

# Number Portability Through the Global Lens

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## Life, Liberty and the Right to Keep Your Number

On July 1, 1995, Hong Kong formally ended the franchised monopoly of its telephony market and, at the same time, became the first government to introduce fixed-line number portability. Since that date, governments and regulatory bodies around the world have pushed, prodded and incited carriers within their borders into implementing number portability for both fixed and mobile networks to the point where today, portability has become a key indicator or bellwether for market openness and consumer choice.

National number portability implementations are as varied as the communications markets they serve. In this report, we look at a sample of those implementations across the globe to discover how other countries' experiences compare to number portability in the U.S., and what lessons, if any, can be learned as number portability continues to evolve here. The current term for number portability services runs through June 2015. Next year, the Federal Communications Commission (FCC) and the U.S. telecommunications carriers will decide whether to renew the contract with the current administrator, Neustar, or award all or part of the contract to a different vendor.

In this paper, we examine number portability experiences in six countries:

- U.K.
- Sweden
- Saudi Arabia
- Malaysia
- Brazil
- India

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Much of the globe leapfrogged fixed-line number portability due to a lack of local wireline or fixed-line competition combined with the gradual, but inexorable, decline in traditional fixed-line services. Three of the surveyed countries, Saudi Arabia, Malaysia and India, do not offer fixed-line number portability. The mobile markets, conversely, are a hotbed of competition. To bolster this competition, governments and regulatory bodies began mandating number portability as early as 1997 (see Exhibit 1), when Singapore became the first country to implement mobile number portability (MNP). MNP in Singapore, however, was nothing more than call forwarding, requiring the subscriber to hold two telephone numbers. Although the solution was easy and inexpensive, it was difficult to administer, scale and operate to a high degree of reliability. For this reason, Singapore moved to a centralized database solution for both fixed and MNP solutions in June 2008.

#### Exhibit 1: Mobile Number Portability Has Been on the Move for 15 Years

Source: Yankee Group, 2012

Year	Country
1997	Singapore
1998	
1999	U.K., Hong Kong, Netherlands
2000	Spain, Switzerland
2001	Australia, Sweden, Denmark, Norway
2002	Belgium, Italy, Portugal, Germany
2003	U.S., Ireland, France, Finland, Luxembourg, Greece, Iceland
2004	Austria, South Korea, Hungary, Cyprus, Lithuania, Slovakia
2005	Taiwan, Estonia, Malta, Slovenia
2006	Czech Republic, Croatia, Poland, Japan, Oman, Saudi Arabia, South Africa
2007	Latvia, Canada, Pakistan, Israel, Nigeria, New Zealand
2008	Egypt, Mexico, Malaysia, Bulgaria, Macedonia, Romania, Turkey
2009	Brazil, Dominican Republic, Ecuador
2010	Peru, Thailand, Albania, Jordan, Kuwait
2011	India, Georgia, Kenya

We examine the number portability implementation in our six profiled countries in chronological order, according to the year in which they implemented MNP. This allows us to investigate some of the challenges of the early implementations and to evaluate how number portability evolved over time. Crucial to our discussion are the factors and perspectives that make each number portability implementation unique:

- **Timing**, from the early implementations in the U.K. and Sweden to the most recent implementation of MNP in India.
- **Geography**, with countries selected from Europe, the Middle East, South America and Asia.
- **Population**, from Sweden, with approximately 9.4 million people, to India, which has a population over two orders of magnitude greater at 1.22 billion.
- **Subscriber makeup**, from the largely postpaid markets of Europe to the heavily prepaid markets of India and Brazil.
- **Technology**, from centralized database solutions to onward routing (OR).

We begin our grand tour of global number portability implementations in the U.K.

## UK: Destined to Serve as a Warning to Others

### Lessons Learned

- **Choose your technology wisely.** Choices made in the name of expediency and cost savings can create more problems than they solve. Solutions should be engineered to meet the needs of subscribers and operators 10 years and more down the road. As with any project, all solutions should be examined with an eye toward long-term impact.
- **Changing technologies takes longer and presents more problems than taking the time to implement a robust solution the first time around.** Temporary and stopgap measures in telecom quickly assume a life of their own and have a habit of hanging around for decades.
- **Partnerships between regulators and service providers are essential.** Number portability cannot succeed without the kind of regulatory support that represents the public interest. By the same token, getting number portability right requires a deep understanding of the cost and complexity of service providers' networks and systems. It's critical for number portability design to reflect the contributions of both groups.

The U.K. is a very competitive mobile telecommunications market. Mobile average revenue per user (ARPU) is less than half that of the U.S. (about U.S.\$20 as opposed to U.S.\$50). Serving a population of 62 million (one-fifth that of the U.S.) are four spectrum-holding mobile network operators (MNOs)—Everything Everywhere (Orange and T-Mobile), O2, Vodafone and 3—and close to four dozen mobile virtual network operators (MVNOs). Ofcom, the U.K.'s regulatory body for the fixed, mobile and broadband service providers, frequently seems to be navigating through regulatory jungles as it tries to juggle the needs of U.K. subscribers, EU directives and the concerns of the MNOs. In hindsight, it might appear that the U.K. implementation of number portability was doomed from the start:

- **Early to market:** The U.K. had little track record to go on, other than the fixed-line example offered by the U.S. (at a scale two orders of magnitude greater than the number of U.K. mobile subscribers in 1999) and the mobile example offered by Singapore.

