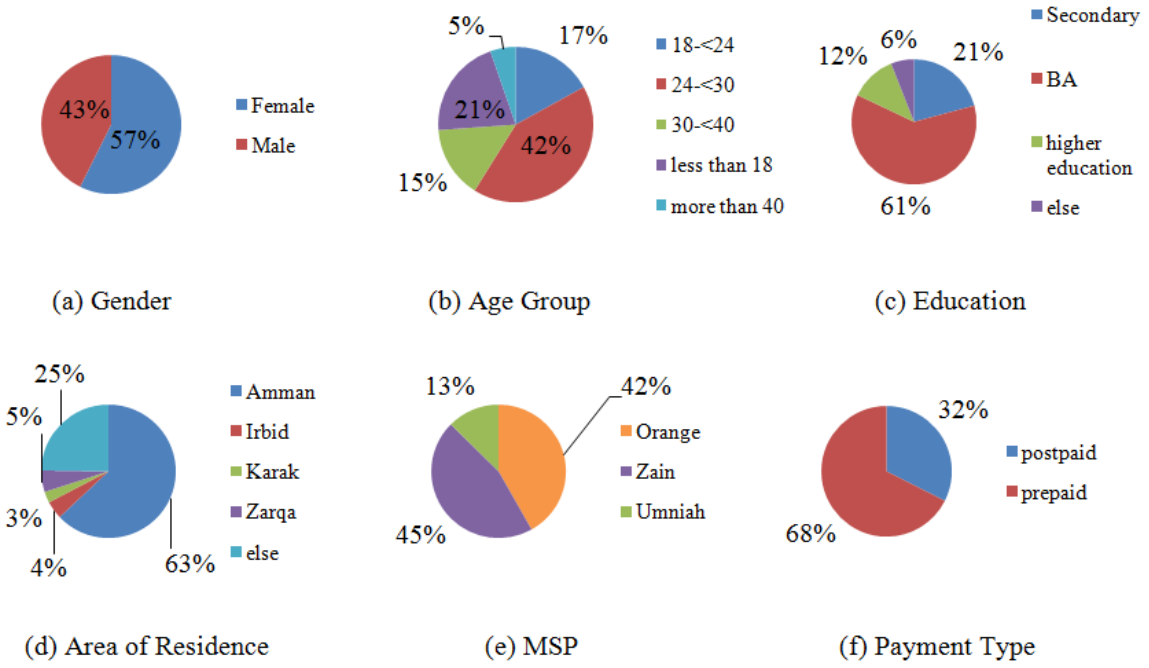
3. DATA COLLECTION AND ANALYSIS

Surveys were used for collecting data from MSP customers in Jordan. The structure of the survey comprised two sections. The first section collected the demographic information (age, gender, education, area of residence, MSP, MSP services, offer payment type, contract age (tenure), second line, data usage on mobile, average gigabyte (GB) consumption, average consumption in JOD, talking

time on-net (within the same MSP), talking time off-net (outside the MSP), number of relatives within the same MSP). The second section presented measured items rated on a5-point Likert scale ranging from 1(strongly disagree) to 5 (strongly agree). The measured items were SC, CS, TR, COM, VASs, CEs, CCMSs, BI, and PP.A pilot study was conducted to observe whether any of the statements were difficult for subjects to understand and to check for the appropriateness of the items used in the survey. The survey was reviewed by experts from academic institutes, in addition to market research experts from the telecom industry in Jordan. A total of 700 surveys were distributed in person and online (e-mail, Facebook, Twitter, LinkedIn), and 601 surveys were returned, a response rate of 86.8%.

