

Adoption Factors of Mobile Service Providers

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Abstract: *With the tremendous growth in the fields of information and telecommunication technology, the demands for telecommunication and Internet services increase rapidly with the passing of time. In the state of Manipur, India, currently, four Mobile Services Providers, namely Bharti Airtel, Reliance Jio, BSNL and Vodafone Idea, are providing these services. A stiff competition is prevailing between these providers for attracting new customers and retaining existing customers. Providers take an appropriate strategy to retain existing customers and build intimate long-term customer relationships. The objective of the present study is to measure the adoption factors of mobile service providers in Imphal valley. Primary data was collected through a questionnaire. A sample of 330 respondents was selected from mobile subscribers of Imphal Valley. The collected data is analyzed using appropriate statistical tools and 2nd order confirmatory factor analysis. The result showed that these six factors, namely Network Quality, Reference group, Tariff, Convenience, Promotion and Seasonal Offer were statistically correlated; however, five factors except Promotion, have significantly influenced mobile service adoption. The result of the study shows that it established the adoption factor of mobile service providers. The service providers should note these factors and draw attention towards these factors in their marketing strategy.*

Keywords: Mobile Service Provider, 2nd order Confirmatory Factor Analysis, Mobile Service Adoption, Consumer Behaviour

1. Introduction

Wireless communication is the fastest and highly developing industry in the present-day world. They provide both voice and data services to the customers. Many industries are growing in these sectors, and now they plan to invest greatly in the development of related software and services (Quan et al., 2010). In order to face competition among service providers, they must know who their customers are and how they make decisions, and what variables they use that influence their decision (Hidayati et al., 2018). As various bundles of goods and services are measured by its utility, consumer rank these bundles according to their utility level and give preference based on their individual tastes (Opele et al., 2018).

With the liberalisation and globalisation of the Indian economy, Service organisations in India are facing tough competition in the global market (Gautam & Kumar, 2011). In order to overcome the competitors and attract and retain customers, service organisations must know the customer service quality perceptions (Gautam & Kumar, 2011).

Although there is an increase in mobile service providers, their competition through the introduction of varieties of service packages to attract customers to opt for their company, customers' preference and satisfaction still differ from customer to customer based on certain attributes, the telecommunication needs and wants of subscribers, which firms must anticipate their changes from time to time (Adebiyi et al., 2016). In order to safeguard this situation, the marketer should gain market reflections through consumer feedback and enable them to know about their market performance, consumer preference and satisfaction level of their customer towards their service (Rajpurohit & Vasita, 2011). Consumers want those mobile phone service provider

that provides multiple features of selection and excellent customer service, and are free from hidden charges (Selvi & Subadra, 2017).

In India, at present, there are six mobile service providers, namely M/s Reliance JIO Infocomm Ltd., M/s Reliance Communication Ltd, Mahanagar Telephone Nigam Ltd.(MTNL), Vodafone Idea Ltd., Bharat Sanchar Nigam Ltd.(BSNL) and Bharti Airtel Ltd. Among these M/s Reliance JIO Infocomm Ltd., Vodafone Idea Ltd. and Bharti Airtel Ltd. are operating throughout the country. Bharat Sanchar Nigam Ltd. is operating all over India except Delhi and Mumbai. And M/s Reliance Communication Ltd is operating all over India except Assam and the North Eastern Region of India. Mahanagar Telephone Nigam Ltd. is operating only in Delhi and Mumbai. Except for BSNL and MTNL all other operators are private operators.

In India, these service operators are governed by a regulatory body known as the Telecom Regulatory Authority of India (TRAI), which was set up by the Government of India. They imposed certain benchmarks in order to cater services to society. On the one side, these mobile service providers adhere to these benchmarks and on the other side, they face high market competition among these service providers. To sustain and dominate market conditions, these service providers need to mobilise to add new customers based on how customers determine while adopting their service provider.

In Manipur, currently there are four Mobile service providers, namely Bharti Airtel, Reliance Jio, Vodafone Idea and BSNL. They rendered services both in the hill and Imphal valley. There are 16 districts in Manipur. Out of 16 districts, 5 Districts are valley region and the remaining 11

districts are hilly region. All the four mobile service providers rendered services to these valley districts.