- **Wrong solution:** Following Singapore's model (most likely because it appeared to be cost-efficient), the U.K. elected to use OR, also known as "call forwarding" or "donor network." In this method, calls are forwarded from the old, or donor, network to the subscriber's new recipient network. There is no centralized database, so the donor network must determine the recipient network and then switch the call. OR is generally simpler and less expensive to implement than a centralized database system. However, neutrality, performance and flexibility all suffer. The donor network collects a fee for forwarded calls from the recipient network. If the subscriber changes service providers again, the number is returned to the donor network and then re-reported to the new recipient network. So the fate of the subscriber is still very much tied to the donor network. If for some reason the donor network fails, so does the ported call. Worse, if a carrier goes out of business, all its customers must give up their phone numbers because there is no donor network through which to route their calls. This occurred in 2001, when 14,000 U.K. subscribers lost their telephone numbers after the failure of Atlantic Telecom.
- **A highly competitive market with narrow margins:** The MNOs believe there is enough competition already, that they can't make a profit and that further regulation is an excessive burden.

By 2006-07, it was clear Ofcom recognized the limitations of the U.K.'s MNP architecture, with its porting times of one week or more, subscriber complaints, competitive carrier complaints and a low percentage of the population that was even aware they could port their current number over to a new service provider. Ofcom published a string of strongly worded documents to try to change or improve its existing number portability system by converting it to a centralized, All Call Query (ACQ) model (similar to that used in the U.S.):

- **November 2006:** Review of General Condition 18 – Number portability. Suggested a move to a common database (CDB) for routing calls to ported numbers and a reduction in mobile porting lead times.
- **July 18, 2007:** Arrangements for porting phone numbers when customers switch supplier, which concluded that:
  - The industry should establish a CDB to allow direct routing of calls to fixed and mobile ported numbers.
  - Mobile porting lead times should be reduced to a maximum period of two working days by March 31, 2008.

- **Nov. 29, 2007:** Telephone number portability for consumers switching suppliers Concluding Statement, which demanded that:
  - “Communications providers use all reasonable endeavors to establish a CDB ready to be populated with data... by Dec. 31, 2008.”
  - “CDB to be populated with all ported mobile numbers as soon as reasonably practicable and, in any event, no later than Sept. 1, 2009, and with all ported fixed numbers as soon as reasonably practicable and, in any event, no later than Dec. 31, 2012.”
  - “All mobile providers to be required to directly route all calls to ported mobile numbers as soon as reasonably practicable and, in any event, no later than 1 Sept. 2009.”
  - “All other calls to ported numbers (fixed and mobile) to be directly routed as soon as reasonably practicable and, in any event, no later than 31 Dec. 2012.”

Ofcom claimed changing the number-porting architecture would cost the industry only £5 million. Vodafone mounted a legal challenge to Ofcom’s plans in January 2008, supported by both Orange and O2. That group estimated the cost of transitioning to a centralized database solution would be £37 million per network, or a total of £185 million for the five major U.K. carriers. The competitive carriers (including the fifth-largest carrier, 3) supported Ofcom’s efforts—not surprising, since they would be sure to benefit from improved number portability. 3 pointed out that at the end of 2008, the U.K. shared the design for its porting system with only one other country (the Dominican Republic) out of dozens of worldwide implementations.

Ofcom’s efforts ultimately came to naught on Sept. 17, 2008, when the Competition Appeal Tribunal (CAT) ruled the regulator had not provided sufficient evidence to back up its claims that MNP could be overhauled at a reasonable cost. With the ruling, the company that had been formed to create the central database, UK Porting, was disbanded, and Ofcom went back to the drawing board.

The lack of a robust number portability process in the U.K. has affected fixed-line subscribers as well. In September 2009, the Federation of Communication Services (FCS), the UK Trade Association for the communications services industry, called for a reform of the fixed-line portability system—for the Ofcom central database project to be revisited and for the porting process to be automated not just for mobile subscribers, but for fixed-line connections as well. The FCS presented as evidence a survey conducted among its communications provider members. The competitive companies responding to the survey ported up to 200 numbers per month from a variety of Tier 1 and Tier 2 service providers, including Openreach, BT Wholesale, Gamma and Opal. The list of issues raised by the survey respondents is lengthy, varied and frustrating, ranging from loss of service and inconsistent implementations to the arbitrary denial of porting requests and a lack of procedural checks and balances.