3.1. Demographic analysis

The analytic results of the demographic parameters (Figure 2) showed that most of the respondents (57%) were females. The highest percentage (42%) of respondents were between24and30 years old, whereas the smallest percentage (5%) were more than 40 years old. Among all of the respondents, approximately61% had attained a bachelor's degree, and approximately 63% lived in Amman. Among the three MSPs considered, most of the respondents used the Zain mobile company (45%), followed by Orange (42%) and Umniah (13%). In addition, approximately 68% of the respondents used prepaid lines, whereas postpaid customers comprised approximately 32% of the respondents. Approximately 96% of the respondents used data on their mobiles, with 26% spending 5–7JOD, followed by 21% spending 3-5JOD, 7–10JOD, or >10 JOD and 11% spending 0–3 JOD. In addition, approximately 57% of the respondents had used their current line for more than 4 years. Approximately 26% talked less than 100minutes per month within their MSP, followed by 21% talking 100–300 minutes. By contrast, approximately 47% of the respondents talked less than 100 minutes per month with other MSPs. Finally, approximately 78% of the respondents knew more than four people who used the same MSP.



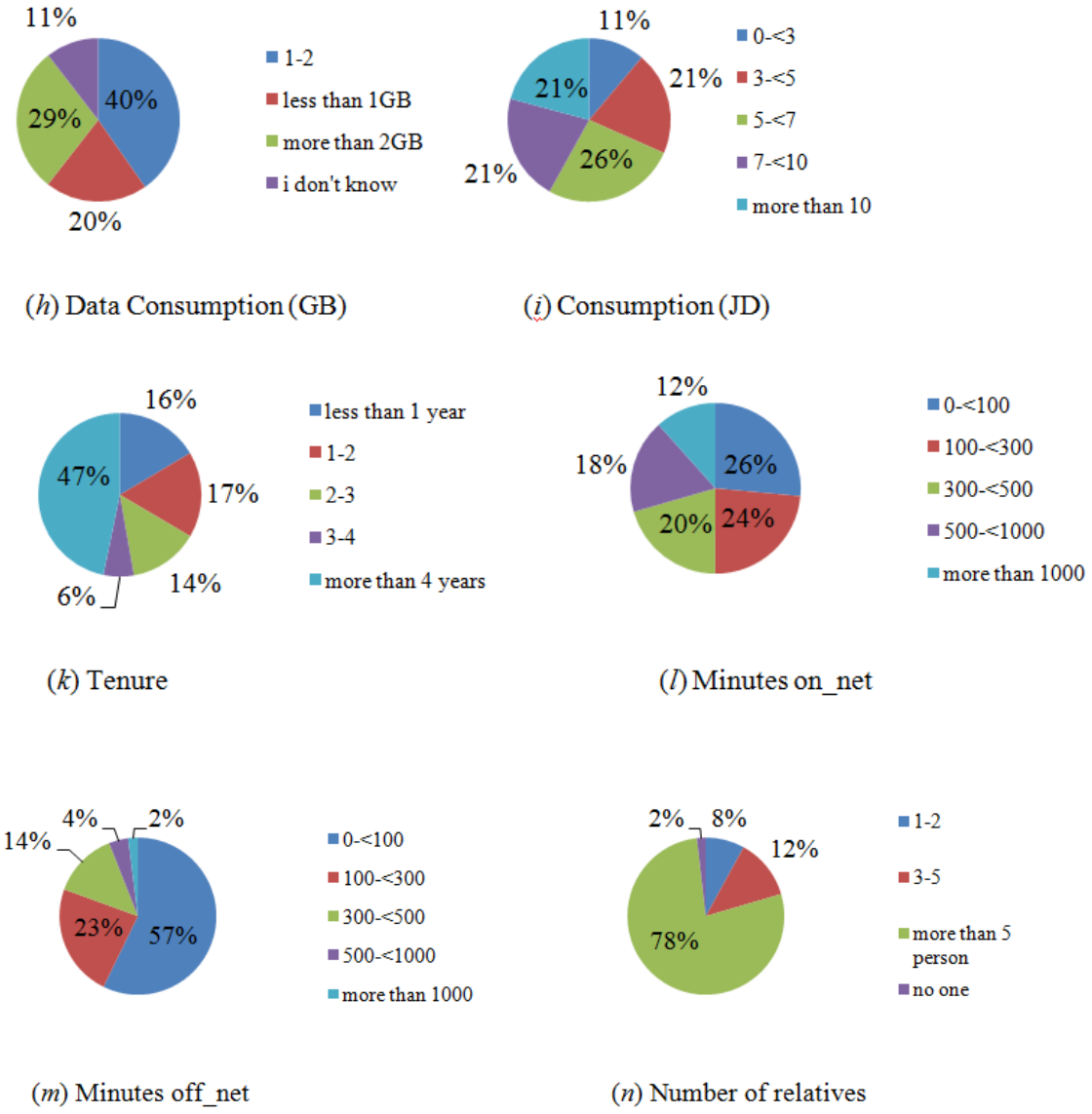


Figure 2. Demographics analysis.

