

# Scope & Challenges of Mobile Number Portability in Nepal

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## Abstract

Nepal is on course of MNP's implementation. MNP would allow customers to change the network operator retaining the existing mobile number. Implementation of MNP in Nepal is an innovative approach by NTA and it is going to affect the financial and technical aspects of mobile operators. The research aims to analyze implementation of MNP in Nepal from stakeholders' and subscribers' perceptions. By reviewing the administrative and technical approach adopted by NTA for MNP's implementation, the research efforts to assess if this is the right time to execute MNP's implementation plan in Nepal. This study could help service providers in upgrading the present marketing strategy in benefit of the subscribers. Relative review of the literatures associated to opportunity and threats of MNP implementation is done in the study. Quantitative research method has been conducted to explore the variable affecting implementation success rate for MNP in Nepal. Independent variables namely technical and financial resources, quality of service, awareness among subscribers, porting time and cost, and process ease are equated with the dependent variables like subscribers' willingness to use MNP and critical analysis on NTA's approach. MNP's implementation would force the service providers to be competitive and they tend to attract maximum subscribers. The struggle among the service providers will lower the cost, improve the quality of the service. From subscribers' perspective, MNP shall reduce the porting cost and time. Whereas, from service providers' perspective, much of network maintenance work needs to be done for successful implementation. For the implementation to be successful in Nepal, key players of telecom industries must have mutual understanding and they must follow the standard regulations. It is important to notify and assist the service providers on upcoming technical and financial challenges.

**Keywords:** Mobile Number Portability, Service Providers, Subscribers, Nepal Telecommunication Authority (NTA), Porting Time, Porting Cost, Process Ease.

## 1 INTRODUCTION

### 1.1 Background

Number Portability allows a subscriber "to switch their current operator, service, or location to different one while preserving the existing telephone number and without negotiating on operational ease" (Aryal, 2019: 1). Number portability has been further classified into three categories and they are briefly clarified here.

Operator portability "lets a subscriber to keep the mobile number with same service area regardless of the operator" (Aryal, 2019: 1). The three different types of operator portability are "Fixed Number Portability", "Mobile Number Portability" and "Intelligent Number Portability". Aryal (2019: 1) discussed the types of operator portability as:

Operator portability within the geographic numbers is known as Fixed Number Portability whereas operator portability of mobile telephone numbers is known as Mobile Number Portability. Likewise, operator portability of non-geographic intelligent number is known as Intelligent Number Portability. Location portability "lets a subscriber to keep current telephone number while shifting from one physical location to another location. Geographic number is ported from one location to another in location portability. The portability can be within numbering, charging area, exchange area and so on" (Aryal, 2019: 1).

Service portability "offers a subscriber to keep the mobile number while switching from one service to another, say from landline to cell phone services" (Aryal, 2019: 2).

Nepal is on course of MNP's implementation. MNP would allow customers to change the network operator retaining the existing mobile number. Aryal (2019: 2) in the previous work revealed the outstanding features of MNP as "MNP eliminates the barrier of network switching for subscriber and

efficient utilization of numbering resources is feasible due to MNP as subscribers are obliged to stick with same mobile number for extended period whereas, MNP rises subscriber choice and more choice would generate bigger competition among operators.”

NTA is planning to implement of MNP in Nepal facilitating the subscribers of major network operators of Nepal. As per NTA's recent announcement “MNP can be enabled by visiting the closest center, through SMS or by submitting an online form” (Aryal, 2019: 2).

### **1.2 Problem Statement**

There exist few papers to examine the views of telecom subscribers and stakeholders regarding MNP across the globe. The research on MNP confirms that MNP affects consumer switching intentions to find the better service in terms of tariff and quality (Kaur and Sambyal, 2016). The other research conducted by Nimako et al. (2016) reveals that the subscribers have limited or knowledge on the MNP so once the MNP gets implemented, it is believed that it might not provide expected benefits to the subscribers. In contrary, Venkatesh (2019) determined that the subscribers are positive towards MNP believing that MNP can improve the quality of service presented by the mobile network operator. The degree of subscribers' retention towards their personal number is affected when network operators considers upgrade in the quality and cost of their existing service. Subscribers are less likely to switch their existing operator if subscribers are not restricted to change their existing mobile number Okom et al. (2018). MNP must be supported by the government along with the respective regulatory bodies to improve the competitive framework between the service providers in the telecommunication market (Akanbi et al., 2015). Pham Hai son et al. (2019) recommended that the regulatory monitoring of the vulnerabilities within telecommunication system is the key factor for MNP's successful implementation.