In particular, they reported:

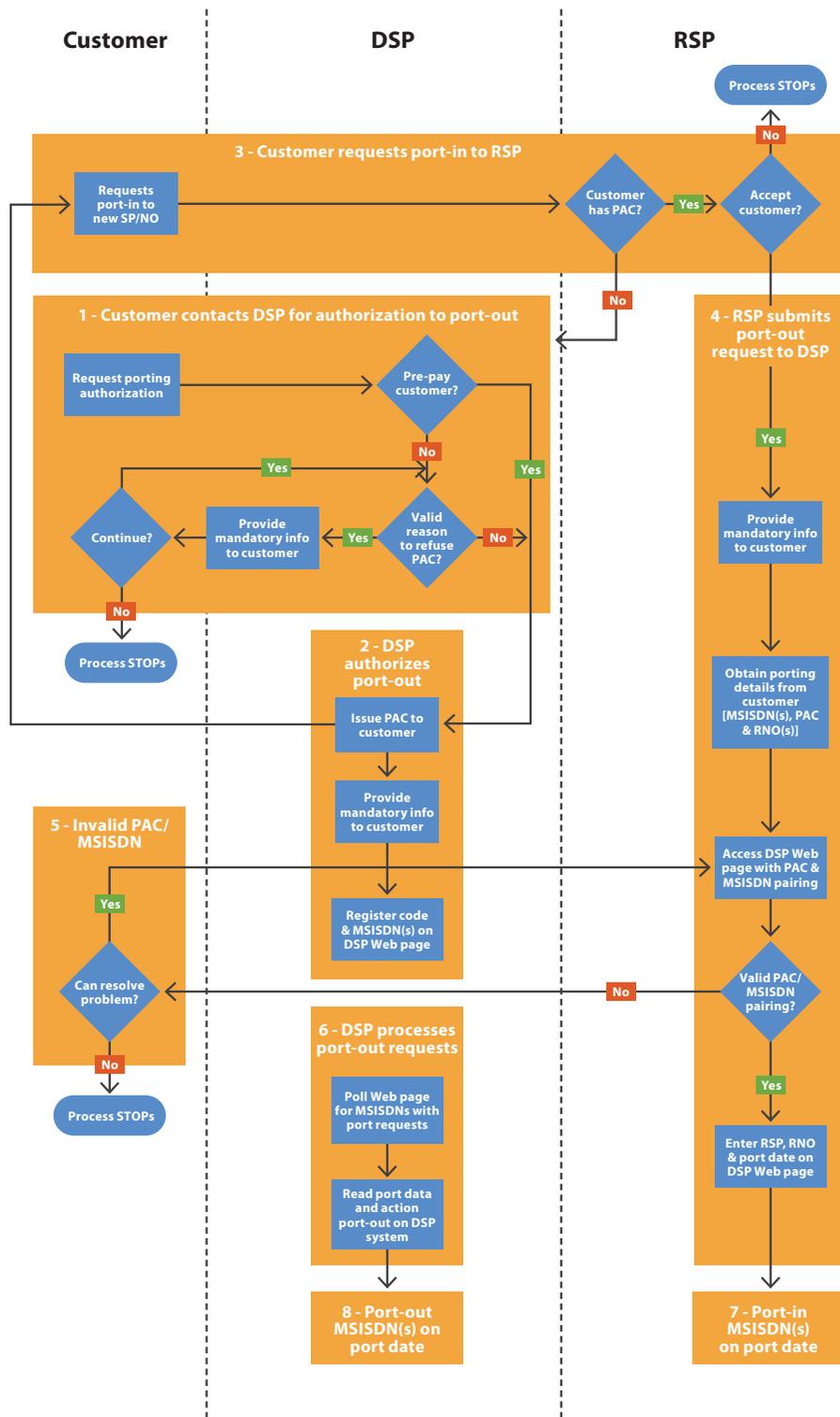
- Average porting times between Wholesale Line Rental (WLR), local loop unbundling (LLU) and VoIP ranged from 10-25 working days. The longest porting transaction completion was generally double this, and one competitive provider pointed to an implementation that was up to 100 days “and still going.”
- One-third of the respondents reported that porting times had actually increased over the past year.

Today, the U.K. remains the only country where customers must obtain a Porting Authorisation Code (PAC) from the donor provider before the porting process can start. The convoluted, complex and time-consuming process is outlined in Exhibit 2 on the next page, which is borrowed from the Mobile Number Portability Porting Process Manual of the Mobile Number Portability Operator Steering Committee.

**Exhibit 2: Mobile Number Portability Maze**

Source: Mobile Number Portability Operator Steering Committee, April 2011

## Customer Porting Process Flow



## Sweden: A Good Balancing Act

### Lessons Learned

- **Industry experience combined with regulatory support will make the difference between success and failure.** Sweden was able to dramatically improve porting transaction time and offer subscribers a user-friendly porting experience, while offering maximum flexibility to service providers up and down market.
- **The impact portability has on competition varies based on surrounding market factors.** Subsidizing handsets, and the contractual obligations that go with those subsidies, will depress customer churn, which in turn impacts porting rates.

