MOBILE NUMBER PORTABILITY IMPLEMENTATION – a critical analysis

AN INDEPENDENT PROJECT REPORT

Submitted to

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PGP 2007-09
Executive summary

India is in the final stages of implementation of Mobile Number Portability. This report attempts to analyze the decisions taken by the Department of Telecommunication (DoT) and try and see the implication of these decisions for all the stakeholders involved.

Mobile number portability gives users the ability to change his service provider without changing his number. This encourages the customer to switch, increases competition in the market, and the customer enjoys better quality of service and better tariffs while at the same time operators are burdened with extra costs of implementing MNP, higher churn rates and serious efforts to retain their high revenue generating customers.

The report draws on the extensive information gathered from the interviews conducted with TRAI and service operators to get a proper understanding of their viewpoint. Surveys were also conducted to understand the latent need for MNP in the Indian market and the intrinsic value that customers attach to their numbers.

Cost components – direct and indirect have been analyzed and cost recovery mechanisms available to the third party clearinghouses have been discussed in detail. Role of regulation in grooming this service and the mobile industry post MNP also have been addressed and the three factors most important for the success of MNP implementation seem to be speed of porting, porting fees and tariff transparency. Issues like predatory pricing and cartelization also needs to be addressed.

Considering all the technical and administrative decisions taken, there is a distinct long term vision with some sound assumptions about the future growth of the Indian mobile industry and investments made from the operator’s side.

All said, the implementation of MNP has been done with a lot of foresight and long term view for the mobile market although it would have been heartening to see some progress being made to facilitate number portability in the fixed networks also.
Objective
The project entails analyzing the implementation of Mobile number portability being carried out by Department of Telecommunication and they are being aided by TRAI. The broad areas to be covered include:

- Analysis of DoT’s and TRAI’s suggestions for the implementation of MNP including the technical and administrative decisions.
- Looking at MNP from other stakeholders perspective: customers and operators

Scope & Research Questions
The scope of the project is to analyze the challenges involved with the implementation of MNP and trying to reason whether this is the appropriate time to implement MNP in the country or not. Taking the learning from similar implementations in other countries, an attempt has been made to draw parallels with the Indian context. Also try to analyze whether the decisions recommended by TRAI and implemented by DoT are the best given the constraints and if not what is the better alternative and how it can implemented.

Methodology/Analytical Framework
The project would entail lot of primary and secondary research to be done for information that might be available in the public domain and also for interactions with policy makers to get a first hand view of the implementation of MNP. Drawing parallels from the international experience of other countries that have already implemented MNP and trying to take a look at the positives gained and also learn from the mistakes made in their implementation and learn from them. Also surveys need to be conducted to get a first hand view of the customers and their latent needs.
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1. Introduction

Number portability enables a subscriber to switch between services, locations, or operators while retaining the original telephone number, without compromising on quality, reliability, and operational convenience. There are three basic types of number portability: operator, location, and service portability.

**Operator portability:**

This is the ability of a subscriber to retain within the same service area, an existing telephone number even if they change from one service provider/operator to another. This type of portability is for the same service, i.e. fixed to fixed, or mobile-to-mobile.

Different types of operator portability are defined as:
- Fixed number portability: portability of fixed geographic numbers
- Mobile number portability: portability of mobile telephone numbers
- Intelligent number portability: portability of non-geographic intelligent number

**Location portability:**

Location portability is the ability of a subscriber to retain an existing telephone number when changing from one physical location to another. Location portability is the porting of a geographic number from one location to another. Location portability can be within exchange area, within numbering area, within charging area, or anywhere.

**Service portability:**

Service Portability is the ability of a subscriber to retain the existing telephone number when changing from one service to another service, say from fixed to mobile services.

Till date operator portability has been implemented internationally and this is going to be implemented in India as well.

Number portability can also be split into fixed number portability (FNP) and Mobile number portability (MNP). Fixed number portability allows users to switch their landline service provider without having to surrender their number while MNP provides the same
service to the mobile counterparts. India is implementing only mobile number portability initially.

2. Indian telecom sector

Indian telecom sector has come a long way in achieving its dream of providing affordable and effective communication facilities to its citizens as envisaged in NTP 99. As a result, common man today has access to the most needed facility. Larger efforts are continuously being made to provide universal service to all uncovered areas including rural areas.

The reform measures coupled with the proactive policies of the DoT have resulted in an unprecedented growth of the telecom sector. Today, the Indian telecommunication network with over 270 million connections is the third largest in the world and the second largest among the emerging economies of Asia. India of late has emerged as an important player in the telecom industry worldwide and it is the endeavor of the Indian government to facilitate further growth of this vital industry as it is not just the growth of the sector but it has a ‘multiplier effect’ on the entire economy.

During the past few years the sector witnessed high growth rates. Since 2004, the number of telephones grew at a rate of 40%. The sector continued to register significant growth during 2007-08. The current addition of about 8 million lines per month puts the telecommunication sector on a strong footing to achieve the target of 500 million connections by 2010.
Network expansion has been one of the major objectives for the DoT and they have been working successfully towards that goal. The total number of telephones reached 272.87 million on December 31st, 2007 as compared to 190 million a year ago. The teledensity has shown a sustained increase in the last few years as shown in the following graph. It has increased from 16.83% in 2006 to 23.89% in 2007. Though these numbers are low when compared with those of the developed economies, the rate of growth in the last few years and the projected growth rates in this sector suggests that we could reach the international standards sooner rather than later.

![Teledensity Graph](image)

*Note. Wireless phones were not included in rural phones before March 2007*

### 2.1 Structural composition of the telecom sector

Landline vs. Wireless

The structure and composition of the telecom growth in the country has undergone major change in terms of the ratio of landline to wireless connections and public private partnerships. The growth of wireless in the last few years has been phenomenal, with subscribers growing at a compound annual growth rate of 8.7% per annum since 2003.

Today the wireless subscribers outnumber the number of landline subscribers. Moreover, they are also increasing at a faster pace. The number of landline and wireless connections...
in 2002 were 382.91 lacs and 66.77 lacs in 2002 and in 2007 it had increased to 407.1 lacs in landline and 1650.9 lacs in wireless.

Liberalization efforts of the government are one of the main reasons for the explosive growth in this sector. It is evident from the growing share of private sector in the telecom industry where the private share has increased up to 73% in December 2007 from a meager 21% in 2003. The private sector growth rate has been considerably higher than that of the public sector counterparts. The private sector experienced a growth rate of 66% in 2007 against a public sector growth of 16.88%. Though some of this can be attributed to the base effect in case of public sector, these growth rates indicates the drive of the private players to ramp up and compete against the public incumbents (BSNL) and this can only be good news for the end customers and the associated industries.

2.2 Telecom tariff
As a result of the growing competition in the sector, the telecom tariffs, which were among the highest in the world four years ago have now dipped to being among the
lowest in the world. In 2007 TRAI further reduced the tariff rates in the range of 22% to 56%. Most of the mobile operators have introduced tariff plans under the name and style of ‘One India’ wherein STD tariff is offered at Re 1 per minute which is a far cry from the Rs 16 per minute that was being charged in 1999. It is important to note that in spite of the low tariffs the telecom sector in the country has shown positive financial results. The gross revenues for the sector have grown at a CAGR of 21% and currently stand at 26 billion USD. Just to put things into perspective, this is almost 3% of our GDP.