### **1.3 Research Questions**

The questionnaire form which are to be attended by telecom subscribers holds below listed questions.

- What are the stakeholders' views on the status of telecommunication services in Nepal?
- What are the stakeholders' judgments towards the style adopted by NTA for MNP's implementation in Nepal?
- What could be the impact on subscribers and network operators after MNP is implemented in Nepal?

### **1.4 Aim & Objectives**

The aim of this study is to discover the challenges with respect to MNP's implementation in Nepal. The study attempts to analyze if this is the correct time to implement MNP in Nepal. With the evaluation of works of literature based on implementation of MNP in other countries, this study attempts to define a similar theory in Nepal's context.

The main objectives of the study have been listed here.

1. To study the status of telecommunication services in Nepal from stakeholders' perspective.
2. To examine the stakeholders' degree of knowledge and appreciation towards the style adopted by NTA for MNP's implementation in Nepal.
3. To explore the after-effects of implementation of MNP technology with respect to the switching time and cost.

### **1.5 Scope and Limitation**

MNP has not been implemented in Nepal so, the major challenge of this study is to find the trials with respect to the review of literatures based on implementation of MNP in other countries.

Moreover, the research is bounded to the following:

- Two major network providers (NCell & NTC)
- Stakeholders from capital city only
- Time bound and population of the survey
- Limited Knowledge on MNP to stakeholders

## 1.6 Significance

This research has been started right after NTA declared the implementation of MNP in Nepal. This could be an appropriate time to know subscriber's inclinations on MNP services. It is important for service providers to stay strong in the competitive market while advancing efforts on saving their existing subscribers. The study aims to assess subscribers' opinion towards MNP implementation and know their plans with respect to changing their current service providers. The study would be helpful to service providers as they can revise their present marketing strategy in benefit of subscribers. This study classifies the subscribers who are most likely to switch the service provider. The study focuses on finding the most favored service provider or network operator in the country and subscribers' expectation from them.

## 2 LITERATURE REVIEW

### 2.1 Implementation of MNP

Okom et al. (2018) defined MNP as a network service that allows user to switch the service provider while retaining the existing number. Users are facilitated to use the same SIM connection even while switching the operator that too without extra charges. Kishore et al. (2015) referred MNP as a roaming free scheme. The complete system for MNP is centered on the centralized database that is connected to the Gateway Mobile Switching Centre (GMSC). The centralized databases are referred as Number Portability Data Base (NPDB) (Chitrapu et al., 2019).

Bala et al. (2015) summarized that ACQ is the most efficient scheme as the scheme has the optimal uses of switching and network associated resources. The ACQ scheme queries the centralized NPDB and the retrieval of the routing information is quick as the centralized NPDB contains information on the ported number from multiple networks.

Kishore et al. (2015) has simplified the idea on call routing in MNP's scenario by clarifying the process of routing when a call is made from one number to another number. Theoretical Framework: TAM model

Several theoretical frameworks have been proposed to relate the impact of technological innovation in the extent of market and the consumer adoption of that innovation. The adoption of the innovation in context of information system has become a significant issue in formation and management. The technology acceptance model (TAM) is a broad model proposed by number of scholars to measure consumer behavior with respect to information technology industry. However, TAM model holds inadequate explanation on technology adoption for specific research contexts (LENG, Phirak., 2016). Nyoro et al. (2020) stated that TAM is mainly used to identify how the external factors like training and distinctiveness relates with the internal factors like intention and attitude.