2. Review of Literature

Gautam & Kumar, (2011), in a study to identify the responsible factors that helped in choosing mobile telecommunication industry by consumers. They analyzed the perception of consumers in the form of demographics, product quality and availability, price and promotion using SEM EFA. The researchers found that from among these factors, price is the most important one then followed by product quality and availability, service quality and promotion in finding the customers' perception towards the selection of mobile telecommunication services. Mehdipour & Zerehkafi, (2013) carried out a study to know the attractive features of the customer while subscribing to their mobile service providers from 2600 respondents in Hyderabad. Their study found that network and friend circle is the main criteria in the selection of their mobile service providers. The reason for friend circle is because of many of their friend used that service provider. They also stated that Packages also play a vital role while choosing a particular mobile service provider. Sama & Jani, (2014) conducted a study to identify factors that affect the buying behaviors of consumers while selecting a mobile service operator in Ahmedabad city. The results of their study interpreted that friends, family members and advertisements were the influencing factors in the selection of mobile service provider. They also found that, not only influenced by call charges and network coverage of service provider, value added services of the service provider also influenced in buying behavior of the consumers.

Jegan & Sudalaiyandi, (2012) conducted a study from 100 mobile phone users in Kovilpatti, Thoothukudi District regarding their preferences and satisfaction towards their mobile service providers. Call tariffs, network coverage and brand image are the inducing factors while selecting mobile service providers. The researchers found that customers faced dissatisfaction in call rate, value added service, coverage of network and customer care.

Olatokun & Nwonne, (2012) carried out a study to determine the significance of call rate, service quality, service availability, promotion and brand image in the selection of mobile service provider from 367 respondents of Ibadan, Nigeria. Their study found that call rate, service quality and service availability were more significant than Promotion and brand image in the process of customer choice of mobile service provider. They suggested that for increasing subscribers' count, instead of investing more in promotion and brand image, the mobile operators should invest in the expansion of network, quality service delivery and infrastructural development of service and product outlets, along with the concentration of price reduction strategies.

Selvi & Subadra, (2017) carried out a study in Salam District to find the consumer preference towards selection of mobile phone service from 450 sample respondents. The researchers chose eight factors, namely network quality, tariff rates, service quality, value-added services, brand reputation, schemes and offers, advertisement and availability of dealer

that are considered normally by customers. By using the Garrett ranking method, they found that based on sample respondents, network quality, brand reputation and schemes and offers are respectively ranked first, second and third factors while selecting mobile service providers and the last rank is advertisement. Hidayati et al., (2018) in their study identified six variables namely brand, tariff, promotion, network, relation and distribution and test these factors influence consumer behaviour in selecting cellular provider. They revealed that brand, network and distribution have significant relationship with preference of the customer behavior and no significant effect on customer behavior by promotion, tariff and relation in choosing mobile service provider. Kumar, (2011) carried out an empirical study to determine the influencing factors of mobile users in the selection of mobile service providers in India. His findings stated that customer service, service accessibility and service affordability are the most important factors then promotional offers, that influence customers in selection of cellular service providers.

Sethi, (2018) carried out a study to extract the factors that influenced customers' buying behavior in telecom industry. By using principal component analysis, from 19 items, he revealed that promotion, social class, perception and religion are the affecting factors of consumer behaviour in the selection of mobile service providers.

In examining the effect of service quality on choosing their preferred mobile service provider in Ghana, Jephthah Kwame et al., (2019) conducted an inquiry about the relationship between customer choice and dimensions of service quality. They found that a close relationship exist between the dimension of service quality and customer choice of mobile service provider. Among these service quality dimensions, empathy is the most preferred dimension followed by responsiveness and reliability. Assurance and tangibility were the least preferred by customers. Sani, (2020) conducted a study that choose mobile brand operator by consumer through the factors coverage, customer service, price, promotions, value added services, purchase behavior, social factors, quality and reliability of services from 384 respondents of mobile phone subscribers in Katsina metropolis by using non-probability/ convenience sampling. The study revealed that in spite of few advertisements of service operators, most of the respondents aware the brands of service providers and all the factors are the key factors while choosing service of mobile phone operator.