2.3 Accessibility of telephones in rural and remote areas

Promotion of telephony and accessibility to telephones in remote areas is an important objective for the DoT. It has been repeatedly noted that an expansive telecom network allows people in rural and remote areas to participate in the economic activities of the country and thereby increases their productivity.

As of December 2007, there are 673 lac phones in rural areas with a teledensity of 8.35% and the strategy for network expansion in rural areas involves provision of phones in the viable areas, market mechanisms and through Universal service obligation fund (USOF) in the non viable areas.

Having realized the potential role of wireless phones in the rural areas because of its convenience, affordability and the capacity to reach out to the masses, effort has been made under the USOF to strengthen the infrastructure for providing wireless phone services in these areas. It is envisaged to provide support for setting up and managing 7871 number of infrastructure sites spread over 500 districts in over 27 states for the provision of these services to hitherto no coverage areas. Wireless services through these shared towers were targeted to be made operation in a phased manner from May 2008 onwards.

Wireless phones have transformed urban economy and it is expected that these would be behind the growth story of the rural areas also. The Eleventh plan targets achieving rural teledensity of 25% by means of 200 million rural connections.

2.4 Regulatory framework
TRAI has always encouraged greater competition in the telecom sector with better quality and affordable prices in order to meet the objectives of the NTP 99. A number of policy decisions have been taken to transform the telecom sector including the broadcasting and cable services to extend the scope, availability and reach of these services in India. There have also been introduction of regulations like Telecom Consumers protection and redressal of grievances, 2007 which has allowed TRAI to keep the industry in check. There have also been initiatives to improve the billing system and towards capacity building in the service provider side. These measures would ensure orderly growth of the sector by promoting healthy competition and enhancing investment efficiency besides protecting interests of consumers.

2.5 Vision for the future
While celebrating the success of the telecom sector, the government needs to recognize the fact that there is no room for complacency. Telecom development in rural areas, particularly assumes special significance as more than 70% of the population lives in villages. The government also needs to start working towards releasing additional spectrum from government use for the commercial telecom operators so that the growth of the sector is not constrained by this vital resource. Most importantly the government needs to recognize that going forward, readiness to change according to changing technologies and make structural changes in the sector to keep up with the trends in other countries is essential to ensure that we can sustain the rapid growth and cost effectiveness of these services needed for the growth of a modernizing economy.

3. Why MNP?
The arguments given in favor of implementing MNP is:

- Removes barriers to switching networks for customers, thereby increasing customer choice
- More choice would translate into greater competition among operators to retain and attract more customers, leading to better quality of service and reduced tariffs
• MNP also allows effective utilization of numbering resources, as one customer is bound to stick to his mobile number for a much longer time, even if he is switching service providers.

Taking a deeper look into the effect that MNP implementation would have on the following parameters puts things into better perspective. We can classify these effects into static and dynamic

3.1 Static Effects

- **Retail Prices:** Without MNP, a service provider can charge a customer more than the competitor as long as the combined cost is less than the cost of being serviced by the other service provider and the switching costs involved. With MNP, switching costs are brought down, encouraging competition

- **Price Elasticity:** In the presence of switching costs, the new service provider has to undercut deeply in order to gain market share. In the Indian context, with the imminent introduction of 3G and new players entering the market, MNP would be helpful in stabilizing the market during the initial phases

- **Termination Charges:** Since customers will not be able to map a number to a particular network, the termination charges are bound to increase (because most of the customers are bothered only about the average prices)

- **Market Shares:** Introduction of MNP would reduce the asymmetry between the market shares of the incumbent vis-à-vis a new entrant. The loss of the incumbent is greater than the extra profits given to the new entrant. Therefore there will be a reduction in the aggregate profits in the industry on the whole

3.2 Dynamic Effects
Entry: With switching costs, entrants have to price aggressively to steal business from the incumbent. Introducing MNP will alleviate the need to price aggressively, thereby facilitating entry. However, there may be countervailing effects. For instance, if incumbent mobile operators have a large captured customer base thanks to switching costs, they are less likely to fight entry by aggressively cutting prices due to the so-called “fat-cat” effect in the absence of MNP. In contrast, MNP makes incumbents also more aggressive so that market entry may become less attractive for new operators. The net effect of introducing MNP on entry is thus ambiguous.

Investment: Introducing MNP is likely to affect the investment incentives of both incumbents and potential competitors. Standard arguments suggest that introducing MNP will reduce the incumbents’ incentive to make cost reducing investments, as the cost-reduction applies to a reduced customer base. Conversely, the competitors’ incentives to make cost-reducing investment should be expected to increase, with ambiguous net effect. The aggregate effects on demand-enhancing investment, such as infrastructure quality or product innovation, are even less clear. The handset prices would increase because the value of a captured customer goes down while the price for mobile services would come down as the competition intensifies.

4. Effectiveness of Implementation

During the initial phase of the discussion, the operators disagreed mainly on two points:

1. Implementation of MNP prior to FNP
2. Timing for the implementation of number portability

The arguments given in favor the first reason were:

- Looking at implementation of number portability in other countries, everywhere FNP was implemented prior to MNP
- Compared to Fixed service sector, level of competition in the mobile service sector is pretty high already. Number portability in the fixed service sector would
do well, because even after 10 years of privatization almost 90% of the market share is still with the incumbents (BSNL and MTNL).

The DoT and TRAI refuted these arguments using the following points:

- Most of the countries implemented FNP ahead of MNP, because at that time in those countries mobile services was still in the nascent stage. However in India mobile network is growing exponentially whereas fixed network growth is marginal.
- Incumbents in the fixed service line have legacy networks with technical/feasibility limitations for accommodating FNP. Huge investment costs would be required as compared to mobile networks having start-of-art technologies. Therefore MNP would be easier to implement than FNP
- Non availability of directory and directory enquiry service for mobile numbers.
- The existing numbering for fixed phones in India is SDCA\(^1\) based. Therefore if FNP is implemented it will be limited to SDCA level only until numbering scheme is modified
- Apart from the incumbent, other players are not present in all SDCA’s in a circle, hence customers in such SDCA’s would not have an option to switch even after the implementation of the service

Interaction with personnel on both sides of the argument, the personal view of the author is that there is logic on both sides of the argument. The operators feel hard done by, especially because FNP implementation has been scrapped/ delayed for later. The TRAI/DoT could have explored more cost effective implementations for FNP which include localized databases within SDCA’s instead of ALL-CALL-QUERY as is the case for MNP.

A timeline detailing the events that need to happen before FNP would make economic logic would also have been appreciated by the service providers.

If we take a look at the fixed service line industry, most of the customers are reluctant to switch service providers because propagating a change in the residential landline number

\(^1\) Short Distance Charging Area
is virtually unthinkable, because for most people this number is used for official communication and has remained the same over the years. FNP would have eliminated this entry barrier for the private players and allowed them to compete more efficiently against the incumbents. They could also enter new markets which were earlier unviable or saturated because customer acquisition becomes a lot easier.