3.2. Statistical analysis of the item measures

Thirty measured items were considered in the proposed model. Table 3 shows the mean and standard deviation of each item measure. The two largest means were exhibited byBI(3.93) and CL (3.87), whereas the two smallest means were exhibited by VASs (2.49) and COM (2.97). The estimated standard deviations were extremely small compared with their corresponding averages. In addition, the correlation matrix and reliability test were used to check the validity of the proposed model. The reliability test uses Cronbach's α to check the reliability of the scales. It measures the internal consistency between the items, checking how closely the items are to each other as a group. A value above 0.6 is recommended, and a value above 0.7 is excellent (Krizman, 2011). Cronbach's α was calculated for each item measure (Table 4).All of the estimated α values were higher than the recommended value of 0.6. Moreover, the overall α value for the data was 0.893. These values indicated the internal consistency of the proposed structural model. The mutlicollinearity test was used to measure the degree to which items measured the same factor (Al-Refaieet al., 2012). It was measured by calculating the inter item correlations between the item measures of each factor. A value of 0.9 or above for the interitem correlations indicate the possibility that two or more items measure the same entity. Two items are considered to be correlated when the correlation value is equal to or

above 0.9 (Al-Refaie, 2011; Al-Refaieet al., 2012). A sample of the inter correlation matrix is shown in Table 5. The results indicated that the largest correlation coefficient was 0.725, which was smaller than the threshold value of 0.9. Consequently, it was concluded that a multicollinearity problem did not exist.

Table 3. Estimated means and standard deviations (*N*=600)

Item	Mean	Standard Deviation (SD)	Item	Mean	Standard Deviation (SD)
CL1	4.06	0.893	VAS1	3.57	0.929
CL2	3.85	0.973	VAS2	1.86	1.072
CL3	3.71	1.001	VAS3	2.05	1.219
CL	**3.87**	**0.0088**	**VAS**	**2.49**	**0.047**
CS1	3.67	1.013	CE1	3.84	0.821
CS2	3.81	0.904	CE2	3.68	0.931
CS3	3.84	0.968	CE3	3.57	0.950
CS	**3.77**	**0.00455**	**CE**	**3.70**	**0.0068**
TR1	3.74	0.974	BI1	3.91	0.882
TR2	3.62	0.962	BI2	3.86	0.887
TR3	3.62	0.963	BI3	4.01	0.900
TR	**3.66**	**0.00345**	**BI**	**3.93**	**0.0038**
SC1	4.10	1.153	PP1	3.70	0.939
SC2	3.42	1.136	PP2	3.62	0.987
SC3	3.67	1.025	PP3	3.40	1.106
SC	**3.73**	**0.017**	**PP**	**3.57**	**0.00775**
COM1	1.84	1.079	CCMS1	3.44	1.103
COM2	3.62	1.000	CCMS2	2.73	1.140
COM3	3.46	1.093	CCMS3	2.89	1.095
COM	**2.97**	**0.049**	**CCMS**	**3.02**	**0.0185**

Table 4. Estimated α values

Item	α value	Item	α value
CL	0.76	VAS	0.62
CS	0.65	CE	0.88
TR	0.81	BI	0.91
SC	0.68	PP	0.75
COM	0.73	CCMS	0.81

