

TELECOM BUSINESS REVIEW

A Journal of Symbiosis Institute of Telecom Management



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| • Low Utilization Towns (LUTs) in Telecom: a study of Imperative factors causing underutilization of Telecom Services in Rural India.
Mr. Aman Kwatra & Mr. Rahul Garg | 3 |
| • MVAS: New Growth Engine for Telecom
Mr. Ashwini Kumar Agarwal | 15 |
| • Mobile Infrastructure Sharing
Mr. Siddharth Puri | 24 |
| • Mobile Number Portability: the mystery yet to be uncovered
Mr. Avinash Aslekar & Ms. Apeksha Thombre | 32 |
| • Indian Telecom: Survival of the Cheapest
Mr. Vikram Singh Mains & Mr. Gaurav Ashok Patil | 39 |
| • Comparative Cashflow Statement Analysis
Mr. Uday Kulkarni & Mr. Abhijit V Chirputka | 51 |
| • Operations Support System, Business Support System & its Business Implications
Mr. Pavan Pachimatla | 58 |
| • Spectrum Auction Process for 3 G Mobile Services in India
Mr. A.M. Joshi | 69 |

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From the Director's desk.

It gives me great pleasure in presenting to you the third issue of Telecom Business Review (**TBR**). **The TBR** has been a platform for scholars, teachers, professionals & students to contribute & showcase their knowledge, experience, study results & findings in the relevant areas of Technology & Business Management. In the 2009 issue we published articles on diverse topics like Infrastructure Sharing, Business viability of WIMAX, m-Commerce and Cash-flow Statement analysis.

I am sure that this year's issue of the TBR too will help to trigger quality studies in field of telecom business management and enlighten and educate the telecom fraternity.

I would like to express my gratitude to Mr A.M.Joshi Former Advisor (Wireless) Govt of India for contributing a very informative research article in our “**Invited Article Section**” on 3G Spectrum auction.

At the release of the third issue I thank all the contributors for their thought provoking articles. I also express my heartfelt gratitude to the members of the editorial board and all our esteemed reviewers. I also seek the support of the telecom fraternity in our efforts of making the TBR global by contributing research papers that highlight global issues in telecom business.

Sunil Patil
Director, SITM

Contents

1. Low Utilization Towns (LUTs) in Telecom: a study of Imperative factors causing underutilization of Telecom Services in Rural India. Mr Aman Kwatra & Mr. Rahul Garg	3
2. MVAS New Growth Engine for Telecom Mr Ashwini Kumar Agarwal	15
3. Mobile Infrastructure Sharing Mr Siddharth Puri	24
4. Mobile Number Portability: the mystery yet to be uncovered Mr. Avinash Aslekar & Ms. Apeksha Thombre	32
5. Indian Telecom: Survival of the Cheapest Mr. Vikram Singh Mains & Mr. Gaurav Ashok Patil	39
6. Comparative Cashflow Statement Analysis Mr Uday Kulkarni & Mr. Abhijit V Chirputka	51
7. Operations Support System, Business Support System & it's Business Implications Mr. Pavan Pachimatla	58
8. Spectrum Auction Process for 3 G Mobile Services in India Mr A.M. Joshi	69

Low Utilization Towns (LUTs) in Telecom: a study of Imperative factors causing underutilization of Telecom Services in Rural India.

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Abstract:

Low Utilization Towns (LUTs) are the biggest challenge among the telecom services providers in India who are looking towards rural areas as new avenues of growth both in revenue and subscriber base, after certain saturation level reached in the urban areas. These LUTs have emerged as a big problem for these companies who either want to invest or have already invested millions of dollars in setting up the telecom infrastructure in the rural and interior parts of the country. The paper aims at identifying various reasons behind the classification of a Telecom Tower town or a village as a LUT. It also highlights the trends in rural telecom sales like customer aspiration and buying behavior and other sales issues, based on the survey done in 75 LUT towns and 75 other rural villages and towns in MP & Chhattisgarh and Rajasthan telecom circles spanning over two months. The paper aims to suggest various solutions and reiterates some of the possible sales and marketing strategies that can be applied to bring potential towns out of the Low Utilization list. It also explains the barriers that can hamper this process.

Introduction:

Rural markets in India represent a wide and untapped market for many products and services which are being marketed and consumed in the urban areas. There is a growing demand for telecommunication services to be provided in these areas, which are facing a huge digital divide. Till now it was government which was trying to reach the villages through various initiatives, but the rural teledensity is low and is now improving with the introduction of modern and suitable technology along with participation from the private operators.

Rural markets are seen as the growth power house for the Indian Telecom Industry which is encountering a nearly saturated urban market with a high cellular penetration. TRAI released the "Indian Telecom Services Performance Indicator Report" for the month of October 2009. The highlights of the report are:-

- 525.65 Million subscribers at the end of October 2009 recording 3.26% growth compared to September.
- Tele-density in India reached 44.87 per cent. Wireless density stands at 41.69 per cent.
- Rural Teledensity reached around 18%.
- Urban Teledensity reached 96.05%.

Now with the saturation of urban markets, the telecom operators have started looking towards the mostly untapped rural market of the country which is providing a large amount of opportunity.

The extent of this market is shown by the fact that India lives in villages, close to 72 percent of Indian population lives in rural areas. In the country we have 6.36 lakhs villages out of which only 13 percent have the population size above 2000. The rural economy contributes nearly half of the country's GDP (ETIG 2002-03) which is mainly agriculture driven and monsoon dependent. More than 50 percent of the sales FMCG and Durable companies come from the rural areas. The McKinsey report (2007) on the rise of consumer market in India predicted that in twenty years the rural Indian market will be larger than the total consumer markets in countries such as South Korea or Canada today, and almost four times the size of today's urban Indian market and estimated the size of the rural market at \$577 Billion.