The second disagreement was on timing for the implementation of number portability. The arguments given for this were:
- In most of the countries, MNP was implemented when the tele-density was at least over 30%. In India, tele-density is around 20%. (dec 2007 data)
- Most of the mobile operators are at present involved in rolling out their networks in semi-urban/rural areas and hence it is not right time to introduce MNP as they will incur huge expenditure on upgradation of their network for MNP purposes.
- There is enough competition in all the license areas and hence the introduction of MNP will not yield major benefits to the customer
- Customers switching technologies, e.g. from CDMA to GSM would have to bear an extra cost of buying a new handset, which may limit the choice of customers

Again the TRAI gives counterarguments for these, which are:
- Tele-density would reach the international levels of 30% by the time of implementation of MNP, because implementation takes 12-18 months
- Additional upgradation costs for implementation of MNP in such a scenario will be marginal because most of the service providers are already in the process of upgrading their services to provide 3G services. Moreover, if number portability is not implemented now then as the customer base increases the cost of implementation would also increase exponentially
- Most of the service providers are providing similar services and low tariffs; the customers in effect do not have an option to switch. Introduction of MNP would force service providers to improve quality of service and more cost benefit tariffs to consumers
Cost of buying new handsets would be minimal with more and more cost effective handsets being produced and sold in the market. Moreover dual technology handsets are also expected to be launched soon.

Tele-density argument given by the TRAI seems to be well based and as of today the tele-density in the country is in the mid 20’s. However the point of incremental cost seems a bit biased. The service providers would incur an incremental up-front cost to implement MNP. However there are going to be many more costs to improve QoS and retain existing customers. These expenditures would be top priority to the service providers because they risk losing the top revenue generating customers. Hence, logically the expansion plans into semi-urban and rural areas might get affected.

Another issue brought up during initial discussions was the area of operation of MNP. It was decided by the TRAI that MNP would be limited to operator portability within a circle. The rationale behind this was that internal migration patterns within India suggested that 80% of migration happened intra-state and providing a pan-India service for the benefit of the other 20% would have increased costs prohibitively. Pan India portability would also require modifications in the numbering plan for mobile users as well.

4.1 Implementation Issues

4.1.1 Technical solutions

Technical solutions adopted would influence the success of the implementation of MNP largely. Deciding between technical solutions would require taking into account all aspects of the network including operational support system modifications, call charging arrangements, routing arrangements in the numbering plan, interconnection between networks etc.

There were 4 options available: Direct routing or ALL-CALL-QUERY, Query on Release, onward routing, Call drop back.
The advantages and shortcomings of these are summarized in the table below:

<table>
<thead>
<tr>
<th>Method</th>
<th>Pros</th>
<th>Cons</th>
<th>International Implementations</th>
</tr>
</thead>
</table>
| Direct Routing or All Call Query | • Does not involve the donor network and therefore the most efficient from a call routing perspective  
• This being direct routing, gives ability to access services such as MMS, data calls after porting  
• Centralized number portability database (containing ported number information for multiple networks) is used for call routing  
• Does not place a call routing burden on the donor network  
• Operational cost is less  
• Long term solution | • Requires a number portability implementation that supports a centralized number portability database  
• Setup cost is comparatively high | USA, Belgium, Denmark, Finland, Italy, Germany, Malta |
| Query on Release              | • Centralized number portability database is used for call routing  
• Operational cost is medium  
• Long term solution | • Requires a number portability implementation that supports a centralized number portability database  
• Somewhat inefficient in using network facilities since a call segment must be setup from the originating network to the donor network  
• Places a call routing burden on the donor network  
• Setup cost is high | Hungary, Portugal |
| Onward Routing                | • Simple number portability implementation since no centralized number portability database needs to be maintained  
• The donor network can implement one or many number portability databases to suit its network setup  
• Setup cost is lower | • Least efficient in using network facilities since it requires the setup of two physical call segments (one from the originating | UK, Singapore, Switzerland, Spain, etc |
<table>
<thead>
<tr>
<th>Call Drop Back</th>
<th>Simple number portability implementation since no centralized number portability database needs to be maintained</th>
<th>Somewhat inefficient in using network facilities since a call segment must be setup from the originating network to the donor network</th>
<th>No country using this approach</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The donor network can implement one or many number portability databases to suit its network setup</td>
<td>Places the call routing burden on the donor network</td>
<td></td>
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</table>

It is clear from the table that ALL-CALL-QUERY is a long term sustainable and the most cost effective solution. Countries like Singapore and UK which had implemented onward routing are now retracting and implementing all call query. One of the major advantages of this method is the fact that there is no dependence on the donor network hence no burden on the donor networks resources.

Whenever multiple operators, lets say N, are involved in forwarding a call to the recipient network, it has been recommended that the (N-1)th operator be responsible for routing the call to the ported number. This would ensure someone is held accountable for the successful completion of the call and prevents the blame game later on.

**Database management**

The implementation of MNP requires setting up of databases from which the mapping can be made as to which number has ported in or out of which network. There were two options available: Centralized or distributed and if distributed the level of distribution.
The centralized model would mean that there is a single reference database containing data for all ported numbers. This data may be copied / updated to local databases on a frequent basis (weekly) whereas a distributed database would mean carrying subsets of information in different locations. This could be managed by each service operator themselves or based on some other mechanism. There would be a lot of data redundancy and there are also scalability issues as the network grows and the subscriber base increases. Hence it was decided that centralized model must be applied in the Indian scenario.

Centralized database is to be managed by a third party company which has experience in database management and would charge the operators for using this service. The revenue model of this is explained in section 6.3 of the report. Other countries that have implemented centralized database include USA, Taiwan, Greece, Pakistan and recently even Singapore is shifting towards a centralized database.

DoT has mentioned that there would be two central clearing houses which would be responsible for the numbers being ported in their jurisdiction of circles. Two clearing house providers concept has been introduced so that their would not be any monopoly in this market going forward and for further implementations, India would not be at the mercy of the one player alone. In case, there is a technical snag/fall out with one of the clearinghouses, the presence of the other one would mean that the downtime would be minimal.

**Phased implementation vs. National implementation**

It has been decided to implement MNP in a phased manner based on the business proposition of each circle such as Metro, A B and C circles. The reasons given are:

- Metros are better positioned in terms of awareness of the new facility and also much more likely to use such facilities than people in other areas
- In metros, all service providers would have better infrastructure such as availability of CCS 7 signaling which is one of the prime requirements for MNP implementation
- Experience gained during the initial implementation phase can be used to ensure smoother and quicker implementation in the subsequent rounds
- National level implementation requires greater level of coordination and higher one-time investment by the service providers
- Phased implementation would guard against any initial phase glitches being propagated to create negative publicity about MNP. It would also ensure that operators would have minimal capital requirements in the initial stages.

4.1.2 Administrative arrangement of porting process

Administrative arrangement is equally important as the technical arrangement. Administrative arrangements include porting time, porting charges etc. International experience indicates that in places like Netherlands and UK it has been considered unsuccessful because of the lack of proper administrative arrangements. Some scenarios that come to mind are poorly designed systems which are very complex or easily abused would take away the benefits that MNP is supposed to deliver.