Ling, (2024) conducted a study to find the influencing factors of customers' choice of mobile service provider in Chengdu and their relationship. He examined the effect of 7Ps of marketing mix, brand equity, consumer behavior on the customer choice of mobile service providers. By using judgment and convenience non-probability sampling he collected 400 questionnaires from customer of China Telecom, China Unicom and China Mobile service providers. His finding revealed that product, price, promotion, people, process, brand awareness, brand personality, brand identity, brand preference, brand loyalty, and consumer behavior can significantly influence in the selection of mobile service provider in Chengdu, China by customer. He mentioned that this is due to customers pay

more aware to the price of telecom services and the conveniences, the service process that their staff provided to the customers, and the benefit of the brand that the mobile service provider created, directly influencing in making purchase decisions by the customers.

3. Objective of the study

The main objective of this study is to determine the choice criteria towards mobile service adoption and its managerial implications.

4. Research Methodology

A total of 330 respondents have been collected by using simple random sampling method. The survey was carried out during the period July 2023 to May 2024. Primary data is collected with the help of pre-tested structured questionnaire from the target respondents. In order to draw the results, confirmatory factor analysis is used using AMOS version 21. To validate the collected data, Cronbach's alpha is calculated. Table 1 shows the research constructs and its corresponding measurement items which is adopted from (Sharma, 2013) and Cronbach's Alpha values.

Table 1: Research constructs and their corresponding measurement items and Cronbach's Alpha values.

Constructs	Code	Items	No. of Items	Cronbach Alpha
Network Quality	Beh 2	Network signal efficiency/ connectivity	3	0.818
	Beh 3	Voice quality and clarity		
	Beh 4	Internet speed and connectivity		
Reference Group	Beh 5	Connection used by the people in my social network/ corporate connection	3	0.70
	Beh 8	Other peoples' experience about service provider		
	Beh 9	Recommendation of dealer/ service provider		
Tariff	Beh 1	Tariff plans and schemes (discount offering)	4	0.761
	Beh 10	Availability of small and easy recharge coupons		
	Beh 11	Value of talk time on Top-up coupons		
	Beh 15	Validity period/ duration of a connection (e.g free life-time validity)		
Convenience	Beh 16	Convenience of bill payment (if applicable)	3	0.792
	Beh 17	Information obtained from customer care services		
	Beh 18	Convenience in procedural formalities		
Promotion	Beh 6	Advertisements of service providers	3	0.731
	Beh 7	Sales promotion measures of service providers		
	Beh 12	Caller tunes/ hello tunes		
Seasonal Offer	Beh 13	Free handset along with connection	2	0.788
	Beh 14	Free SIM along with connection		

Source: Calculated value based on Primary data

Reliability

Reliability is the extent in which a consistent results is produces by measuring instrument under similar conditions (Hair et al., 2009). It means the measuring instrument is reliable when measuring on different occasions with the same individuals produces the same results.

For this measurement, we calculate Cronbach's alpha for each factor by using IBM SPSS 21. We found the reliability of Network Quality is 0.818, Reference Group is 0.70, Tariff plan is 0.761, Convenience is 0.792, Promotion and Seasonal Offers are respectively found as 0.731 and 0.788. From this we have drawn the conclusion that all the measuring instruments are acceptable level of reliability which is above 0.70 except the factor influencers which is equal to 0.7.

Construct validity

Construct validity of a research refers to how well the output or results among the items selected represent the true findings among same or similar items outside the study. It is the extent to which a scale or instrument accurately represents the concept of factors or constructs. In the current study, there are six constructs that helps in determining how well these factors or latent unobserved construct are measured by respective items of the construct. Construct validity is explained by two types of validities, convergent validity and discriminate validity.

Convergent validity

Convergent validity refers to the degree to which multiple items of a factor that theoretically should be related are related. It assesses the degree to which multiple items measuring the same concept are correlated. High correlations among items indicate that the items are measuring its underlying concept. Convergent validity is assessed using Average Variance Extracted (AVE). It explained the average percentage of variation among the items of a construct. For convergent validity, an AVE greater than 0.05 provides empirical evidence (Bagozzi & Yi, 1988) as the corresponding factor explains more than half of the variance in the belonging items. It is calculated by taking sum of squares of the factor loadings and dividing it by the number of items in the factor.

Discriminant Validity

Discriminant validity is demonstrated when different items are used to measure unrelated or divergent constructs and the correlation coefficients between the items are weak or strongly negative. It shows how far a construct is truly distinct from others constructs. It expressed that a construct is unique and show some characteristics that other construct do not.