TAM has been used in information system areas to examine the behavior of user with respect to several information technologies like computer application, internet, and so on. TAM model was used to examine the preference for MNP among consumers and understand the willingness of consumer to pay for the MNP in Cambodia (LENG, Phirak., 2016). Similarly, the same model was used for empirical study on the attitude of sampled subscribers in Ghana towards the MNP implementation (Daniel et al., 2014). Here, MNP has been considered as a unique innovation with the objective of number porting while switching the carriers.

Table 1: Definition of TAM variables

Construct	Construct Definition
Behavioral Intention	Individual's intent to carry out activities
Attitude	Positive or negative assessment of an activity by an individual
Perceived Usefulness (PU)	Beliefs that using a specific system would improve an individual task execution
Perceived Ease of Use (PEU)	Belief that a system usage would be free of effort

With respect to the TAM, users' attitude towards acknowledging any technology is a major factor of technology adoption and it is affected by two major factors: PU and PEU (Davis, 1989).

In the context of MNP, PU indicates the subscribers' perception on the costs and functionalities from the MNP in comparison to the switching costs without MNP. Here, PU of using the MNP basically focuses on the affordable cost, while comparing with the total cost of purchasing new mobile number. Likewise, waiting time or the implementation process can also affect the subscribers' adoption as MNP is implemented by the service providers. Hence, for this study, three basic factors can be identified based on the Technology Acceptance Model. The factors are

- porting cost of PU
- porting time
- porting process of PEU

## 2.2 Global Observation of MNP Implementation

MNP service was primarily offered by Singapore in 1997 which was followed by Hong Kong, UK, and Netherlands in 1999 (Dhaval Motwani, 2016). Among the most successful MNP implementation globally, MNP's implementation in Hong Kong, Australia and South Korea is the most hyped one as the porting rate was over 6% in these countries. Malaysia and Singapore have the largest telecommunication market in Southeast Asia (Sato, T., 2016). Based on ERICSSON mobility report, it has been identified that Myanmar, Indonesia, Vietnam, and Philippines are countries with possibility of better penetration rate of MNP in future. In the year 2008, Malaysia successfully implemented MNP after planning for four long years. Similarly, India introduced MNP in the Indian telecommunication market in January 2011. Most of the South Asian countries have not planned or yet implemented the MNP service (Sato, T., 2016).

## 2.3 Switching behavior of subscribers

Whereas, Soomro et al. (2020) evaluated that the switching cost is not the stand-alone factor affecting the subscribers' switching behavior. If the subscribers are already dissatisfied with the service provided by the current operator, they intend to switch their operator. Low quality of service, high tariff are the factors that impact the subscribers switching behavior. Similarly, Patro, C.S. (2020) in his study over Indian mobile users identified that the trustworthiness, service payout, monetary value and operators' responsiveness have strong influence on switching behavior of customers.

Daniel, Alfred, and Solomon (2014), in their study, examined the impact of MNP implementation on subscribers in Ghana. As per the result, there is adverse correlation between the income of subscribers and their willingness to switch. The study identified that the subscriber's willingness to switch the network operator drop off with the increment in their income.

## 2.4 Success & failure of MNP

Sato, T (2016) studied success and failure dynamics of MNP's implementation in his study "A Study on Analysis of User's Response for Mobile Number Portability in Myanmar Using Game Theory." In the study, Sato, T (2016) identified that "Higher porting rates defines that the service is useful for subscribers and the service is in high demand". Furthermore, success considerations and failure causes were discussed in the study which have been contrasted here.

Table 2: Consideration and threats for implementation of MNP

Considerations	Threats
Good speed of porting time	Lag of porting time
Low cost on call or data service	High cost on call or data service
Good promotion and customer service	Zero promotion
User awareness	Poor customer service
Addition of fresh operators in the market	Costly porting process

In 2019, Pham Hai son et al. evaluated MNP's impact based on weaknesses present in the telecommunication systems of the developing nations. They recommended that "the regulatory

monitoring of these vulnerabilities within the system for the successful implementation of MNP". Aguilar et al. (2020) in his study concluded that the regulatory focus on promoting healthy competition in the market has impact on the market share's persistence. Gupta et al. (2020) analyzed that the social development and economic growth gets impacted by the mobile telephony's services through his paper entitled "What drives Indian mobile service market: Policies or users?" The study concluded that the MNP is liable to add up values to MVNOs model.