According to the Post and Telecom Authority (PTS), the Swedish regulator, Sweden had a fixed broadband penetration rate of 31.9 percent as of January 2011, the sixth highest in the EU, and a mobile penetration rate of 116 percent. A decade after implementing MNP in 2001, Sweden registered 232,136 fixed number porting transactions and 502,101 mobile porting transactions in 2011. With a subscriber base of approximately 11 million, that makes for a respectable porting rate of about 2 percent for the fixed network and 5 percent for the mobile network (see Exhibit 3). Porting transactions on the fixed network almost tripled between 2004 and 2005, due in part to the increased role of VoIP from service providers such as Com Hem and Bredbandsbolaget.

### Exhibit 3: Number of Porting Transactions Has Stabilized in Sweden

Source: The Swedish Post and Telecom Authority and Swedish Number Portability Administrative Centre, May 29, 2012

	2011	2010	2009	2008	2007	2006	2005	2004	2003	2002
Fixed call services [1]	232,136	235,084	267,690	223,070	225,447	221,203	159,985	58,250	33,486	4,783
Mobile call services	502,101	540,135	444,802	473,045	519,410	628,792	565,075	389,123	231,999	167,069
Total [2, 3]	734,237	775,219	712,492	696,115	744,857	849,995	725,060	447,373	265,485	171,852

[1] 076-numbers from late 2005 through 2009 are accounted for as fixed numbers even though they are mobile. This concerns about 3,000 numbers a year.

[2] Ports relating to free phone services are not included.

[3] Before 2010 administrative ports were not separately accounted for.

Note that subsidizing handsets, and the contractual obligations that go with those subsidies, have a tendency to depress customer churn and impact porting rates. Swedish service providers do offer subsidies and the porting rates are around 5 percent. In Finland, conversely, where there are no subsidies and no contractual lock-in periods, the porting percentages are much higher at around 20 percent.

The PTS reports the time taken to port fixed numbers was on average three days in 2010, a significant improvement over 2009, when it could take up to 15 days to port a fixed number. Likewise, the average porting time for a mobile number in Sweden in 2010 was three days (see Exhibit 4).

#### Exhibit 4: Porting Time Has Improved in Sweden

Source: The Swedish Post and Telecom Authority, 2010

Type of Contract	Type of End-User	Number of Telephone Numbers	NTP	Porting Time	Cutoff Time
Subscription without/with lock-in period Registered prepaid card	Consumer	One or more	Fixed Mobile	3 working days	± 30 minutes according to NP-Forum decision
Subscription without/with lock-in period Registered prepaid card	Business	One or more	Mobile	3 working days	± 30 minutes according to NP-Forum decision
Subscription without/with lock-in period	Business	One or more	Fixed	10 working days	± 30 minutes according to NP-Forum decision
Not registered prepaid card	Consumer	One or more	Mobile	3 working days	± 30 minutes according to NP-Forum decision

Like the U.K., Sweden was relatively early to the number portability table. Sweden rolled out fixed-line portability in 1999 and MNP was introduced on Sept. 1, 2001. Also like the U.K., Sweden started out with an initial implementation of OR, but it also implemented ACQ with a central database at the same time. OR was intended to be used by smaller Tier 2 service providers without an operational and/or administrative database for all ported numbers in the portability domain. ACQ would be used by Tier 1 operators for all ported numbers in their domain. This method enabled the subscribers of smaller operators to have the same porting capabilities as the subscribers of a Tier 1 carrier. At the same time, it relieved the Tier 2s from the cost of setting up and maintaining an ACQ solution. It was, however, more complex overall than going with a single solution, given the need to avoid looping and incompatibility situations between the two methods. Sweden will eventually move to a centralized database solution for both fixed and mobile networks, as the PTS acknowledged in its 2009 report "Number portability for future networks - PTS-ER-2009:7" that OR is not a scalable, viable solution for future networks. PTS's stated goal in choosing both ACQ and OR from the start was to roll out number portability quickly to Sweden's relatively small subscriber base and avoid saddling all operators with a heavy implementation bill. Were the goals of the initial rollout worth the time and cost of the transition to ACQ further down the road? That remains to be seen.

At the introduction of MNP, the Swedish operators joined forces and procured a central database solution system implemented by Capgemini and Oracle and based on an Oracle database. The two administrators have equal responsibility from a geographic and network operator perspective for the central database, ACQ system. They work under the auspices of the Swedish Number Portability Administrative Centre (SNPAC) AB, which was formed in December 2000 and began operations on Sept. 1, 2001. SNPAC itself does not retain any technical infrastructure—all services and technical solutions for the central database system are provided by third parties, most notably Oracle and Capgemini—but the information in the databases is owned and protected by SNPAC. SNPAC also retains the “right to use” the developed system with its associated documentation (even with a third-party outsourcing supplier). Four of the larger players in the Swedish market took equal ownership in the SNPAC:

- TDC Sverige AB
- Tele2 Sverige AB
- Telenor Sverige AB
- TeliaSonera AB

Making the operators partners in portability will set a foundation for success. The fact that the SNPAC is owned by the four largest operators in Sweden means that each has a vested interest in the success of portability.