Table 5. Sample of the inter correlation matrix

	CC1	**CC2**	**CC3**	**CS1**	**CS2**	**CS3**	**TR1**	**TR2**	**TR3**	**SC1**	**SC2**	**SC3**
CE1	0.46	0.49	0.53	0.57	0.46	0.48	0.49	0.29	0.44	0.07	0.17	0.15
CE2	0.27	0.35	0.32	0.36	0.36	0.28	0.32	0.24	0.34	0.04	0.16	0.10
CE3	0.46	0.50	0.52	0.53	0.41	0.47	0.51	0.38	0.51	0.04	0.21	0.20
BI1	0.56	0.57	0.51	0.50	0.42	0.56	0.54	0.31	0.44	0.06	0.16	0.19
BI2	0.48	0.48	0.47	0.44	0.37	0.49	0.45	0.32	0.41	0.10	0.13	0.21
BI3	0.30	0.28	0.22	0.22	0.31	0.35	0.23	0.16	0.19	-0.04	0.00	0.07

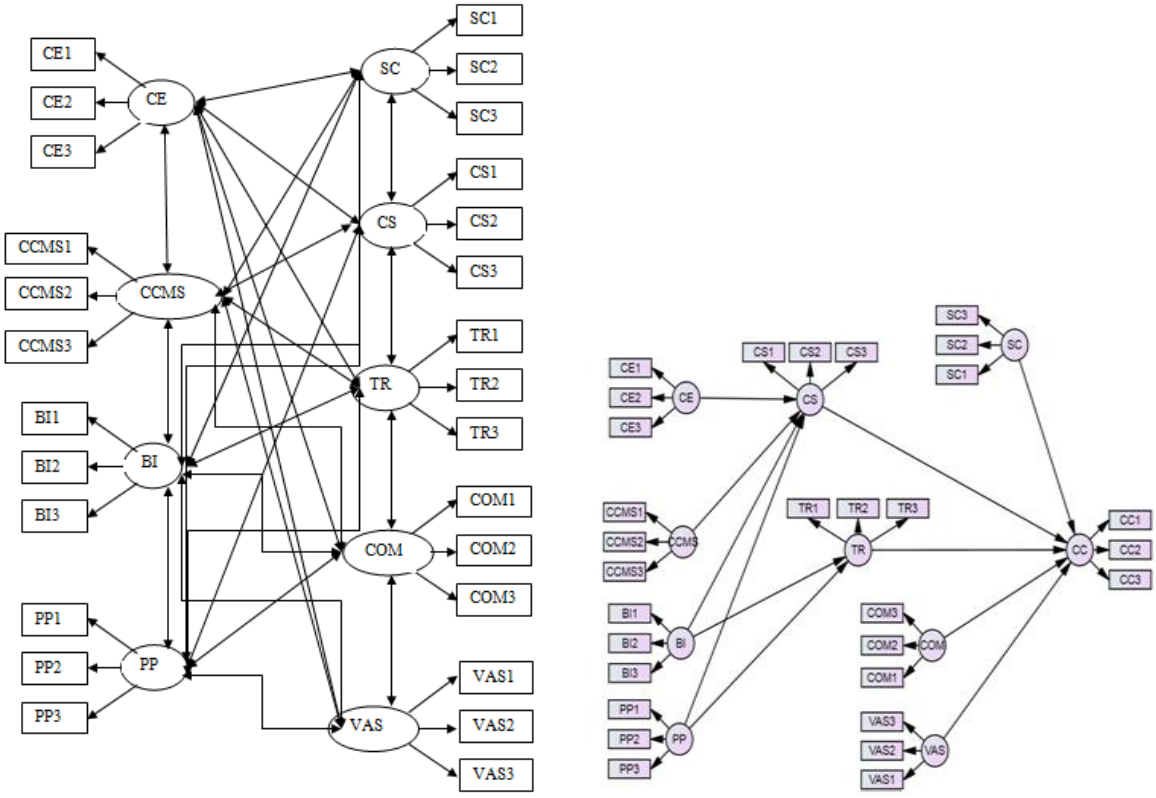
3.3. Model validation

To validate the goodness-of-fit of the proposed model, the following measures were used:

(1) Goodness-of-fit index (GFI), which is a measure of the fit between the proposed model and the acquired covariance matrix; Adjusted goodness-of-fit index (AGFI), which corrects the GFI and is affected by the number of indicators of each latent variable. The GFI and AGFI range between zero and one, with recommended values achieving 0.8 and above.