1. **Porting requests**: Most of the customers deal with retail outlets in establishing their connection for the first time. Therefore the porting request would be best handled by this mechanism itself. Authentication: Authentication could happen via reference to some previous records, previous bills supplied by the person who wants to port his number

2. **Porting Authentication** would be carried out by recipient network, donor network (one stop shopping and two stop shopping respectively)

**Advantages of one stop shopping over two stop shopping**
- Customer needs to interact only with the recipient network (the network he is porting to) and authorize this operator to handle the porting process
- It is easier for the end user who does not have to interact with the donor network who might make life difficult for him because there is no incentive to speed up things
- Operators tend to go out with heavy marketing campaigns to get new customers
- This method is increasingly used in many countries

3. **Time to port** is another fact that is an important administrative arrangement that needs to be covered. This is explained in detail in section 8.2 of the report.
4. **Tariff transparency**: This means that the customer must be aware of what his costs are going to be before he makes the call. The solution envisaged right now is a beep before the call connects to let the customer know that the call is OFF-NET. However with the extensive ring tones and caller tunes available, it would be difficult to clearly hear the beep and understand its significance. A grey area in this segment could lead to many public interest litigations once MNP has been introduced.

4.2 **Parameters to measure effectiveness**

The success of the implementation of MNP would depend on a number of factors including:

- **Porting time**: If the porting time increases, there is a tendency to refrain from porting

- **Porting fees**: Many of India’s mobile subscribers are pre-paid subscribers and constitute almost 75% of the subscribers and are highly price sensitive. High porting fees would stifle the number of portings by a huge amount.

- Since most of the Indian customers are prepaid customers, and the existing overall churn rate is nearly 10%, this shows that the customers are not very attached to their numbers. Therefore there might be only marginal increase in churn rates in this segment

Parameters to measure how successful MNP are going to be fuzzy and highly subjective:

- **Churn rates**: Increased churn rates could be construed as a success factor for the MNP implementation. However in the long term as the services provided by competitors in a particular circle is standardized, every service providers bucket would be equally filled up

- **Increased emphasis on QoS and add-on services**: As the service providers would be very desperate to retain their high revenue customers, there would be a rush towards providing the best add-on services and increasing their quality of service to prevent attrition of these customers.

- **Better price deals**: Better price deals being offered to the customers could also be considered as a measure for the effectiveness of MNP implementation.

5. **Is there a latent need for MNP?**

The survey conducted in this regard has thrown up some very interesting observations and would have some serious issues to contemplate for all the service providers and the regulator.
The survey was administered to people from different age groups, regions (metros, A circle, B circle), income brackets etc. The sample size is 200.

The one thing that stands out is the lack of awareness about the service at this point of time among the public. The awareness is low across regions irrespective of people hailing from the metros, A circle or the B circle. This clearly shows a lack of any concerted marketing efforts done by either the regulator or the service provider. 90% of the people surveyed had no idea that a service called MNP was about to be launched soon. The regulator was of the opinion that the marketing for the service would commence only after the product has been tested and is ready to hit the market. Moreover, TRAI also mentioned that teething out the initial problems without too much of negative publicity would be critical for the success of the implementation. The operators when interviewed were of the opinion that most of the markets were highly competitive pre MNP and this would not bring in any significant churn as such and that the industry churn would average out in the medium/long term.

Given the success enjoyed by Verizon in USA after the implementation of MNP, there is bound to be some service provider looking to ride this wave. It would be interesting how the other companies respond to the threat posed by these competitors and also the new 3G entrants in the market.

Most of the respondents considered that call quality and tariff to be the two most important factors considered when making their decision about the service provider. Many in the semi-urban areas complained about lack of serious competition when it comes to quality of service and signal strength in their areas. All this shows that as we move away from the Metros and A circle cities, there is a dearth of serious competition and would restrict the opportunity to port to majority of the mobile subscribers in the country.

80% of the respondents were ready to pay up to Rs 50 and another 10% were ready to pay Rs 100 if they could take their phone number with them when they switched operators. This considers only the primary cost benefit, the other callers also benefit because they don’t have to update their number databases etc. Therefore the value associated with MNP would be slightly above Rs 50 for most people.
The people in the age group 18-25 were most likely to switch operators based on price offerings provided. While those in the income group above 5 lac per annum wanted to switch to that provider who would provide better connectivity and QoS and add on services. This gives an indication of how the market would be sliced after the introduction of MNP. The high profile customers are very dear to the service operators because of the high ARPU from these customers and there would be a significant effort to improve QoS in order to retain these customers. If there is competition to retain customers, all service providers would want to retain their high revenue generating ones, and therefore there would a flight to quality.

6. Cost of providing the service

6.1 Direct Costs

- **Set-up Costs**: The set-up costs are the non-recurring costs of developing and implementing a particular MNP system. These costs are fixed, that is, they do not depend on the number of actual portings. In general, these fixed costs are relatively high for so-called IN solutions, while they are relatively low for ON Switch solutions.

- **Costs per Actual Porting Process**: These are mainly the costs of carrying out the porting, e.g. advising the customer, communications between the donor and the receiver network, administrative work related to the number switch and so on. These costs are essentially personnel costs, and they depend on the specific administrative and technical procedures put in place.

- **Additional Conveyance Costs**: Comparing the cost of various technical implementations, On switch solutions have low fixed cost and high variable cost components while the IN solutions have a high fixed cost and a lower variable cost component. India has decided to go forward with All call query which is a IN solution and past studies have shown
that this method has been successful only when there are a large number of portings.

![Fig 6.1: Number of portings vs costs involved](image)

### 6.2 Indirect Costs

- **Indirect cost of porting**: This can be mainly attributed to the cost involved with the potential loss of tariff transparency. Once MNP is implemented customers cannot distinguish between numbers by just looking at the first three digits. The loss of transparency can be overcome in many ways (as has already been done in European countries). There is a need to deliberate on the best mechanism to take this forward.

### 6.3 Possible cost allocation mechanisms

Cost components can be split into the following:

![Fig 6.2: Cost components in number portability implementation](image)
Setup costs, administration costs and conveyance costs. These costs can be allocated in different ways among the stakeholders

**Setup and Management costs**
A key cost allocation principle followed in many countries is that each network bears its own system costs, including the costs associated with upgrading network exchanges to support number portability. This method encourages service providers to implement the most cost effective solution of setting up the network and to minimize the costs that they would have to bear.

In India’s context, centralized database is being implemented which would be maintained by a third party. The recovery of the establishment and operating costs could be done either through:
- the third party, charging a fee from the service providers for accessing the database
- Network operators share the cost of implementation of the database and maintaining the database on some allocation basis
- Market share in the region
- Number of ported in numbers to that service providers network

In December 2006, TRAI had estimated that the cost of implementation to be around Rs 940 crores for upgrading the networks which is a significant investment from the service providers point of view.

**Administration cost**
The administrative process of porting a number involves various costs for the recipient network operator, the donor network operator, and potentially for mobile dealers or mobile resellers which may be involved in the porting process, and for the operator of a number database.

The actual cost of a single port of a mobile number in CEPT countries for which information is available ranges from €10 up to €31 (the average cost is €22). Following the principle of
cost-oriented charging, the following scenarios may arise for allocating the per-line administration costs:

a. The donor network may pass on the costs of porting to the recipient network operator. The recipient network operator would have to take a decision on whether to recover the costs from end-users. In practice, as observed in many countries, they tend not to do so to promote their network and facilitate easy porting in for potential customers.

b. The donor network operator charges the user for the costs of a port. It may become necessary to regulate this charge to ensure that an inflated price charged by the donor network does not discourage users from porting to a competitor.

c. The administrative costs of the recipient network and the donor network could pass on to the user requesting a port. These prices may need to be regulated to ensure that subscribers are not overcharged.