## Saudi Arabia: Just When You Thought Everything Was Going So Well...

### Lessons Learned

- **Mobile and fixed line portability are not set-it-and-forget-it services.** Fixed-line portability and MNP require constant monitoring and management. Even if things go well at the start, ongoing investment and attention are required to avoid situations that dilute the value for the subscriber.

The Kingdom of Saudi Arabia (KSA) has the highest mobile penetration rate in the Middle East and North Africa (followed by Libya, Oman and Kuwait). KSA, with a population of just over 27 million in 2010, reported 19.6 million mobile subscribers in 2006 for a penetration rate of 87 percent, burgeoning just five years later to 53.7 million in 2011 for a penetration rate of close to 190 percent. The Saudi mobile market is predominantly prepaid—87 percent in 2011. Conversely, the country had a paltry 4.4 million wireline subscribers in 2011 for a penetration rate of 16 percent, with Saudi Telecom (STC) as the dominant provider.

KSA became the first country in the Middle East and Africa region to introduce MNP when it launched the service in 2006 (South Africa launched its MNP offering later that same year). The introduction was scheduled for June 21 and was introduced with only a minor delay on July 8, 2006. This is not an insignificant feat when you consider that the United Arab Emirates was also scheduled to launch MNP in 2006 but, with delay after delay, has yet to do so. It was not until October 2011 that fixed-line portability was introduced by a country in the Middle East and North Africa region (the Kingdom of Bahrain).

The Saudi regulatory authority, the Communication and Information Technology Commission (CITC), chose to implement a centralized number portability clearinghouse (NPC) solution and required its two dominant mobile phone operators, Mobily and STC, to implement the MNP solution and interface with the NPC. A third operator, Zain, entered the mobile arena in KSA in August 2008. The CITC applies penalties to operators that fail to meet regulatory deadlines and guideline. However, CITC did not require the new market entrant to offer MNP until July 2011. The CITC also mandates that no fee be charged to the subscriber. Costs are borne by the recipient operator, which pays approximately U.S.\$14 per ported transaction to the donor operator and the CITC. About U.S.\$4 is paid to the MNP clearinghouse operator, in this case Telcordia, for every completed port.

The time to execute a porting transaction in KSA was originally seven days for postpaid subscribers and three business days for prepaid subscribers, but this has been reduced to five business days for postpaid subscribers and one business day for prepaid subscribers. Nevertheless, the uptake on portability has been low—under 2 percent in 2011, according to Yankee Group estimates. This is in keeping with the other heavily prepaid economies we have looked at. Another reason for the low uptake is likely the high rejection rate; there were 17,000 rejected requests in the first 12 months (over half the porting requests at the time). A third of these rejections were due to ID mismatches (and therefore security concerns) and another third were attributed to outstanding unpaid bills. In an attempt to lower the rejection rates, in 2011 the CITC mandated that a porting request could only be rejected for four reasons:

- The number to be ported is disconnected.
- The subscriber has not paid his or her preliminary bill in the required time.
- The data submitted with the request does not match the data registered in the donor provider’s records.
- The last MNP transaction for this number was less than two months ago.

Modest uptake and a high rejection rate notwithstanding, the portability service introduction was considered a success. However, just because a porting service is up and running is no guarantee it will remain that way. In May 2009, three years after service introduction, Mobily announced its MNP service had been down for weeks due to a technical problem in STC's network. Mobily filed a complaint with the CITC and released a statement that it had received more than 16,000 port-in complaints due to requests that could not be processed, adding that the delay in port-ins was beyond its control. Mobily was ultimately able to resolve only 12,000 of the complaints. This is the largest portability incident Yankee Group has encountered in its research. One of the hallmarks of a robust number portability system is an ability to isolate and recover from problems or errors within an individual service provider. The fact that a failure in one carrier was able to seriously impact the operation of a second carrier points to a significant design/implementation vulnerability. Unfortunately, since the underlying cause of the problem was never explained, we do not know what that vulnerability is.

## Malaysia: Starting Strong but Finishing Back in the Pack

### Lessons Learned

- **A positive user experience is key to achieving the goals of number portability.** The ease of the porting experience, the time it takes to port a number and cost to the user all have an effect on the impact of number portability.

Malaysia is one of the largest mobile markets in Asia. According to the Malaysian Communications and Multimedia Commission (MCMC), the country's mobile subscriber base was over 35.7 million at the end of Q3 2011, a penetration rate of 124.7 percent. On Sept. 10, 2004, the Malaysian Ministry of Energy, Water and Communications fired off the starting gun for number portability in Malaysia with a succinct, one-page "Ministerial Direction on Number Portability." In it, the Minister provides the official directive for the MCMC to "undertake the effective implementation of number portability for public cellular services as soon as possible and to take all such measures as may be necessary to amend or modify existing regulatory rules or other decisions that may impede or delay the implementation of number portability for public cellular services in the country." The MCMC saw the goals of MNP to be enhanced competition, deployment of advanced technologies, lower costs for users and enhanced economic development in Malaysia.