5. Analysis and Interpretation

Table 2 gives the demographic profile of the respondents. Out of 330 respondents 207 are male and 123 are female. In case of occupation, 185 are employed, 70 are students, 22 are unemployed, business and housewife have 11 and 10 respectively and the 6 respondents out of 330 are specified as doing any others jobs. In respect of using number of SIMs (service connection) used by the respondents, 172 respondents are using only one service connection, 146 respondents are using two service connections and 12 are using three service connections. As per data obtained from respondents, the respondents who used more than one connection may use from the same mobile service providers or from different mobile service providers. With respects to the type of services, most of the respondents are using prepaid service only i.e. 296. 22 respondents are using both prepaid and postpaid and only 12 respondents are using postpaid service only. In finding the educational qualification of the respondents, under the level Under Matriculation, Matric, Secondary, Degree, Master, Professional, PhD and Other, we found their corresponding values as 6, 15, 27, 130, 115, 33, 2 and 2 respectively. Lastly the monthly income of the respondents is determined. Out of 330 respondents, 61 respondents earned less than 2000. 20 respondents earned 2000 to 5000, 41 respondents earned 5000 to 10000. 87 and 79 respondents earned 10000 to 50000 and 50000 to 1 lakh respectively. 42 respondents earned above 1 lakh.

Table 2: Demographic Profiles of the respondents

Measure	Items	Frequency	Total
Gender	Male	207	330
	Female	123	
Occupation	Employee	185	330
	Self employed	26	
	Unemployed	22	
	Business	11	
	Student	70	
	House wife	10	
	Any other	6	
Number of SIMs used	1 SIM	172	330
	2 SIMs	146	
	3 SIMs	12	
Type of Services	Prepaid	296	330
	Postpaid	12	
	Prepaid and Postpaid	22	
Educational Qualification	Under Matriculation	6	330
	Matric	15	
	Secondary	27	
	Degree	130	
	Master	115	
	Professional	33	
	PhD	2	
	Other	2	
Monthly Income	Less than 2000	61	330
	2000 to 5000	20	
	5000 to 10000	41	
	10000 to 50000	87	
	50000 to 1 lakh	79	
	Above 1 lakh	42	

Source: Primary data

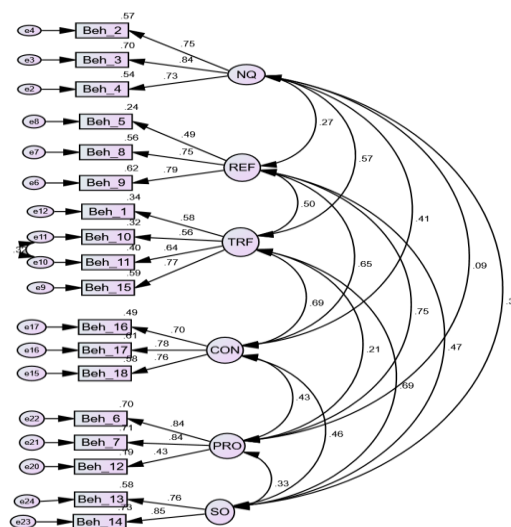


Figure 1: Path Diagram of 1st order CFA

Table 3: Goodness of Fit Indices for the proposed model

Goodness of fit Indices	Benchmark	Value
Absolute goodness of fit measure		
Chi-Square (CMIN)		278.058
Chi-Square/Degree of Freedom	≤ 3	2.337
Goodness of fit Index (GFI)	≥ 0.90	0.916
Incremental fit measure		
Comparative fit Index (CFI)	> 0.90	0.931
Root Mean Square Error approximation (RMSEA)	0.05-0.08	0.064
Parsimony fit measure		
Parsimony Goodness of fit Index (PGFI)	> 0.90	0.91
Parsimony Comparative fit Index (PCFI)	> 0.90	0.90

Source: Primary data

In table 3, to validate the propose model, the model fit index parameter along with benchmark are shown. In our study the ratio of chi-square to its degree of freedom is 278.058 which is less than the benchmark value ≤ 3 . The goodness of fit index and comparative fit index are respectively 0.916 and 0.931 which is above 0.90. The root mean square error approximation (RMSEA) value is 0.064. Lastly the Parsimony Goodness of fit Index (PGFI) and Parsimony Comparative fit Index (PCFI) are found as 0.91 and 0.90 respectively. From the above finding, all the fit indices are better than the benchmark value, therefore, there is good fit for the propose model and we draw the conclusion that our model is fit.