As of 2006, the fee charged to users for porting a mobile number among CEPT countries for which information is available ranges from zero up to €43.55 (the average charge is €8.38) as shown in the table below:

<table>
<thead>
<tr>
<th>Country</th>
<th>Original announced costs</th>
<th>Costs in Rupees(2006 rate)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>19 euros</td>
<td>1140</td>
</tr>
<tr>
<td>Belgium</td>
<td>No fee</td>
<td>-</td>
</tr>
<tr>
<td>Croatia</td>
<td>No fee</td>
<td>-</td>
</tr>
<tr>
<td>Cyprus</td>
<td>No fee</td>
<td>-</td>
</tr>
<tr>
<td>Denmark</td>
<td>No fee</td>
<td>-</td>
</tr>
<tr>
<td>Estonia</td>
<td>No fee</td>
<td>-</td>
</tr>
<tr>
<td>Finland</td>
<td>No fee</td>
<td>-</td>
</tr>
<tr>
<td>Hungary</td>
<td>No fee</td>
<td>-</td>
</tr>
<tr>
<td>Ireland</td>
<td>No fee</td>
<td>-</td>
</tr>
<tr>
<td>Italy</td>
<td>10 euros</td>
<td>600</td>
</tr>
<tr>
<td>Lithuania</td>
<td>No fee</td>
<td>-</td>
</tr>
<tr>
<td>Netherlands</td>
<td>9.08 euros</td>
<td>544.8</td>
</tr>
<tr>
<td>Norway</td>
<td>85 NOK</td>
<td>595</td>
</tr>
<tr>
<td>Portugal</td>
<td>40 euros</td>
<td>2400</td>
</tr>
<tr>
<td>Slovenia</td>
<td>10 euros</td>
<td>600</td>
</tr>
<tr>
<td>Switzerland</td>
<td>No fee</td>
<td>-</td>
</tr>
</tbody>
</table>
Conveyance costs
Each operator that is required to incur additional costs in routing calls may charge the operator from whom the call is originating for these additional costs. Such additional charges may be applied to each call individually or averaged over all the calls over a period from the specific operator.

The mechanism followed in different countries has been listed down in the table:

<table>
<thead>
<tr>
<th>Country</th>
<th>Costs borne by the originating network</th>
<th>Costs split between the originating network and network originally associated with the number</th>
<th>Costs borne by the network originally associated with the number</th>
<th>Costs borne by the terminating network</th>
<th>Costs borne by network undertaking additional conveyance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Croatia</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Cyprus</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Estonia</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hungary</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ireland</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Italy</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Lithuania</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Malta</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Portugal</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Slovenia</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Switzerland</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>United Kingdom</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
</tr>
</tbody>
</table>

Table: Approaches to apportioning additional conveyance costs

6.4 Clearinghouse provider costs

The cost elements usually involved at the clearinghouse level is:
- **Hardware**: Initial cost, installation, turn-up testing, maintenance and upgrades for the third party computing platform on which the application will run plus networking equipment such as routers.

- **Software**: Initial cost, installation, turn-up testing, maintenance and upgrades both for the clearinghouse and third party software, including the database for porting record storage

- **Data center**: Recurring cost of hosting, backup power, environmental control and security

- **Operations**: Recurring cost of staffing to support the various functions at the clearinghouse level which includes report generation, service monitoring, system administration and database backup

- **Help desk**: Recurring cost and training to handle all queries regarding the use of the clearinghouse plus problem ticketing and problem resolution. (revoking the number portability etc)

**Clearinghouse provider cost recovery**

The clearinghouses are generally allowed to impose a fee on the operators that use the clearinghouse based on the services provided. The general convention followed in most countries is that the clearinghouse charges fixed or fixed-transaction fees to each connection operator.

**Fixed fee model**

A fixed one-time connection fee is charged by the clearinghouse to every operator who uses their service. It could be a yearly or monthly fee charged to each operator connected to the clearinghouse.

**Fixed-transaction fee hybrid model**

A fixed one time connection fee is charged to each operator connected to the clearinghouse. This could again be a monthly or yearly fee. For all additional services provided by the clearinghouse like customized reports the service provider would have to pay over and above the fixed component.

**Transaction model**
Transaction fees are associated with messages processed for each ported number and/or for a query on the database to obtain routing information when it is required to determine the correct network to which a call must be routed. This is specifically relevant to countries that have implemented a centralized query database.

The fixed and transaction fees must be reasonable enough to encourage number portability and promote competition, yet allow the clearinghouse to recover the costs in a reasonable timeframe and continue providing a quality service.

Determining the appropriate fixed and transaction fees can be a very complex process and this is especially true when there is a high level of uncertainty associated with parameters like the volume of the ported numbers which cannot be controlled by the regulator or by the clearinghouse provider.

<table>
<thead>
<tr>
<th>Country</th>
<th>Fixed only</th>
<th>Fixed – transaction</th>
<th>Transaction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Belgium</td>
<td></td>
<td>X*</td>
<td></td>
</tr>
<tr>
<td>Finland</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Germany</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Greece</td>
<td></td>
<td></td>
<td>X</td>
</tr>
<tr>
<td>Lithuania</td>
<td></td>
<td>X*</td>
<td></td>
</tr>
<tr>
<td>Pakistan</td>
<td>X</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Saudi Arabia</td>
<td></td>
<td>X</td>
<td></td>
</tr>
<tr>
<td>Sweden</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>USA</td>
<td></td>
<td>X</td>
<td></td>
</tr>
</tbody>
</table>

- Transaction fee based on algorithm according to size of subscriber base

Table 6.2: Different cost recovery models in different countries

Figure 6.3: A typical clearinghouse Cost Model
The cost estimated for the implementation of ALL CALL QUERY in India by the TRAI is given in exhibit 1. The estimates have been made taking into account the response of the service providers to the questionnaire posted to them by TRAI on an earlier date.

7 Lessons from US implementation

Process: How FCC Went About It

Congress enacted the Telecommunications Act of 1996 to establish a national framework to promote competition and reduce regulation in all telecommunications markets. Under the Act, Congress directed local telephone companies to offer telephone number portability in accordance with requirements prescribed by the FCC.

In May 1998, the Commission determined what types of costs local telephone companies will be allowed to recover through separate charges for establishing and providing telephone number portability service, and which costs they must treat as part of their overall cost of doing business.

Number portability was first implemented in major metropolitan areas. Number portability was mandated be made available in other areas within six months after a new telephone company requests that the incumbent local telephone company offer number portability in that service area. The type of number portability being offered is service provider portability, which allows a customer to change his or her local telephone company without changing telephone numbers. It does not allow customers to take their telephone numbers with them when they move.

Cellular and other wireless carriers were not required to provide telephone number portability at that time. For this reason, customers could not retain the same local telephone number if they changed their local service from a fixed local telephone company to a wireless carrier, like a cellular or PCS service provider. Likewise, customers could not switch from a cellular or PCS service provider to a local fixed service provider and keep the same cellular or PCS telephone number.
Which Costs can be passed on to the Consumers

The Commission’s solution to promote competition was to allow the states the flexibility to adopt a variety of approaches in cost recovery methods during the interim period. The Commission has articulated general criteria to conform these methods to statutory requirements, the main principle being that the carriers are to share in the access revenue received for a ported call.

In Florida, carriers negotiated appropriate rates for currently available measures of cost recovery as telecommunication companies interconnect with each other to provide service to the public. Louisiana also had a two-tiered approach to pricing which allowed the Public Service Commission to step in and determine an appropriate rate.