It was not until one year later, on Sept. 1, 2005, however, that the MCMC moved forward with the first phase of MNP implementation by initiating a Public Inquiry. The Inquiry had three goals in mind: to clarify the many questions MCMC had about MNP, to invite comment from vendors and integrators interested in administering MNP, and to likewise invite comment and feedback from Malaysian operators.

The operators' comments on the Public Inquiry put pressure on the MCMC to implement a simple, low-cost number forwarding solution similar to the one implemented in Hong Kong. However, the MCMC was ultimately able to build consensus around a centralized database solution and overcome the objections of service providers that felt the effort would be too expensive and would not provide sufficient benefit to subscribers.

Malaysia has a strong, engaged regulatory infrastructure that first created a directive for MNP and then created a well-thought-out implementation plan implemented with Telcordia as the administrator. MCMC also publicized the rollout to consumers and for the most part kept the parochial concerns of the incumbent carriers in check. Nevertheless, the project ended up taking twice as long to complete as anticipated. The cause for the delay was not publicized, but in examining the rollout plan, which had the project concluding in April 2007, at least a year and a half of that delay appeared to be in the execution of the project (see Exhibit 5).

**Exhibit 5: The Best-Laid Plans: Malaysia’s Rollout Plan for MNP**

Source: The Malaysian Communications and Multimedia Commission, 2005

	2005		2006												2007			
	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr
Phase 1: Geographic MNP																		
Stage 1: Planning																		
Submission of PI paper																		
Report on PI paper																		
MNP determination by MCMC																		
Analyze business processes																		
Analyze existing network and IT processes																		
Modify business processes																		
Modify network and IT systems and processes																		
Stage 2: Deployment																		
Establish central clearinghouse																		
Develop and test network and IT systems																		
Internal and external integration testing																		
Implement new and modified processes																		
Training on new and modified business processes																		
Overall implementation of the MNP service																		
Pilot of integrated solution																		
Launch																		
Phase 2: Non-geographic MNP																		
Review and amendments to interconnect regime																		
Testing																		
Pilot of integrated solution																		
Launch																		

MNP was made available to Malaysian subscribers in October 2008—over four years after the Ministry Directive. According to the MCMC, 1.17 percent of mobile subscribers applied for MNP in 2008, 5.06 percent in 2009 and 2.89 percent in 2010. These numbers are in keeping with what we’ve seen from markets that are predominately prepaid. Of these attempts, the porting success rate was 70 percent, meaning that 30 percent of the applications were rejected for the same reasons discussed in our profile of Saudi Arabia. Note, however, that not all regulatory agencies support these reasons for rejecting portability requests. The U.S. FCC requires an operator to port a number even if the subscriber owes money for an outstanding balance or termination fee. The subscriber can change service providers at any time, and the operator may not refuse to port a number because a consumer has not paid his or her bill.

The number of subscribers who have actually ported their mobile number averages out to 2.13 percent per year. Despite the prepaid profile of Malaysia, Yankee Group expected these numbers to be closer to 5 percent. We know that all else being equal, lower-than-expected uptake of number portability can be attributed to issues with user experience, including:

- **Lengthy time to port.** Users do not want to wait five days, much less 10 or 15, for their number to be ported.
- **Complex porting process.** If the process is manual, time-consuming and complicated and if it results in a high rejection rate, users will avoid it.

## Brazil: Who Says You Can't Be Big and Agile at the Same Time?

### Lessons Learned

- **It can be done.** The Brazilian number portability project was rolled out to the 67 national codes of the country on time despite the comparatively short deployment schedule. Just as significantly, it has remained stable and robust since its rollout in March 2009. How has Brazil accomplished this? It had a carefully thought-out rollout plan, an experienced team and a clearly defined set of operator penalties for non-compliance with deadlines.

Brazil is the largest economy in South America and has the fifth-largest population in the world, with close to 195 million people. Despite this (and unlike India and the U.S., which rank second and third in population), Brazil still manages to have a mobile penetration rate of over 100 percent. With approximately 203 million mobile subscribers as of 2010 according to the World Bank, Brazil's mobile penetration rate is 104 percent.

Number portability for this huge economy was made available nationwide in March 2009 for both fixed and mobile lines. The process of moving to MNP was started approximately two years earlier when the Council Director of the National Telecommunications Agency (Anatel) in Brazil approved number portability on March 8, 2007. The announced plan called for MNP to be offered on an experimental basis in 16 months in selected regional capitals and to be fully available throughout Brazil in 24 months (i.e., March 2009). Fixed-line portability had an even more aggressive rollout plan, with full rollout scheduled for implementation in 18 months. The fixed-line portability design would enable subscribers to keep their number as long as they remained within the local area. In the case of the mobile service, subscribers would be able to maintain their number within an area of registration— analogous to area codes in the U.S., e.g., 11 (Sao Paulo), 21 (Rio de Janeiro) and 61 (Brazilia).