Table 4: Testing of Reliability and Construct Validity

Factors	Items	Factor loading						Communalities
Network Quality	Beh 4	0.732						0.536
	Beh 3	0.835						0.697
	Beh 2	0.752						0.566
Reference Group	Beh 9		0.785					0.616
	Beh 8		0.751					0.564
	Beh 5		0.489					0.239
Tariff	Beh 15			0.769				0.591
	Beh 11			0.635				0.403
	Beh 10			0.564				0.318
	Beh 1			0.584				0.341
Convenience	Beh 18				0.760			0.578
	Beh 17				0.782			0.612
	Beh 16				0.700			0.49
Promotion	Beh 12					0.435		0.189
	Beh 7					0.842		0.709
	Beh 6					0.836		0.699
Seasonal Offer	Beh 14						0.854	0.729
	Beh 13						0.763	0.582
AVE (>0.50)		0.600	0.473	0.413	0.560	0.532	0.656	
CR (>0.70)		0.817	0.722	0.735	0.792	0.761	0.792	
		Established	Established	Established	Established	Established	Established	

Source: Primary data

Before testing our hypothesized model (confirmatory factor analysis), assessing the validity and reliability of measures is essential as this may affect the outcomes and objectives of the study (Hair et al., 2009). Validity indicates how well measured variables (items) represent the intended latent construct (factor). This can be assessed through convergent and discriminant validity.

To assess the convergent validity, the internal consistency of all latent factors is examined by evaluating how well the items loaded onto the respective factors. To measure

convergent validity, the average variance extracted (AVE) and composite reliability (CR) are calculated for each factor. The checking of conditions for convergent validity requires AVE values above 0.50 and CR greater than 0.70. However, the CR value for each factor is above 0.70 and even low AVE value but CR values are greater than AVE values indicate adequate reliability and convergent validity. Thus, the convergent validity has been established for all latent factors as they meet the requirements indicating that the items load well onto the respective factors.

Table 5: Testing of Discriminant Validity

Correlational relationships			Factor correlation	Square correlation	AVE1	AVE2	Discriminant Validity
NQ	<-->	REF	0.27	0.073	0.600	0.473	Established
NQ	<-->	TRF	0.572	0.327	0.600	0.413	Established
NQ	<-->	CON	0.41	0.168	0.600	0.560	Established
NQ	<-->	PRO	0.095	0.009	0.600	0.532	Established
NQ	<-->	SO	0.32	0.102	0.600	0.656	Established
REF	<-->	TRF	0.504	0.254	0.473	0.413	Established
REF	<-->	CON	0.649	0.421	0.473	0.560	Established
REF	<-->	PRO	0.745	0.555	0.473	0.532	Not established
REF	<-->	SO	0.467	0.218	0.473	0.656	Established
TRF	<-->	CON	0.686	0.471	0.413	0.560	Not established
TRF	<-->	PRO	0.206	0.042	0.413	0.532	Established
TRF	<-->	SO	0.686	0.471	0.413	0.656	Not established
CON	<-->	PRO	0.426	0.181	0.560	0.532	Established
CON	<-->	SO	0.462	0.213	0.560	0.656	Established
PRO	<-->	SO	0.334	0.112	0.532	0.656	Established

Source: Primary data

In addition, discriminant validity provides the distinctiveness of latent factors. If the squared correlation between any two factors is less than the AVEs of the factors then the discriminant validity is established. The AVEs for most of latent factors are greater than their squared correlations and hence most latent factors support the discriminant validity

indicating their distinctiveness (see table 5). Finally, it can be concluded the data fit to confirmatory factor model and the relationships among latent factors are well established.