On the cost allocation front, the Commission determined that incumbent local telephone companies were allowed, but not required, to recover the costs of implementing and providing telephone number portability through two kinds of charges: (1) charges paid by other telephone companies that use a telephone company’s number portability facilities to process their own calls; and (2) a small, fixed monthly charge assessed on telephone customers (end users). The reason was that all customers benefit from telephone number portability when they call someone who has changed local service providers. At the end of the five-year period, the local telephone company had to stop assessing the charge.

The telephone companies were required to file tariffs, or schedules, establishing the rates they will charge end-users before the charges are placed on end-users’ telephone bill. The FCC reviewed the tariffs to determine whether the charges were reasonable and in accordance with the Commission’s rules and orders.

Technical Criteria for Permanent Number Portability

The Commission came up with the suggestion that "technology-neutral" approach may be the best way to allow competition to develop. The Commission chose the technology-neutral approach keeping the following performance criteria in mind:
The technology-neutral approach supported the existing network standards by using existing technology. That ensured that service providers could compete in the local market no matter what degree of market penetration they may have had at that point of time. Since the technology-neutral approach meets the performance criteria and allows for the full development of number portability, it should promote true competition in the local market.

US implemented ALL CALL QUERY which is similar to the decision made by the DoT in the Indian context. There is also the issue of having two databases, which is somewhat similar to the different databases for all the states in the USA.

**Concerns Raised by Operators and Regulator Response**

Some members of the telecommunications industry claimed that number portability is overrated when it comes to competing for consumers. They believed consumers’ main consideration in switching local access providers is price—not convenience. The Commission took a more objective approach finding that number portability’s competitive importance depended upon the value that the consumers assign to their current telephone numbers.

Some companies were worried that the cost of implementing number portability would affect their ability to compete. US West was quoted as saying that telecommunications providers should not be required to implement more costly local route numbering (LRN) methods unless consumers can perceive the difference and it is enough to justify expenditures of an additional $500 to $700 million to deploy LRN. This expense is just one of the reasons cited...
by several companies which felt that the Commission’s Number Portability Order barred them from using network technology that could reduce costs and improve efficiency. The Cellular Telecommunications Industry Association wanted clarification of the requirements placed on wireless service providers as compared to those placed on fixed line operators, because the number portability order requires wireless carriers to provide number portability in every part of the country while fixed line carriers (i.e., NYNEX, Bell Atlantic) would have to serve rural areas only if requested. The requirements placed on wireless carriers appeared to be broader.

Given the technological complexities surrounding the provision of number portability across any service provider’s network, it was very clear that the service provider would not be able to meet the Commission’s goals within the requested time limits. And that proved to be the case.

**Dispute Resolution Mechanisms**

Over the years federal and state governments have disagreed over whose jurisdiction will govern new technologies that affect both interstate and intrastate telecommunications. To have competition in the local market there has to be an agreement between the federal government and the state commissions about whose rules shall apply. While it might seem obvious that the Commission’s conclusions would apply to the states, the Supreme Court has held that the Commission may not act with impunity in effectuating federal policy (i.e., ensuring competition in the local market). The federal and state commissions should work together to avoid conflict that will delay the local phone service competition that will take place once there is permanent number portability.

**Problems encountered during the initial rollout stages**

- Public was not aware about the number portability service being provided, because of lack of marketing by the service providers. This can be seen from the number of porting requests that came in during the first week the service was introduced. Only 350,000 porting requests came through when independent industry analysts estimated the figure to be in millions.
- The Service providers were more interested in maintaining their current customer base, rather compete against each other for new customers
  - Cost to the subscriber when porting numbers
  - If porting required a change in technology (from GSM to CDMA or vice versa), a change in the handset would be required which is a significant cost that has to be borne by the customer
  - Initial claim of number porting within 3 hours was way off the mark and it ended up being days and in some cases even weeks before a number was successfully ported
  - Interoperability issues and some capacity issues played a major role

- The biggest losers reportedly continue to be Cingular Wireless L.L.C. and to a greater extent AT&T Wireless Services Inc., which is being singled out as the most affected by LNP. AT&T Wireless has received a number of complaints from customers regarding network activation problems on its GSM network following a software glitch that is reportedly bleeding over to its Number Portability processes

  - Analysts estimated AT&T Wireless' software issues alone cost the carrier tens of thousands of net subscriber additions during the usually hectic fourth quarter and subsequently adjusted down their customer growth estimates

- During the first day number portability was announced approximately 350,000 porting requests came in during the first week that could not handle and there has been a constant backlog ever since

- Verizon with its perceived superior network quality saw an increase in customer base and emerged as the early winner after MNP was introduced

  - The number of port outs from Verizon’s network were the least showing that levels of latent dissatisfaction among Verizon’s existing customers to be minimal

  **A look back into how MNP has progressed**
FCC in its 11th annual report mentions that the increased competition generated a continued decline in per-minute costs to consumers, a rise in the use of wireless phones as a consumer's main phone, improved call quality, and an increasing focus by carriers on pursuing the prepaid market.

**Carriers per market:** The percentage of the U.S. population living in counties with three or more carriers went up by the end of 2005, but mergers dramatically reduced the percentage of the population with access to five or more carriers, the FCC found. About 280 million people or 98 percent of the population, live in counties with three or more operators, slightly higher than the previous year's 97 percent and higher than the 88 percent in the FCC's 2000 report. The percentage of the population living in counties with access to four or more different mobile telephone operators also rose slightly to 94 percent. The percentage in areas with five or more competitors fell to almost 51 percent at the end of 2005 from 87 percent at the end of 2004.

Comparing this to the Indian scenario, the number of operators in a particular area are very less as we move away from the cities. This would mean that even with the implementation of MNP there would be very few choices for the customers and chances of cooperation among the service providers to maximize profits.

**Porting:** About 20.4 million wireless subscribers ported their numbers to another wireless carrier between December 2003 and December 2005 at an average monthly rate of 812,000 ports. Despite the advent of local number portability, carriers' churn rates fell slightly in 2005, largely because carriers improved service as a defensive move. Carriers improved subscriber-retention efforts by offering better deals on upgrade handsets, providing incentives for signing longer contracts, offering better customer service, and spending more to improve network quality.

Implication for India: The advent of MNP could induce all the existing players to take a defensive stance and start giving more thought on customer retention and improving network quality and customer service.
**Service costs:** Thanks to pricing competition, carriers' average revenue per minute is falling. The FCC estimates that revenue per minute fell 22 percent to seven cents in the second half of 2005 from the year-ago period and by 86 percent from second-half 1994's 47 cents per minute.

Implication for India: Price competition would further push down revenues for the service providers. India has one of the cheapest call rates and further erosion in the revenues of the service providers could impact the industry growth itself.

**Call quality:** It was found that the overall rate of customers experiencing a wireless call quality problem declined for a second consecutive year, with reported problems per 100 calls reaching the lowest level since the inaugural study in 2003.

Implication for India: The improved quality would be experienced only in areas where the level of competition is high and that would mean that many areas in the country would remain neglected, at least until there are more players in those regions. But in the medium to long term this would imply better customer service and easy accountability of the service provider in case he provides suboptimal service in any region.