### 3 RESEARCH DESIGN AND METHODOLOGY

#### 3.1 Introduction

Problem statement and the research objectives derive the Research Design where data collection can either be qualitative or quantitative. Creswell & Guetterman (2011) stated that the researchers shall assume narrow plus specific doubts to collect quantifiable variables in the quantitative research. The quantitative design contains minimum two variables specifically, dependent, and independent variable. Quantitative research assist in quantifying a problem which are the variables and to find out the relation between those variables, mainly independent and dependent variables is the significant purpose of this type of research. Whereas in qualitative research, pictorial, literal and objectified format of data is collected, and the variables are unknown (Neuman, 2009).

For this survey, quantitative research method has been performed to investigate the variable affecting implementation success rate for MNP in Nepal due to below listed reasons:

- Availability of both dependent and independent variables in this research.
- This research is more focused in addressing the research question based on the relationship between the variables.
- Survey, observations, and variable-correlations are the major objectives of this research

#### 3.2 Research Approach

Primary data is original work of research study as there's only official opinion and with no interpretation (Malhotra, Baalbaki & Nasr, 2013). Primary data are always the most dependable as that data are raw and not manipulated by any of the second party.

##### 3.2.1 Primary Data Source

Primary data is original work of research study as there's only official opinion and with no interpretation (Malhotra, Baalbaki & Nasr, 2013). Primary data are always the most dependable as that data are raw and not manipulated by any of the second party.

Primary data for the study has been collected from Kathmandu based IT authorities from the Nepal telecom industries. Out of various methods for primary data collection, self-administered questionnaire survey has been preferred for this study to normalize the survey questions and the responses. The respondents are provided with the standard set of objective-response- questions. Questionnaire had 34 close-ended questions and further four queries to cover the respondents' demographic information. Questionnaire was shared in both online and offline mode using google forms and print outs of the questionnaire.

Table 3: Survey vs Response

<i>Mode</i>	<i>Number of Surveys Sent</i>	<i>Number of Respondents</i>	<i>Response Rate</i>
Online	250	209	83.6
Offline	120	98	81.7
<b>Total</b>	<b>370</b>	<b>307</b>	<b>83</b>

Likert scale or categorical scale has been used in the questionnaire for respondents' ease on answering the questions based on their general understanding and experience. For most of the outstanding questions, 4 Point Likert Scale has been used with the motive of collecting the specific responses from the respondent. Private interview with some of the respondents has been carried out while they were responding to the questionnaire. Consultations session with the telecom

operators has been done to collect their standpoint on the implementation of MNP and its after effect on Nepal Telecommunication market.

### **3.2.2 Secondary Data**

Those data which are not collected for the direct study are called as secondary data as they are collected by other researchers for their work (Hair, Bush & Ortinau, 2006). Secondary data for the study has been collected through related articles and journals published on the internet. The major object of referring secondary data is to cut down both the cost and the time. For this study, secondary data has helped to understand the problem specification and supported in finding the suitable approach in exploring the defined problem statement.

### **3.3 Sample Design**

The target population is an entity pursued by the researchers to collect the data (Malhotra, Baalbaki & Nasr, 2013). The target population for the research are the IT authorities of telecom industries and the mobile number subscribers residing in the Kathmandu valley.

Sampling frame means to depict the target population out of larger population (Malhotra, Baalbaki & Nasr, 2013). Kathmandu is the sampling location for this study.

### **3.4 Research Instrument**

For this study, Google Form, MS Excel, and SPSS are the tools that have been used to collect, analyze, and represent the data. SPSS has been used to interpret the data. SPSS comprises several statistical tools like regression and correlations for representation of data. Frequency is used for quantifying the responses from the survey.

### **3.5 Limitation of the Study**

Here are the key limitations of this study.

- The study more relies on the primary data, so accuracy of the conclusion directly depends on the respondent's accuracy level for their answers.
- The study is bounded to specific region as all respondents were from the capital city of Nepal.
- The study ignored the non-linear regression hypothesis and only focused on finding out the correlation among the dependent and independent variables.