Anatel set the price of 4 Brazilian reals—about U.S.\$2—for number porting. This cost is borne by the user and charged once the porting transaction is completed. Anatel believed that having the subscriber bear the cost of the portability administrator would help guarantee the autonomy and neutrality of the number porting process. However, the winning service provider has the option to waive the fee for the subscriber and instead compensate the MNP administrator directly.

The schedule appeared overly ambitious, particularly when set against the huge subscriber base. However, the planning process for the implementation had started six months earlier in September 2006 with Anatel's Public Consultation No. 734 soliciting feedback from the MNP community (subscribers, operators and vendors). Over the course of 63 days, Anatel collected almost 1,000 contributions from industry and municipalities and 180 from individual users. It also held five public hearings in various capitals, the last two in São Paulo at the end of October 2006.

In 2007, ABR Telecom was chosen by Brazilian telecom providers to act as the Administrative Entity for number portability in Brazil. ABR was created in 1998 to implement and manage the National Roaming Service in Brazil and had since broadened its charter to include other services targeted at Brazilian carriers. However, the selection of ABR Telecom as the number portability administrator was a dramatic expansion of its responsibilities.

ABR's charter for number portability is to:

- Present the technology solution for number portability through the development and implementation of a centralized database, the National Reference Database of Numbers Held.
- Guarantee the state of the database in terms of updates, operations and quality.
- Guarantee the ongoing neutrality of the porting process.
- Provide access to the database for service providers.

To execute these tasks, ABR has partnered with Cleartech, the Brazilian integrator, which in turn works with Neustar to create, manage, troubleshoot and maintain the Reference Database, or RDB. Portability service has been available nationwide since March 2009. It is not possible, however, to port a fixed-line number to a mobile-line number and vice-versa (Like many countries, Brazil uses distinct numbering plans for mobile versus fixed networks and these numbers cannot be ported between networks). How did Brazil accomplish this monumental rollout on time? It had a carefully thought-out plan, an experienced team and a clearly defined set of penalties aimed at the service providers for non-compliance with deadlines. Those penalties could result in a fine of up to 50 million reals (U.S.\$25 million).

## India: Big and Getting Bigger

### Lessons Learned

- **Every national communications market is unique.** India is a price-driven market with a high rate of churn as subscribers jump carriers for a better rate. Prepaid plans come with few contractual obligations, plus subscribers have adapted to multiple-SIM devices. As a result of all these factors, and given the maturity of the mobile market by the time portability was introduced, subscribers in India are not attached to their telephone numbers.
- **Customer experience must be the priority for number portability.** Without a good customer experience, uptake will be limited. Complex porting, porting transactions that take seven days and are likely to include down time, little perceived benefit and too many rejections all will make subscribers turn away from number portability.

India is second in population only to China. It continues to add mobile subscribers at the blistering rate of close to 1 million a week. At the beginning of 2012, its subscriber base was at 881 million with a mobile penetration rate of only 63 percent. With a population that is still largely rural and a penetration of fixed telephony under 10 percent, mobile communications is critical infrastructure for the Indian population. India is also the most competitive market of any discussed in this report, with 15 mobile carriers competing in an environment that is very price-driven. The mobile ARPU in India, which has declined rapidly over the last five years, is U.S.\$3.10 a month. Compare this to the U.S. mobile ARPU of about U.S.\$50 a month. About 96 percent of mobile subscriptions in India are prepaid and there is a very high churn rate as subscribers constantly switch out providers to get the lowest rates. Over half of all handsets shipped in India in 2011 have multiple-service/SIM capabilities, allowing the user to swap out SIM cards for up to four mobile carriers in order to grab the best mobile rate at that time.

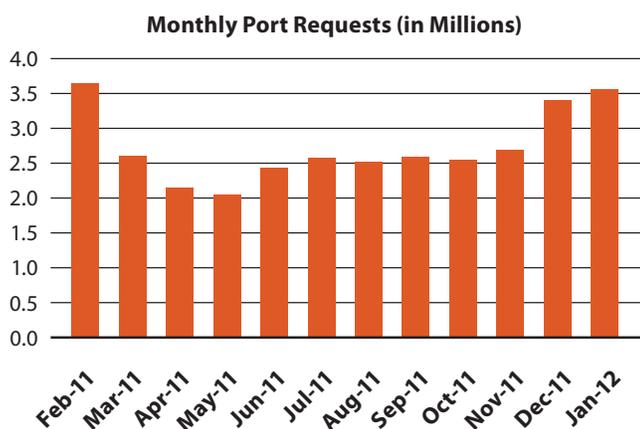
Given this, it is not surprising the churn rate in India is very high. The monthly churn rate averages approximately 6 percent, which means that a carrier such as Airtel, the largest mobile operator in India, could see annual churn nearly equivalent to its entire customer base of 179 million subscribers. Given this highly volatile mobile market, how receptive would India be to MNP? The other countries we have looked at with high prepaid populations have seen MNP implementations with, on average, a porting rate of under 5 percent and high rejection rates that appear to discourage users from leveraging the service. Will India be a macrocosm of these earlier implementations?