**Prepaid:** As carriers scramble to make their numbers, they've increasingly turned to prepaid subscribers, the FCC said. As a result, the percentage of wireless users who subscribe to prepaid plans grew to 11 percent at the end of 2005 from 9.5 percent at the end of 2004 and 8.1 percent at the end of 2003.

**Implication for India:** If the allocation of spectrum is going to be based on the subscriber base, we could see a similar rush towards prepaid customers. Having a sizeable customer base is also critical for a service provider's success in the region. This could mean many different packages being brought out that would rely on giving deep discounts to customers who are willing to stay for a longer time with a particular service
provider (defensive strategy) or enticing the customers to shift to your network by providing incentives (like free talk time etc). The latter would be an aggressive strategy.

Recent issues

In May 2007, The Federal Communications Commission called for an end to delays in porting telephone numbers from one carrier to another, an action responding to complaints from some wireless operators about the lengthy, bureaucratic process of transferring wire line numbers to mobile-phone service providers.

The FCC concluded local number portability validation for a simple number port should be limited to four fields: the 10-digit telephone number, the customer account number, 5-digit ZIP code, and a pass code, if applicable. The agency also tentatively concluded simple ports should be completed within in 48 hours.

Sprint Nextel Corp. and T-Mobile USA Inc. had asked the FCC to clarify porting requirements because the local phone companies had been frustrating both customers and competitors by making the process of moving the telephone number to a wireless carrier more difficult and more complicated than it needed to be.

8. Regulatory Issues

The next step is to look for an efficient charge for porting a number. Economic intuition suggests that market forces are unlikely to lead to efficient charges for captured customers because of the monopoly power enjoyed by them. Note that most customers have received their mobile telephone number well before MNP has been introduced.

The pricing for MNP is thus similar to natural monopoly price settings where the price is set as the incremental cost of providing the service. It is desirable to have two components to the price: Variable and fixed component. The users must be charged only the incremental cost incurred while the fixed cost should be compensated by the government. If the government is unwilling to do so, the next best solution is implementing a ‘price-cap’ regime so that operators have an incentive to implement the most efficient solution.
Implementation of MNP has been delayed in various countries for a wide variety of reasons. (In Germany it was delayed by 60 months because of lack of international standards, public consultations and time needed to design solutions). In India’s case it has to be implemented without delays to ensure the ease of entry for new entrants in the 3G spectrum.

The success of any MNP implementation depends on the churn rates; however there are no reliable statistics for this measure, so generally we use number of portings as a surrogate for the success of the MNP implementation. Many variables such as contract periods, competitive environments, and switching costs affect the decision to use MNP services. A crucial factor, however, should be the price for porting numbers. As charges for porting mobile numbers strongly vary across countries, price differentials might be an adequate explanation.

8.1 Pricing: In most countries either the donor or the recipient network are allowed to charge the customer who wants to avail the service. In countries where the recipient network charges the customer, the donor network can charge the recipient network. (This practice is followed in Finland where the service is free to the customers due to the intensive competition prevailing in that market). Though low cost of porting does not guarantee high number of portings, high cost of porting definitely acts as a disincentive to switch between operators.

8.2 Speed of Porting: It has been observed from past implementations that longer porting times acts as a deterrent to porting. However, shorter porting times also have the inherent risk of having very less time for proper checks and thereby increasing chances of fraud. It also increases the costs associated with making a porting process available 24x7, extra manpower required to handle the request etc.
During the transition period the number cannot handle incoming/outgoing calls and therefore speed of porting is a very important factor when a customer decides whether to port. DoT has decided to have a porting period of no more than 2 hours while in some European countries it takes up to 1 week to get ported. For a comprehensive list of porting times of various CEPT countries refer exhibit 2.

8.3 Tariff Transparency: Customer might not be aware of the cost of the call as the numbers no longer indicate which network we are calling. There are many solutions to the problem: Customers may be informed by enquiry numbers or SMS services to learn about the network of a given number. Acoustic signals may alert subscribers when placing off-net calls or verbal announcements could inform about tariffs when calling to different networks. An efficient solution would involve informing the customer about the tariffs before the call goes through.

India, in all probability, is going forward with implementing an acoustic signal which would alert subscribers when placing off-net calls. Given the number of caller tunes and ring tones doing their rounds in the market, how distinguishable this beep would be, is a question up for debate.

9. Ethical Issues involved
Some of the issues that might crop up as and when the MNP implementation is complete and the product come to market are:

- **Predatory pricing**: There can be an attempt to tie up customers to a particular service provider by making him sign up for a long term deal, like a subsidized handset connection or a reduced tariff connection. This would deter port outs from that service provider’s network thereby reducing the effectiveness of the MNP implementation. The service providers interviewed were of the opinion that the pricing models not perceived predatory at present could come under scrutiny once MNP is implemented while TRAI is of the opinion that the market forces would play out the situation in the most optimal manner. However significant price cuts and eroding industry profitability could force them to take another look at this issue.

- **Cartelization**: There have been cases in EU where the service providers have formed cartels and have effectively nullified the impact of MNP in increasing competition in those markets. However in the Indian scenario, this is highly unlikely to happen given the level of competition already existing and the impending entry of 3G players also into the market.

- **Tightening of existing rules/modification of norms**: There are some examples like spectrum allocation where at present the spectrum is allocated based on the subscriber base of the service provider. This could lead to severe price cuts just to get short term market share to boost up the numbers and get a higher share of the spectrum which is going to be allocated. However the interaction with the service providers indicates that the spectrum allocation is based on the subscriber base over a period of time and not a snapshot at a particular time. This would nullify the threat of deep price cuts to get market share to a large extent. The TRAI would have to come up with modifications to all relevant rules to ensure MNP is not misused or abused.

**10. Conclusion**

Number portability can be broadly classified into fixed number portability and mobile number portability. Indian implementation is strictly constrained to MNP for a variety of reasons provided, all of which do not make logical sense. Mobile number portability is
also constrained by the fact that only operator portability is supported and people migrating out of a circle would have to surrender their number. This reduces the scope of implementation and benefits to the users. Measures have to be taken to include these services going forward if the full benefits from MNP are to be extracted.

Timing for the introduction of MNP is also well thought out. An earlier introduction was unadvisable because of the low level of penetration in the market at that time. A delayed introduction would have required massive upgrades on the operator side so that they could provide MNP, which would have again created hindrances. The decision to implement a central clearinghouse and use ALL-CALL-QUERY shows long term vision of the regulators. However, the objective of number portability would not be realized without fixed number portability. The competitors in fixed service are up against deep entrenched incumbents and the switching cost for customers is very high for a landline. Number portability introduction would go a long way in leveling the playing field in fixed network.

Effectiveness of the implementation would depend on how well three factors are controlled: time to port, cost of porting and tariff transparency. The time to port is tentatively 2 working days. Cost of porting has not yet been decided, but surveys conducted show that more than 80% of the people are willing to pay somewhere between Rs50 and Rs100 to retain their mobile number. This value goes up for businessmen and entrepreneurs.

There have been cases in many countries like Germany where the MNP implementation was stifled by raising negative publicity during the initial phase. Therefore, it is very important to release the service after extensive testing and a phased implementation would give enough time to weed out any glitches in the system.