## **4 DATA ANALYSIS AND FINDINGS OF RESEARCH**

### **4.1 Data Preparation**

Data collected from the online survey with the support of google form was exported to Ms. Excel. Responses from the offline survey and interview sessions were further added to the excel spreadsheet. We have received total 307 responses from the online and offline survey.

To improve the responses, the collected data have been cleaned where missing values have been handled through imputation method. For numeric data, the mean/median of the available data was calculated to replace the missing values in that column. For categorical data, the missing values were replaced with the most frequent values on that column. The excel report was then imported to SPSS for data interpretation.

#### **4.1.1 Frequency analysis of survey**

To capture the stakeholder's views on the status of telecom services in Nepal, total 12 questions were included in the questionnaire.

##### Q1. Which Mobile connection do you have?

Out of 307 respondents, 172 of them have connection of NTC, 91 of them have NCELL's connection and 2 of them have SmartCell's connection. 12.4% of total respondents have the connection of both NTC and NCell. Likewise, 1% respondents use both the connection from NTC and SmartCell and 0.3% respondents use both NCell and SmartCell.

**MOBILE\_CONNECTION**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	NCell	91	29.6	29.6	29.6
	NCell, Smart Cell	1	.3	.3	30.0
	NTC	172	56.0	56.0	86.0
	NTC, NCell	38	12.4	12.4	98.4
	NTC, Smart Cell	3	1.0	1.0	99.3
	Smart Cell	2	.7	.7	100.0
	Total	307	100.0	100.0	

Figure 1: Frequency for Mobile Connection

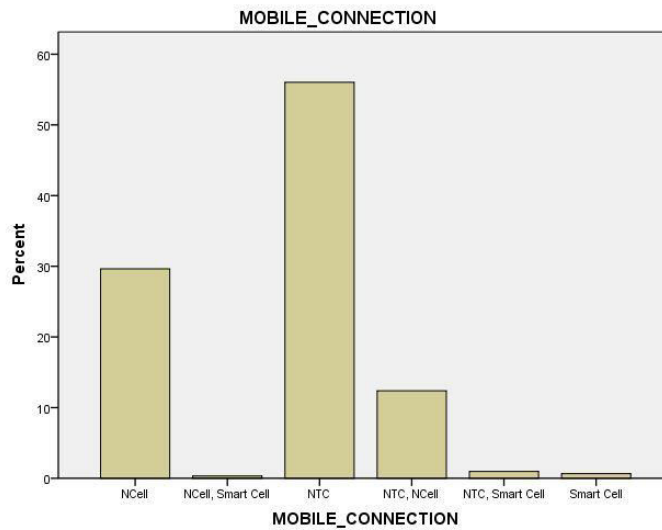


Figure 2: Distribution for Mobile Connection

**Q2. Are you a pre-paid or post-paid subscriber?**

271 out of 307 respondents use prepaid connection, 17 of them use postpaid and 19 of them have both pre-paid and postpaid connection.

**PREPAID\_POSTPAID**

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Both	19	6.2	6.2	6.2
	Postpaid	17	5.5	5.5	11.7
	Prepaid	271	88.3	88.3	100.0
	Total	307	100.0	100.0	

Figure 3: Frequency for Prepaid vs Post-paid

Maximum 88.3% respondents have prepaid connection from either NTC, NCell or SmartCell.