(2) Root mean square error of approximation (RMSEA), which gives an indication of the discrepancy between the proposed model, with optimally chosen parameter estimates, and the population covariance matrix. The RMSEA ranges from zero to one, with smaller values indicating better model fit.

First, the validity of the measurement model (Figure 3(a)) was checked. The GFI, AGFI, and RMSEA estimates were 0.926, 0.897, and0.067, respectively. These values indicated that the measurement model was valid and hence could be used for testing the structural model (Figure 3(b)). SEM was used to analyze the structural model and to test the proposed model hypotheses. The corresponding GFI, AGFI, and RMSEA estimates were 0.910, 0.865, and 0.052, respectively. These values indicated the discriminate validity of the structural model.



(a) Measurement model (b) Structural model

Figure 3. Proposed measurement and structural models.

4. RESEARCH RESULTS

4.1. Structural model results

The obtained results for the structural model (Table 6) indicated the following conclusions:

The relationships CS→CC, TR→CC, and COM→CC were supported. These results supported the negative influences of CS (H2, weight = 0.608, p<0.001), TR (H3, weight = 0.179, p = 0.007), and COM (H4, weight = 0.266, p =0.043) on CC. The customers' perceived satisfaction with the overall service quality and service varieties and their TR in the reputation, policies and practices, and billing system of the MSP are critical for reducing CC. In addition, the frequency of dropped and failed calls, calling quality, and good network characteristics have significant negative effects on CC. The strongest effect on CC was contributed by CS; specifically, an increase in CS by one, decreases CC by 0.608. Although MSPs focus on increasing CS levels, building strong relationships with customers is based on TR and minimizing the rate of dropped or failed calls. Nevertheless, MSPs should direct considerable attention to enhancing TR and COM.

The relationships SC→CC and VASs→CC were not supported. In other words, the negative effects of SC (H1, weight = 0.023, p =0.669) and VASs (H5, weight = 0.166, p =0.150) were not supported. The reason is that most customers use prepaid lines, which external shops offer with mobile handsets at lower prices to encourage customers to switch from their current MSP. In other words, a low SC and minimal time and effort required to switch to another MSP encourages CC. In addition, the costly and hassling phone options that are offered, such as ringback tones and missed-call alerts, and SMS advertisements encourage customers not to continue with their current MSP. Consequently, VASs did not show a significant negative effect on CC. To improve their performance and survive in the intensely competitive telecom industry, MSPs should plan,

design, and offer high-quality VASs at reasonable costs to overcome the effect of low SCs, thereby reducing CC.

Regarding CS, the relationships of CEs→CS, BI→CS, PP→CS, and CCMSs→CS were supported. In other words, CEs (H6, weight = 1.734, p<0.001) and CCMSs (H7, weight = 0.075, p =0.035), BI (H8a, weight = 0.911, p<0.001), and PP (H9a, weight = 0.797, p<0.001) positively affected CS. CEs contributed the largest effect on CS, followed by BI and PP. However, CCMSs contributed the smallest effect. Regarding MSPs, customers believe that updating them about new services, satisfying their expectations, and offering personalized services, good BI, and flexible and communicated prices are key methods for achieving their satisfaction. Typically, customer complaints can be used to measure satisfaction. To achieve a high level of CS, MSPs should design effective CCMSs with reduced waiting times, recruit trained call center employees, and handle complaints quickly.

For BI, the relationships BI→TR (H8b, weight = 0.960, p<0.001) and PP→BI(H9b, weight = 1.039, p<0.001) were supported. The MSPs that maintain good BI and offer flexible service prices to their customers increase their CS and TR levels.