Regulators would also have to keep an eye against predatory pricing mechanisms, forcing customers to stay with one network by binding them to long term contracts and worst of all cartelization among service providers. Some of the existing rules would have to be modified to ensure undue advantage of this service is not taken.
All factors considered the implementation of MNP is being rolled out in a very systematic and timely manner taking into account all the factors at play and not committing a mistake already done by another country in their implementation of MNP. There are some contentious decisions made but again these can be argued equally from both sides as has been already discussed. Mobile number portability seems to be the right way forward to spur competition in the market and also ease the entry of new players by creating a level playing field. All this analysis can only take us so far, one will have to wait and see how the actual MNP implementation fares once it is rolled out.
References:

1. Mobile number portability in Europe retrieved on September 20th 2008 from:

   http://www.sciencedirect.com/science?_ob=MImg&_imagekey=B6VCC-4KJBY0-1-8&cdi=5951&_user=1007252&_orig=search&_coverDate=08%2F31%2F2006&_sk=99699992&view=c&wchp=dGLzVzz-zSkWz&md5=d80f3821efe777e192c2ee1adfe6bd41&ie=/sdarticle.pdf


7. http://web.ebscohost.com/bsi/detail?vid=1&hid=13&sid=e2f258a56-e0df-46d8-86c3-671894e61529%40sessionmgr3&bdata=JnNpdGU9YnNpLWxpdmU%3d#db=buh&AN=11728450


10. Recommendations by TRAI on Mobile Number Portability, on March 8, 2006
**Exhibit 1**: Details of Setup Costs (All Call Query) for implementations of MNP

<table>
<thead>
<tr>
<th>Operator Cost</th>
<th>Region/ Circle wide: Operators with existing SS7 signaling systems and no STP/SCP infrastructure (5 regional database) (A)</th>
<th>Region/ Circle wide: Operators with existing SS7 signaling systems and no STP/SCP infrastructure (5 regional database) (B)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Exchanges/Central Office Costs</td>
<td></td>
</tr>
<tr>
<td>1.1</td>
<td>Switch Upgrade Costs</td>
<td>Operator Setup Costs</td>
</tr>
<tr>
<td>1.2</td>
<td>Switch Upgrade Costs</td>
<td>Operator Setup Costs</td>
</tr>
<tr>
<td>1.3</td>
<td>Additional costs incurred for new circuits, interconnection etc</td>
<td>Operator Setup Costs</td>
</tr>
<tr>
<td>2</td>
<td>Signaling Network Costs</td>
<td></td>
</tr>
<tr>
<td>2.1</td>
<td>New/additional STP/SCP system cost</td>
<td>Operator Setup Costs</td>
</tr>
<tr>
<td>2.2</td>
<td>Existing STP/SCP upgradation costs</td>
<td>Operator Setup Costs</td>
</tr>
<tr>
<td>2.3</td>
<td>Additional signaling costs (including additional circuits, interconnection charges etc)</td>
<td>Operator Setup Costs</td>
</tr>
<tr>
<td>3</td>
<td>Software Costs</td>
<td></td>
</tr>
<tr>
<td>3.1</td>
<td>Changes in Order management systems, Provisioning</td>
<td>Operator and Call Setup Costs</td>
</tr>
<tr>
<td>3.2</td>
<td>Changes in Billing systems</td>
<td>Operator Setup</td>
</tr>
<tr>
<td></td>
<td>Costs</td>
<td>Operator Setup Costs</td>
</tr>
<tr>
<td>---</td>
<td>-----------------------------------------------------------------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>3.3</td>
<td>Additional Software Charges (database updation etc.)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Hardware costs US$(1.1+1.2+1.3+2.3)</td>
<td>2,000,000.00</td>
</tr>
<tr>
<td>5</td>
<td>Software Costs US$(3.1+3.2+3.3)</td>
<td>1,500,000.00</td>
</tr>
<tr>
<td>6</td>
<td>STP/SCP cost US$(2.1)</td>
<td>2,600,000.00</td>
</tr>
<tr>
<td></td>
<td>Total setup cost per circle per operator US$</td>
<td>6,100,000.00</td>
</tr>
<tr>
<td></td>
<td>Rupees in crores</td>
<td>27.5</td>
</tr>
<tr>
<td>7</td>
<td>No. of Licenses</td>
<td>4</td>
</tr>
<tr>
<td>8</td>
<td>No. of operators</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>Total Hardware Costs US$(4*7)</td>
<td>8,000,000.00</td>
</tr>
<tr>
<td>10</td>
<td>Total Software costs US$(5*8)</td>
<td>3,000,000.00</td>
</tr>
<tr>
<td>11</td>
<td>Total SCP/STP costs US$(6*7)</td>
<td>10,400,000.00</td>
</tr>
<tr>
<td>12</td>
<td>Total cost US$(9+10+11)</td>
<td>21,400,000.00</td>
</tr>
<tr>
<td>13</td>
<td>Rupees in Crores</td>
<td>96.3</td>
</tr>
<tr>
<td>14</td>
<td>Setup costs Nationwide US$(Total Cost of A+ Total Cost of B)</td>
<td>208,600,000.00</td>
</tr>
</tbody>
</table>

1 operators have operations in 23 circles, 2 operators in 21 circles, one in 20 circles, one in 16 circles, one in 8 circles, two in 7 circles, three in 2 circles, and four in 1 circle

Sourced from TRAI, recommendations on MNP, March, 2006

**Exhibit 2**

<table>
<thead>
<tr>
<th>Country</th>
<th>Target maximum porting period</th>
</tr>
</thead>
<tbody>
<tr>
<td>Austria</td>
<td>3 working days</td>
</tr>
<tr>
<td>Belgium</td>
<td>2 days*</td>
</tr>
<tr>
<td>Croatia</td>
<td>5 days</td>
</tr>
<tr>
<td>Cyprus</td>
<td>14 days</td>
</tr>
<tr>
<td>Estonia</td>
<td>7 working days</td>
</tr>
<tr>
<td>Finland</td>
<td>5 working days</td>
</tr>
<tr>
<td>France</td>
<td>30 days</td>
</tr>
<tr>
<td>Germany</td>
<td>4 working days + 2 further days</td>
</tr>
<tr>
<td>Hungary</td>
<td>14 working days</td>
</tr>
<tr>
<td>Ireland</td>
<td>2 hours single line/ 8 hours multi line ports</td>
</tr>
<tr>
<td>Italy</td>
<td>5 working days*</td>
</tr>
<tr>
<td>Lithuania</td>
<td>28 days</td>
</tr>
<tr>
<td>Country</td>
<td>Time Period</td>
</tr>
<tr>
<td>--------------</td>
<td>----------------------</td>
</tr>
<tr>
<td>Malta</td>
<td>4 hours</td>
</tr>
<tr>
<td>Netherlands</td>
<td>10 working days</td>
</tr>
<tr>
<td>Norway</td>
<td>7 days</td>
</tr>
<tr>
<td>Portugal</td>
<td>5-20 working days</td>
</tr>
<tr>
<td>Slovenia</td>
<td>5 working days</td>
</tr>
<tr>
<td>Sweden</td>
<td>5 working days</td>
</tr>
<tr>
<td>Switzerland</td>
<td>5 working days*</td>
</tr>
<tr>
<td>United Kingdom</td>
<td>2 working days + 1 calendar week</td>
</tr>
</tbody>
</table>

* Different periods applies to complex port requests

Source: ECC, within the CEPT, Mobile number portability in CEPT countries updated October 2005