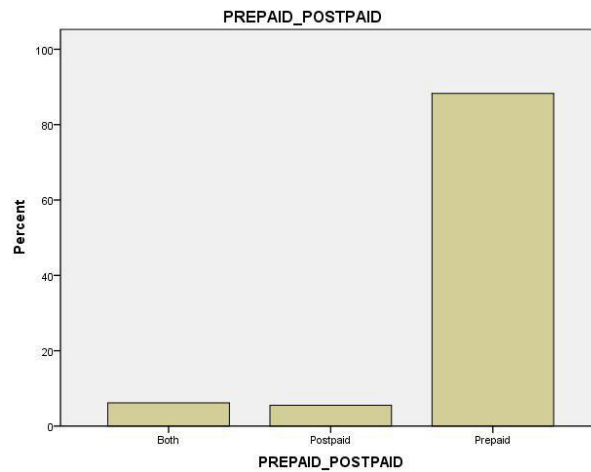


Figure 4: Distribution for Prepaid vs Post-paid

**Q3. Are you happy with your current mobile service operators?**

In this study, 90.2% of respondents are happy with their current service operators and 4.2% are not so happy from their service operators. 5.5% of them are not sure if they are satisfied with the service operators.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	No	13	4.2	4.2	4.2
	Not Sure	17	5.5	5.5	9.8
	Yes	277	90.2	90.2	100.0
Total		307	100.0	100.0	

Figure 5: Frequency for Satisfied Respondent

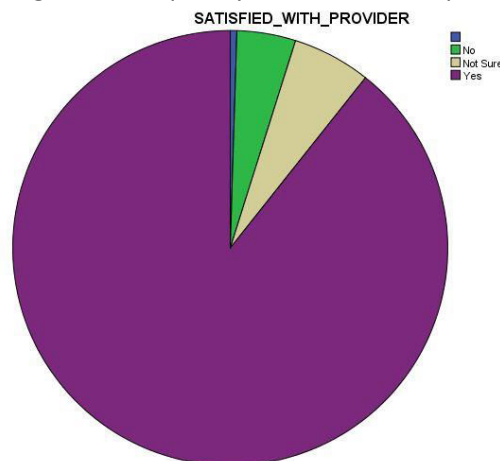


Figure 6: Distribution for Satisfied Respondent

**4.2Results**

Study covers maximum respondents from age group of 23-40 years where the ratio to male & female, and single & married respondents is adjacent. 96.7% of the respondents are employed. Among 307 respondents, maximum of them are positive towards NTA’s approach to implement the MNP in Nepal. As per figure 57, 90% of total respondents believe that the MNP’s implementation in Nepal would be successful.

The study attempted to find the correlation among the variables. As per the result of inferential analysis, it has been identified that there is medium correlation between “Attitude” and “Ease of



Use", "Attitude" and "Usefulness" and "Usefulness" and "Behavioral Intention". Whereas, "Usefulness" and "Behavioral Intention" have low degree of correlation.

While analyzing the prominent factors affecting the implementation of MNP, these independent variables have been identified.

- Technical and Financial Resources
- Quality of Service
- Awareness among subscribers
- Porting Cost and Time
- Process ease

The above independent variables are equated with the dependent variables of the research. Those two dependent variables are:

- Subscribers' willingness to use MNP service
- Critical analysis to NTA's approach for MNP's implementation

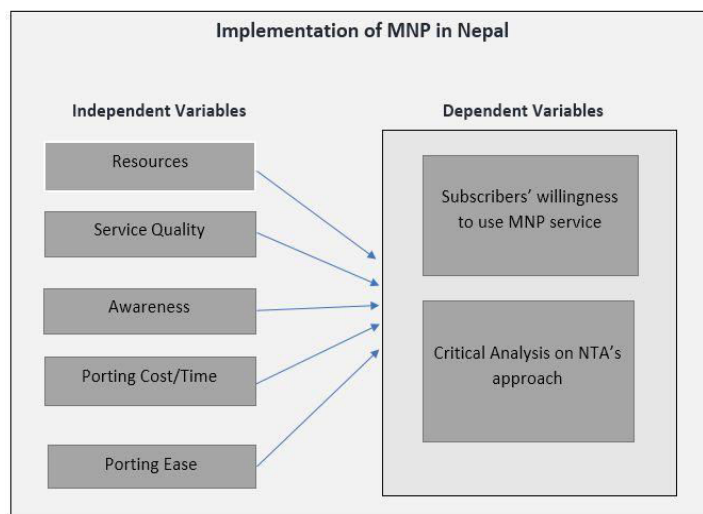


Figure 7: Dependent and Independent variable for MNP's implementation

Below are the results while correlating the independent and dependent variables for this study.