The factor loading is the correlation between an item (variable) and the factor. In this study, we consider choice of

any mobile services provider depends on Network Quality, Reference group, Tariff, Convenience, Promotion and Seasonal offer. Network Quality is attributed by three items namely Beh_2 Network signal efficiency/ connectivity, Beh_3 Voice quality and clarity and Beh_4 Internet speed and connectivity with factor loadings 0.752, 0.835 and 0.732 respectively. Reference group is attributed by three items namely Beh_5 Connection used by the people in my social network/ corporate connection, Beh_8 Other peoples' experience about service provider and Beh_9 Recommendation of dealer/ service provider with factor loadings 0.489, 0.751 and 0.785 respectively. In case of tariff, it is attributed by four items namely Beh_1 Tariff plans and schemes (discount offering), Beh_10 Availability of small and easy recharge coupons, Beh_11 Value of talk time on Top-up coupons and Beh_15 Validity period/ duration of a connection (e.g free life-time validity) with factor loadings 0.584, 0.564, 0.635 and 0.769 respectively. In case of convenience, it is attributed by three items namely Beh_16 Convenience of bill payment (if applicable), Beh_10 Information obtained from customer care services and Beh_11 Convenience in procedural formalities with factor loadings 0.700, 0.782 and 0.760 respectively. Promotion is attributed by three items namely Beh_6 Advertisements of service providers, Beh_7 Sales promotion measures of service providers and Beh_12 Caller tunes/ hello tunes with factor loading 0.836, 0.842 and 0.435 respectively. Lastly Seasonal Offer is attributed by Beh_13 Free handset along with connection and Beh_14 Free SIM along with connection with factor loading 0.763 and 0.854 respectively.

After confirming the exogenous factors of the mobile service provider/adaption, the second order confirmatory factor analysis is undertaken to measure the effects of these (1st order factors) on the mobile service adoption. The path diagram of second order confirmatory factor analysis is shown in figure-2. However, the hypothetical model in figure -2 is not established since the model fit indices of the confirmatory factor analysis are not achieved the benchmark of the good fit, since GFI and CFI are less than 0.900 and RMSEA value is greater than 0.08. Therefore, the first order factor Promotion is deleted from the model since its Beh-7 has standardized residual covariance greater than 2.58. Finally, the best 2nd order confirmatory factor model is established as shown in figure-3 and all model fit indices are established with the data. Further, the model convergent validity is established since CR (composite reliability) is greater than 0.70 and AVE is also greater than 0.05 (Table 6).

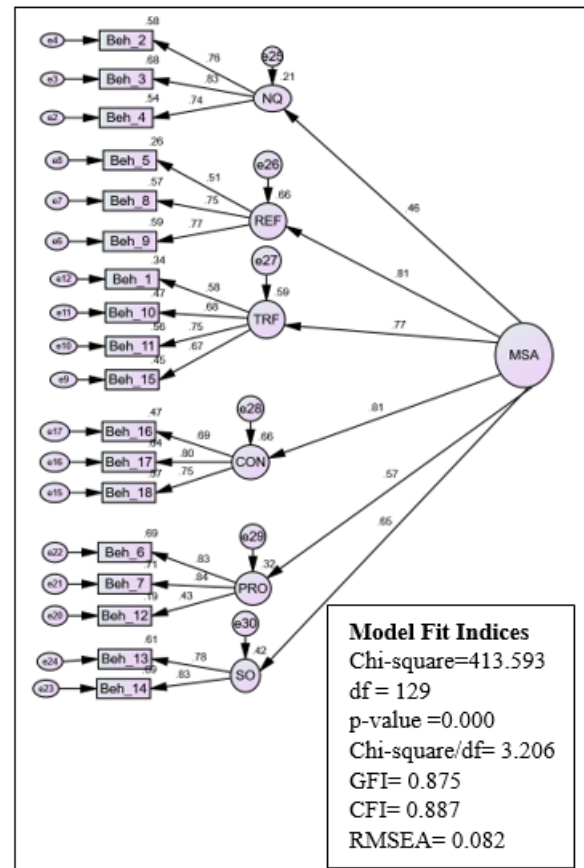


Figure 2: 2nd order CFA (Initial)