Table 6. Results of the Model Hypotheses

Hypothesis Number	Relationship	Standardized Weight	Estimate	Standard error	*p* value	Test result
H_1	SC→CC	0.018	0.023	0.053	0.669	not supported
H_2	CS→CC	0.797	0.608	0.07	<0.001	Supported
H_3	TR→CC	0.228	0.179	0.066	0.007	Supported
H_4	COM→CC	0.117	0.266	0.131	0.043	Supported
H_5	VAS→CC	0.061	0.166	0.115	0.150	not supported
H_6	CE→CS	0.579	1.734	0.465	<0.001	Supported
H_7	CCMS→CS	0.02	0.075	0.035	0.035	Supported
H_{8a}	BI→CS	0.547	0.911	0.103	<0.001	Supported
H_{8b}	BI→TR	0.591	0.960	0.111	<0.001	Supported
H_{9a}	PP→CS	0.604	0.797	0.100	<0.001	Supported
H_{9b}	PP→TR	0.807	1.039	0.122	<0.001	Supported

4.2. Analysis of the Amman area and Orange MSP data

Further analysis was conducted on the collected surveys of respondents who lived in the Amman area and those who were customers of the Orange MSP because they constituted most of the respondents. Cronbach's α values were calculated for all of the measurement items (Table 7), with the smallest value being higher than the threshold value of 0.7. The overall α values for the Amman area and the Orange MSP were 0.90 and 0.886, respectively. The results indicated the reliability of the scales. Table 8 shows a sample of the intercorrelation matrix that was used for the measurement items, which indicates that a multicollinearity problem did not exist in the respondent data of the Amman area or the Orange MSP.

Table 7. Descriptive analysis and Cronbach's α for the Amman area and Orange MSP.

Construct	Measured Item	Amman			Orange		
		Mean	SD	Cronbach's α	Mean	SD	Cronbach's α
CL	CC1	4.135	0.797	0.894	3.988	0.965	0.879
	CC2	3.955	0.879	0.892	3.781	0.994	0.878
	CC3	3.794	0.951	0.892	3.689	1.039	0.877
CS	CS1	3.739	0.953	0.892	3.594	1.040	0.878
	CS2	3.873	0.864	0.895	3.741	0.947	0.881
	CS3	3.955	0.876	0.893	3.685	0.984	0.877
TR	TR1	3.797	0.980	0.892	3.785	0.909	0.879
	TR2	3.578	0.941	0.895	3.741	0.913	0.882
	TR3	3.573	0.974	0.892	3.757	0.886	0.879
SC	SC1	4.237	1.080	0.905	4.052	1.220	0.893
	SC2	3.393	1.173	0.904	3.522	1.111	0.886
	SC3	3.728	0.972	0.901	3.661	1.040	0.887
COM	COM1	1.913	1.125	0.907	1.550	0.881	0.893
	COM2	3.710	0.920	0.894	3.538	1.036	0.880
	COM3	3.607	0.998	0.895	3.307	1.127	0.880
VAS	VAS1	3.528	0.915	0.896	3.665	0.929	0.882
	VAS2	1.813	1.002	0.904	1.960	1.076	0.890
	VAS3	1.918	1.158	0.902	2.104	1.254	0.888
CE	CE1	3.884	0.757	0.893	3.809	0.896	0.879
	CE2	3.678	0.915	0.896	3.745	0.916	0.882
	CE3	3.559	0.936	0.892	3.606	0.988	0.877
CCMS	CCMS1	3.401	1.107	0.895	3.315	1.139	0.883
	CCMS2	2.704	1.140	0.906	2.578	1.199	0.895
	CCMS3	2.900	1.079	0.902	2.713	1.109	0.892
BI	BI1	3.974	0.803	0.894	3.833	0.888	0.879
	BI2	3.926	0.842	0.894	3.761	0.866	0.880
	BI3	3.966	0.915	0.899	3.777	0.941	0.885
PP	PP1	3.628	0.966	0.895	3.709	0.959	0.881
	PP2	3.583	0.965	0.895	3.606	0.921	0.882
	PP3	3.472	1.060	0.896	3.363	1.124	0.881

Table 8. Sample of the inter correlation matrix for the Amman area and Orange MSP.