1. 90.2% respondents are happy with their present network operators in terms of cost, customer service, connectivity, and network coverage. However, 82.1% of them wish to change their service provider upon finding attractive deals from another service provider. 88.9% respondents wish to retain their current mobile number while switching the operator.
2. 11.1% respondents do not find the current switching process easy. 99.4% respondents believe that if the MNP process is simple, they are more likely to use the MNP service.
3. 13.7% respondents are using multiple SIM cards due to poor network and high call rates. 96.4% of total respondents agree that they are compelled to stick to the existing service operator due to fear of loss of contact.
4. 84.7% of respondents are familiar with the concept of MNP. 98% respondents believe that subscribers are to be made aware of MNP, its advantages, and how to go about it before practically implementing it.
5. Porting time and cost of porting are the foremost factors affecting MNP's successful implementation. On average 98% respondents believe that the successful implementation of MNP depends on porting cost and time.
6. 76.9% respondents believe Nepal is financially ready to implement the MNP and 76.2% believe that there are enough technical resources in Nepal to implement the MNP.

## 5 CONCLUSION & RECOMMENDATION

### 5.1 Research Findings

To meet the objectives of this study, quantitative research has been completed with below findings:

1. To study the status of telecommunication services in Nepal from stakeholders' perspective

Based on the informative analysis on chapter 4.3.2, 56% of respondents have NTC's connection and 29.6% of them have Ncell as their primary connection. So, we can conclude that the leading stars for Nepal telecom industry are NTC and NCell. Prepaid plan is the most used and preferred one where the subscribers should pay for the plan upfront. 88.3% of respondents have prepaid mode of connection.

Results show that good number of subscribers are satisfied with the customer service, plan tariff, network coverage and connectivity services offered by their service providers. However, the subscribers are also ready to switch their service provider if provided with superior deals. In response to the question related to changing the operator, 82.1% of respondents wished to change their current service provider if the service provider has attractive deals for them. It is crucial for the subscribers to retain their existing mobile numbers while switching the operator. 88.9% of total respondents feel that it is critical to preserve the present mobile number while switching the operator whereas 4.2% of them feel other way.

Just because of the fear of contact loss, subscribers are bound to the existing service providers despite the costly plan and network issues. Out of 307 respondents, 159 of them strongly agree that the fear of contact loss and inconvenienced caused, subscribers are compelled to stick to the existing operator. To surmount the issue while retaining the existing mobile number, most subscribers use multiple SIM cards from two different service providers. Out of 307 respondents, 40 of them have couple of SIM card from different service provider and 7 of them have multiple SIM cards from the same provider. 51.1% of total respondents agree to the statement that "Because of poor network/high call rates, mobile users are using multiple phones/SIMs".

2. To examine the stakeholders' degree of knowledge and appreciation towards the style adopted by NTA for MNP's implementation in Nepal.

Based on the critical analysis on chapter 4.3.3, it can be stated that most of the telecom subscribers in Nepal are aware of the service that permits the customer to change the network operator while preserving the current number. In this study, 84.7% of respondents are familiar to the concept of MNP. 85.7% of total respondents are looking forward to MNP's implementation in Nepal. The subscribers gathered information on MNP through radio, newspaper, TV, and social media. Maximum 88.9% of total respondents believe that it is important to preserve their existing mobile number(s) while changing the service operator whereas only 2.3% respondents do not feel the significance of retaining the existing mobile number(s). Subscribers are ready to explore the deals from the different network operator while maintaining their present mobile number if the procedure to active MNP in their mobile phone is easy and not so complicated. Also, if the cost to activate MNP is high, most of the subscribers would not wish to use it and they would rather prefer to use multiple SIM cards from different providers.

194 out of 307 respondents believe that the porting time is one of the major factors that make the MNP successful. In this study, 59.9% of respondents agree and 37.1% of them strongly agree that the cost of porting the number affects the success rate of MNP's implementation. Maximum 60.6% respondents believe that the successful implementation of MNP primarily depends on the process ease. With the above statistics, it can be derived that the successful implementation of MNP depends on the simplicity of the process and the applied charges.