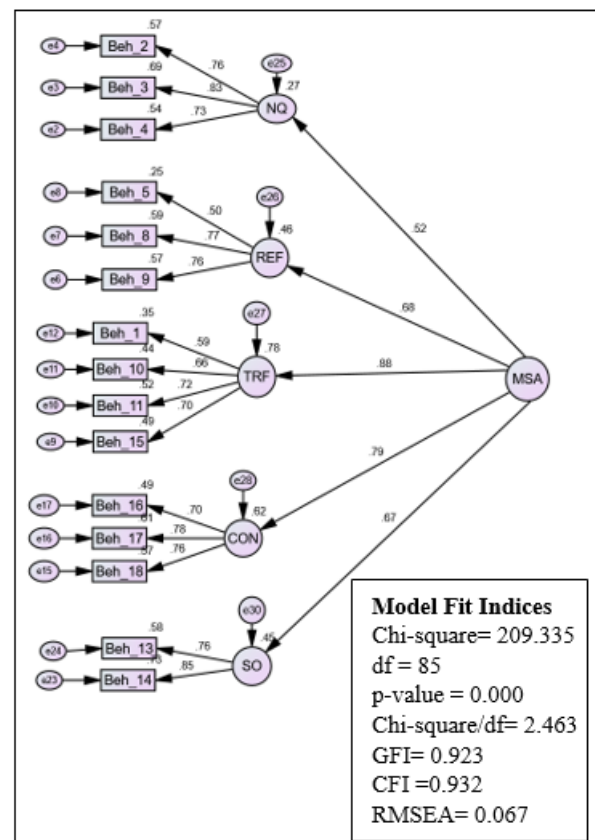


Figure 3: 2nd order CFA (Final)

Table 6: Testing of reliability and construct validity

2 nd Order factor	1 st Order factor	Factor loading	CR	AVE
MSA	NQ	0.523	0.71	0.52
	REF	0.676		
	TRF	0.883		
	CON	0.788		
	SO	0.671		

Source: Primary data.

The estimated regression coefficients, S.E. (standard error) C.R. (critical ratio) P (p-value) of exogenous constructs (factors) and endogenous construct (mobile service adoption) is shown in the above table 6. It has been revealed that a choice of a particular mobile service provider by the customers depends of the network quality, reference group, tariff, convenience and seasonal offer and they are statistically significant.

Table 7: Regression path coefficient and its significance

Exogenous Construct		Endogenous Construct	Estimate	S.E.	C.R.	P	Result
NQ	<---	MSA	0.523	0.043	7.462	***	Significant
REF	<---	MSA	0.676	0.071	9.21	***	Significant
TRF	<---	MSA	0.883	0.076	11.295	***	Significant
CON	<---	MSA	0.788	0.07	11.019	***	Significant
SO	<---	MSA	0.671	0.087	8.83	***	Significant

Source: Primary data

6. Limitation

The present study poses many limitations. The first limitation is smaller sample size that is 330 respondents and smaller area which is within the context of Imphal valley of Manipur, India. So similar studies should be performed in different areas in similar service providers and compare the results before generalization could be made by using larger sample sizes. Secondly, the study only identified the factors that determine mobile service adoption by using five factors. Future researchers may include different factors and also may determine the preference level among these factors so that the service providers may enhance the higher preference factors and improve the lower preference factors.

7. Managerial Implication

The current study has presented an important insight to management implications. It may allow management of mobile service providers to know the customer preferences, so that they can improve their relationship with customers and attract new customers, by including the preferred combination of features. The mobile service providers can also evaluate the information provided by the study to appropriately match those gaps between customers' perception and managerial perception of the value of services rendered by them. This will provide greater customer satisfaction along with a noticeable difference among competitive mobile service providers.

8. Conclusion

The study revealed that in the selection of mobile service providers, we assumed customer measured their preference through Network quality, Reference groups, Tariff, Convenience, Promotion and Seasonal offers which is supported by previous studies. In this study we try to confirm whether these factors still hold the underlying prediction by using second order Confirmatory Factor Analysis. It is a statistical method employed to confirm or validate on whether these factors act as criteria in selecting mobile service provider by introducing second order factor namely Mobile Service Adoption (MSA) using second

order Confirmatory Factor Analysis. The studies try to estimate the effect of sub construct namely Network quality, Reference groups, Tariff, Convenience, Promotion and Seasonal offer to main construct Mobile Service Adoption. From the study it revealed that all the sub constructs are statically significant except Promotion since it has standardized residual covariance greater than 2.58. Hence it was concluded that these five factors have a positive influence in selecting the mobile service providers.

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