Amman City												
	CC1	**CC2**	**CC3**	**CS1**	**CS2**	**CS3**	**TR1**	**TR2**	**TR3**	**SC1**	**SC2**	**SC3**
CE1	0.460	0.480	0.510	0.580	0.550	0.520	0.540	0.350	0.500	0.120	0.180	0.180
CE2	0.200	0.290	0.280	0.320	0.400	0.270	0.320	0.220	0.300	0.070	0.170	0.130
CE3	0.540	0.570	0.560	0.580	0.480	0.510	0.570	0.420	0.560	0.040	0.270	0.230
BI1	0.580	0.600	0.540	0.540	0.450	0.660	0.650	0.480	0.580	0.080	0.160	0.230
BI2	0.490	0.520	0.460	0.450	0.370	0.560	0.540	0.380	0.490	0.090	0.130	0.190
BI3	0.370	0.290	0.230	0.300	0.280	0.460	0.380	0.220	0.280	0.010	0.030	0.160
Orange MPS												
	CC1	**CC2**	**CC3**	**CS1**	**CS2**	**CS3**	**TR1**	**TR2**	**TR3**	**SC1**	**SC2**	**SC3**
CE1	0.460	0.492	0.507	0.517	0.375	0.421	0.416	0.335	0.440	0.046	0.293	0.145
CE2	0.363	0.435	0.337	0.399	0.357	0.301	0.352	0.275	0.441	0.001	0.289	0.094
CE3	0.406	0.482	0.535	0.505	0.361	0.431	0.449	0.388	0.498	0.083	0.301	0.185
BI1	0.535	0.548	0.499	0.481	0.338	0.439	0.491	0.252	0.426	0.123	0.332	0.151
BI2	0.446	0.445	0.504	0.447	0.300	0.413	0.422	0.367	0.445	0.110	0.280	0.212
BI3	0.257	0.243	0.178	0.160	0.294	0.269	0.210	0.244	0.247	-0.056	0.062	0.086

The calculated fit measures for the measurement and structural models are displayed in Table 9. The obtained fit values for both the Amman area and the Orange MSP indicates the discriminant validity of the measurement and structural models.

The obtained results from the analysis of the structural model for respondents' surveys from the Amman area and the Orange MSP are displayed in Table 10. The relationship SC→CC(H1, weight = 0.044, p = 0.504; weight = 0.109, p = 0.104) was insignificant for both respondents from the Amman area and the Orange MSP. This result indicated that SC had a weak influence on CC. However, the remaining relationships, CS→CC (H2), TR→CC (H3), and COM→CC(H4),were supported. Finally, the relationship VASs→CC (H5, weight = 0.051, p = 0.308) was determined to be insignificant only in the Amman area. These results indicated the poor effect of the VASs offered by the MSPs on the CC of the respondents from the Amman area. Consequently, MSPs should direct considerable attention to designing, promoting, and delivering reasonable VASs. Clearly, CS contributed the largest effect on CC, whereas SC had the smallest effect among respondents from both the Amman area and the Orange MSP.

4.3. Factor impact on customer churn

The contributions of the model factors on CC were calculated (Table 11) and yielded the following conclusions:

In all of the respondents' surveys, CEs through CS had the largest impact (1.054) on CC, whereas CCMSs had the smallest impact (0.046). However, CCMSs had the largest impact on CC in both the Amman area (0.344) and the Orange MSP (0.896).

Regarding direct relations, COM→CC had the largest impact (0.266); however, SC→CC had the smallest impact (0.023) in the overall results and those based on the surveys of the Amman area

respondents. However, responses from the customers of the Orange MSP showed that VASs (0.400) and SC (0.109) had the largest and smallest impacts on CC, respectively.

The impact of BI on CC was calculated as the sum of the impacts of BI→CS→CC and BI→TR→CC (0.554 + 0.172), which yielded 0.726. Similarly, the impact of PP on CC was calculated as the sum of the impacts of PP→CS→CC and PP→TR→CC (0.485 + 0.186), which yielded0.671. Similarly, the impacts of BI (PP) on CC were calculated as 0.426 (0.765) and 0.656 (0.805) for the Amman area and the Orange MSP, respectively.

For indirect relations, CEs had the largest impact through CS on CC in all of the data, whereas PP had the largest impact on CC in the Amman area (0.765) and the Orange MSP (0.805).