Nepal is still a developing country but the telecommunication industry in Nepal is growing rapidly in terms of resource and business. 76.2% of total respondents believe that Nepal has enough technical resources to implement the MNP and 76.9% of total respondents believe that Nepal is financially ready to implement MNP. Nepal is now financially ready to implement MNP and there are capable technical resources for deploying the project. To complete the project successfully, there must be a mutual agreement between the top

service providers. 52.8% of respondents agreed and 42.7% of them strongly agreed to this statement. Furthermore, 169 out of 307 respondents believe that it is important to share awareness among subscribers regarding MNP's implementation. Hence, it can be concluded that it is critical to notify subscribers regarding MNP's implementation, its procedure, and advantages before executing it.

3. To explore the after-effects of implementation of MNP technology with respect to the switching time and cost.

Based on the impact analysis on chapter 4.3.4, there are numerous after-effects once MNP gets implemented in the country. Some outstanding positive after-effects are listed below:

- There would be strong competition among service providers which would be advantageous to subscribers.
- Monopoly from the telecom industry would be removed.
- The call rates would be down.
- The service operators would have better control over the quality of routing.
- The quality of network services would be improved.
- There would be effective use of existing mobile numbers.

MNP's implementation in Nepal poses many financial and technical challenges. Outstanding challenges have been listed below:

- Market expenses for mobile operators would be high.
- With the high market expenses, operators ought to face low profit.
- Service operators need to do additional work on maintaining and upgrading their operation.
- Service operators would be responsible to pay fixed cost for routing and call forwarding.

## 5.2 Conclusion

The study draws a conclusion that implementation of MNP would allow subscribers to select the appropriate service providers for their required plans. MNP's implementation would force the service providers to be competitive and they tend to attract maximum subscribers. The rivalry between the service providers will lower the rate, improve the quality of service. From subscribers' perspective, MNP shall reduce the porting cost and time. Whereas, from service providers' perspective, much of network maintenance work needs to be done for successful implementation. The porting cost, time, process ease, technical and financial resources, quality of service and awareness among subscribers are the main factor for the successful implementation of MNP in Nepal. Subscribers' preference towards MNP in Nepal matches with that of other developing countries. For other developing countries as well, the porting cost and porting time are the major factors for subscribers' acceptance for MNP.

The study findings depict that currently the subscribers are restricted to mobile carriers despite the satisfaction because of fear of losing the existing mobile number. As per the survey, if the cost to activate MNP is high, most of the subscribers would rather prefer to use multiple SIM cards from different providers instead of using MNP. For the implementation to be successful in Nepal, key players of telecom industries must have mutual understanding and they must follow the standard regulations. It is important to notify and assist the service providers on upcoming technical and financial challenges. Furthermore, subscribers also need to be aware of MNP's implementation, its procedure, and advantages just before introducing the innovation to the Nepal telecom industry.

## 5.3 Research Gap

This is an empirical study with an objective to evaluate stakeholders' views towards NTA's approach on MNP's implementation in Nepal. MNP is a technological innovation in Nepal and this brings some restrictions to this study. Budget and time constraint are one of the major limits for this study. Due to mentioned constraints, the sample size was bounded to the capital city only. Study on a larger sample size is required as the implementation of MNP would have nationwide impact. Furthermore, the study has been performed while Nepal is at a pre-adoption stage for MNP. There must be more of impact analysis on the subject once MNP practically jumps into the market.

## 5.4 Future Recommendations

This study embraces few significant suggestions for the successful implementation of MNP in Nepal.

- Subscribers in Nepal are willing to spend less time and bare less cost and follow easy process to activate the MNP service. So, NTA along with the service providers must focus to deploy the service with an acceptable porting charge, agreeable porting time, and basic porting process.
- There is a high possibility of foul play from the service providers after MNP's implementation. Each network operator or service provider desires to stay robust in the completive market and they can go to unacceptable extent for their business growth. To control this, NTA must impose standard regulations for the service providers.
- The best approach for MNP's implementation is to adopt the consolidated system to retain a common number porting database. NTA should take ownership on maintaining the centralized database.
- As most of the subscribers are ready to use number portability, All Call Query (ACQ) routing method is most suitable long-term solution for porting in Nepal.

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