The most significant manner in which the India implementation differs from the other countries we have looked at is the fact that it chose to select two vendors to implement MNP: Telcordia and Syniverse. The two administrators are both responsible for porting transactions but operate separate platforms in specific service areas or zones. Syniverse provides MNP services in Zone 1 (North/West regions) and MITS, a joint venture with Telcordia (acquired by Ericsson in January 2012), provides MNP services in Zone 2 (South/East regions). The Indian regulator, the Telecom Regulatory Authority of India (TRAI), made its administrator selection in March 2009 and announced in April that MNP services would be available at the end of the year. This date was pushed out a number of times, evidently in part due to unanticipated security concerns. The MNP service was finally launched, more than one year late, in January 2011. TRAI mandates that the porting transaction be completed in seven days. Subscribers can expect to be out of service for up to two hours as the porting process is taking place.

So, has MNP been a success in India? As we see in Exhibit 6 on the next page, the number of porting requests over the first 12 months has amounted to about 3.66 percent (17.4 million in Zone 1 and 15.3 million in Zone 2), which is below TRAI's expectations but higher than some other percentages we've seen. Perhaps not too surprisingly, there has been a high volume of rejections, customer complaints and significant porting delays. Over 25 percent of porting requests submitted between January 2011 and November 2011 were rejected or abandoned. As we have seen with the earlier MNP implementations, rejections were due to outstanding bills, unverifiable identity, existing contractual obligations or ports requested within a 90-day don't-ask-to-port-again restricted period.

#### Exhibit 6: The First 12 Months of Porting Requests in India

Source: Telecom Regulatory Authority of India, 2011 and 2012 Monthly Press Releases



## Porting Lessons Learned Through to Today

There are certainly common threads that run throughout our country profiles from which we can learn; for example, a strong partnership between regulators and carriers is critical to the ongoing success of number portability. We can carry these lessons learned to both new and existing number portability implementations. However, just as important as the common threads are the differences we see between implementations (see Exhibit 7 on the next page). Each implementation is unique in hundreds of ways, including:

- Population
- Number of mobile subscribers
- Mobile penetration
- Percent prepaid subscribers
- Number of porting transactions
- Device subsidies
- Postpaid contracts
- ARPU
- Fixed-line penetration and number porting on fixed lines
- Number portability between fixed and mobile networks
- Number of operators/competition in the region
- Power of the regulator
- Implementation choices such as technology, fee structure, porting time, rejection reasons and user implementation process

This list scratches the surface of the variables involved in a number portability implementation. The final lesson learned is to acknowledge country differences. You can't take number portability from one country and port it over to another. Deploying number portability in Brazil only makes you eminently qualified to deploy number portability in Brazil again.

### Exhibit 7: A Sampling of Mobile Portability Demographics

Source: World Bank and Yankee Group, 2012

Country	2010 Population (in Millions)	2010 Mobile Subs (in Millions)	2010 Mobile Penetration	MNP Year Deployed	Time to Port	Percent Mobile Porting Transactions	Percent Prepaid Subscribers	Porting Charge to Dollar Equivalent
<b>UK</b>	62.219	81.115	130%	1999	2+ days	Not Reported	52%	Typically no charge
<b>Sweden</b>	9.378	10.885	116%	2001	3 days	5%	37%	No charge
<b>US</b>	309.349	278.900	90%	2003	2 hours	5.5%	25%	Monthly fee; varies by operator, around \$0.25
<b>Saudi Arabia</b>	27.448	51.564	188%	2006	5 days	3%	85%	
<b>Malaysia</b>	28.401	33.859	119%	2008	3 days	3%	76%	Allowed to charge up to \$8
<b>Brazil</b>	194.946	202.944	104%	2008	3 days	1.5%	81%	\$2, but may be paid by operator
<b>India</b>	1,224.600	752.190	61%	2011	7 days	3.6%	95%	Operator can charge subscriber up to \$0.33

Yankee Group research shows how important both common threads and country differences are to the success of number portability whether it is a new or an existing implementation. As the FCC and operators prepare to examine the next NPAC term, we offer the following synthesis of our global portability research:

- **Number portability implementations are highly complex.** Technical and operational decisions have wide-reaching effects that are not always easy to anticipate, including those related to cost, market uptake and the customer experience.
- **Number portability works when there's a strong partnership between carriers and regulators.** The former have the necessary operational and technical expertise, the latter are most effective in representing the public interest, and both sides working together is key to success.
- **Number portability, like all elements of today's communications infrastructure, must change and adapt.** As markets evolve, networks expand and subscriber trends emerge, number portability must conform to meet the challenges represented by these changes. Investment in number portability helps ensure the goals of a communication infrastructure that is open, neutral and competitive.

## About the Authors

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