5. CONCLUSIONS

This study used SEM to investigate the impact of SC, CS, TR, COM, and VASs on CC in the telecom industry. The effects of CEs, CCMSs, BI, and PP on CS were used to measure CS. TR was measured by BI and PP. The data was collected from MSP customers in Jordan. The results showed that SC and VASs had insignificant and negative effects on CC. The effects of the relationships of CS with CEs, CCMSs, BI, and PP on CS were significant. Finally, the effects of BI and PP on TR were significant. In addition, the data of respondents from the Amman area and the Orange MSP were examined. In conclusion, MSPs can decrease CC by enhancing the overall service quality offered to customers, which includes creating a good reputation among customers by constructing trustworthy billing systems, decreasing the number of dropped or failed calls, and increasing call clarity, signal quality, and network coverage. In addition, MSPs should focus on decreasing the number of SMS advertisements, offering new VASs, and increasing the availability of mobile phones with competitive prices. Finally, in addition to increasing staff for handling customer complaints at peak times and conducting professional training courses for frontline employees, MSPs can decrease CC rates by listening to customers' opinions, creating offers that satisfy their expectations, providing competitive prices, updating customers regarding offers, and handling customer complaints promptly.

Table 9. Estimated fit values for the direct and indirect submodels.

Model	Type	Amman			Orange		
		GFI	AGFI	RMSEA	GFI	AGFI	RMSEA
Indirect model	Measurement	0.936	0.899	0.063	0.907	0.866	0.068
	Structural	0.864	0.833	0.088	0.867	0.843	0.085

Table 10. Results of the structural models

(a) Amman area

Hypothesis Number	Relationship	Standardized Weight	Estimate	Standard Error	*p* value	Test Result
H_1	SC→CC	0.036	0.044	0.066	0.504	not supported
H_2	CS→CC	0.879	0.478	0.043	<0.001	Supported
H_3	TR→CC	0.452	0.256	0.031	<0.001	Supported
H_4	COM→CC	0.134	0.096	0.033	0.003	Supported
H_5	VAS→CC	0.058	0.051	0.050	0.308	not supported
H_6	CE→CS	0.405	0.384	0.050	<0.001	Supported
H_7	CCMS→CS	0.572	0.720	0.142	<0.001	Supported

H_{8a}	BI→CS	0.499	0.417	0.046	<0.001	Supported
H_{8b}	BI→TR	0.510	0.885	0.167	<0.001	Supported
H_{9a}	PP→CS	0.568	0.612	0.058	<0.001	Supported
H_{9b}	PP→TR	0.823	1.842	0.303	<0.001	Supported

(b) Orange MSP

Hypothesis Number	Relationship	Standardized Weight	Estimate	Standard Error	*p* value	Test Result
H_1	SC→CC	0.108	0.109	0.067	0.104	not supported
H_2	CS→CC	0.819	0.718	0.091	<0.001	Supported
H_3	TR→CC	0.386	0.341	0.063	<0.001	Supported
H_4	COM→CC	0.345	0.291	0.064	<0.001	Supported
H_5	VAS→CC	0.224	0.400	0.169	0.018	Supported
H_6	CE→CS	0.348	0.360	0.075	<0.001	Supported
H_7	CCMS→CS	0.603	1.248	0.523	0.017	Supported
H_{8a}	BI→CS	0.436	0.407	0.071	<0.001	Supported
H_{8b}	BI→TR	0.570	1.068	0.283	<0.001	Supported
H_{9a}	PP→CS	0.690	0.560	0.069	<0.001	Supported
H_{9b}	PP→TR	0.724	1.182	0.284	<0.001	Supported

Table 11. Direct and Indirect Factor Contributions.

Relationship	Impact		
	All	Amman Area	Orange MSP
SC→CC	0.023	0.044	0.109
COM→CC	0.266	0.096	0.291
VAS→CC	0.166	0.051	0.400
CE→CS→CC	1.054	0.184	0.258
CCMS→CS→CC	0.046	0.344	0.896
BI→CS→CC	0.554	0.199	0.292
BI→TR→CC	0.172	0.227	0.364
BI→CC	**0.726**	**0.426**	**0.626**
PP→CS→CC	0.485	0.293	0.402
PP→TR→CC	0.186	0.472	0.403
PP→CC	**0.671**	**0.765**	**0.805**

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