According to the Census of India "Rural is defined as any habitation with a population density less than 400 persons per sq. km., where at least 75 percent of the male working population is engaged in agriculture and where there exists no municipality or board". The table below gives us the population and village size details in the country.

Rural Population Statistics

Population	Number of Villages	Percentage of total villages
Less than 200	114267	17.9
200-499	155123	24.3
500-999	159400	25
1000-1999	125758	19.7
2000-4999	69135	10.9
5000-9999	11618	1.8
1000 & above	3064	0.5
Total	636365	100

Source: Census 2001

Table no-1- Rural Population Statistics

USO Fund Utilization

The Universal Services Obligation (USO) Fund was set up to collect money from private telecom operators i.e customers of those operators, mainly in the metro, A and B class towns and then utilize this amount for improving the state of telephony in rural India. As of 31st March 2009, a total of 20,404.4 crores of money had been generated by this fund, and an abysmally low 34.44% of that money had been utilized; in fact, utilization was at its lowest in the 2008-09 fiscal in the last five years.

Table 9.26 : USO Fund: Collections And Disbursements			
Year	Collections	Disbursements	% Utilized
2003-04	2143.20	200.00	9.33%
2004-05	3457.70	1314.60	38.02%
2005-06	3533.30	1766.90	50.01%
2006-07	4211.10	1500.90	35.62%
2007-08	5405.50	1290.00	23.86%
2008-09	—	655.90	—
Total	20404.40	7027.30	34.44%
© MediaNama.com Data Source: Economic Survey 2008-09			

Table no-2- USO Fund Utilisation

The USO Fund was discontinued due to low utilization last fiscal, but has so far been used for the following:

- 1. Village Public Telephones (VPT), Rural Community Phones:** about 549,133 VPTs were currently eligible for financial support as on 28.2.2009. BSNL has set up 56,736 VPTs of a planned 66,822 uncovered villages; to be completed by November 2009. 40,616 Rural Community Phones were provided till February 2009, out of a planned number of 40,705 rural community phones (RCP) in villages with population of more than 2,000 and not having PCO facility.
- 2. Tower Infrastructure:** The government plans to set up and manage 7,871 infrastructure sites spread over 500 districts in 27 states for the provision of mobile services. The infrastructure so created shall be shared by three service providers, and as of 28.02.2009, about 3,941 towers were set up, of which 3,715 BTSs installed on many of these towers have started providing services. About 10,128 towers are proposed to be installed under second phase of the scheme.
- 3. MARR and Rural Direct Exchanges:** USO (F) support is given for provisioning of rural direct exchange lines (RDELs) in all the 1,685 net cost positive short distance charging areas (SDCAs). Multi-access radio relay (MARR)-based VPT's installed before April 2002 are being replaced under USO (F). Out of a total of 1,86,872 MARR based VPTs, 183,756 were replaced till February 2009.

What is an LUT town?

LUT, a technical term is defined as the tower or tower town in which the average traffic volume is less than 100 Erlang. An Erlang is a unit of traffic measurement in telecommunications. Strictly speaking, an Erlang represents the continuous use of one voice path. In practice, it is used to describe the traffic volume per hour

For example, if a group of users made 30 calls in one hour, and each call had average call duration of 5 minutes, then the number of Erlangs this represents is worked out as follows:

$$\begin{aligned}
 \text{Minutes of traffic in the hour} &= \text{number of calls} \times \text{duration} \\
 \text{Minutes of traffic in the hour} &= 30 \times 5 \\
 \text{Minutes of traffic in the hour} &= 150 = 2.5 \text{ hours} \\
 \text{Traffic figure} &= 2.5 \text{ Erlangs}
 \end{aligned}$$

Erlang traffic measurements are made in order to help telecommunications network designers understand traffic patterns within their voice networks. This is essential if they are to successfully design their network topology and establish the necessary trunk group sizes.

In the business sense, the low utilization town refers to the town where the call traffic volumes are small and hence revenue generated is less. And therefore it becomes financially unviable for an operator. According to Cellular Operators' Association of India (COAI); erecting one cell site involves a capex of about Rs 30 lakhs. To add to that are operating and marketing expenses. So as far as LUTs are concerned the return on investment for the telecom company is not sufficient. The companies are particularly concerned with tower towns that have traffic volume less than 60 Erlangs as this traffic volume represents the minimum required return on investment (RoI). A Town can be a LUT for one particular telecom player or it could a LUT for all the players. This paper analyses the reasons behind the classification of towns as LUTs for a mobile operator based on data collected during 2 months of survey across 75 LUT towns as well as 75 other villages/towns in rural India. It also discusses various strategies a Telecom operator can apply so as to declassify potential LUTs and to improve their RoI.

Methodology of Survey:

There can be various reasons for a tower town to have a low utilization or low traffic levels. For this purpose a survey was conducted by the authors in summers of 2009 in about 75 LUT towns as well as 75 other rural towns and villages in Madhya Pradesh, Chhattisgarh and Rajasthan circles. About 1200 mobile phone users, 400 retailers (of mobile phones, recharge coupons and new connections) and about 75 distributors were interviewed. Most of them were personally interviewed and some on telephone.

A comprehensive questionnaire was prepared keeping in mind the aim to:

1. To understand all the possible reasons for a town to be classified as LUT.
2. To understand the telecom usage pattern in rural areas.
3. To capture the profile of the customer.

Personal visits were then made to each of these towns where the authors met mobile users, retailers and distributors of telecom operators as well as handset manufacturers. These respondents were interviewed to identify the major reasons behind low usage of telecom services in different towns as well as to understand the needs and aspirations of mobile phone users in rural India.

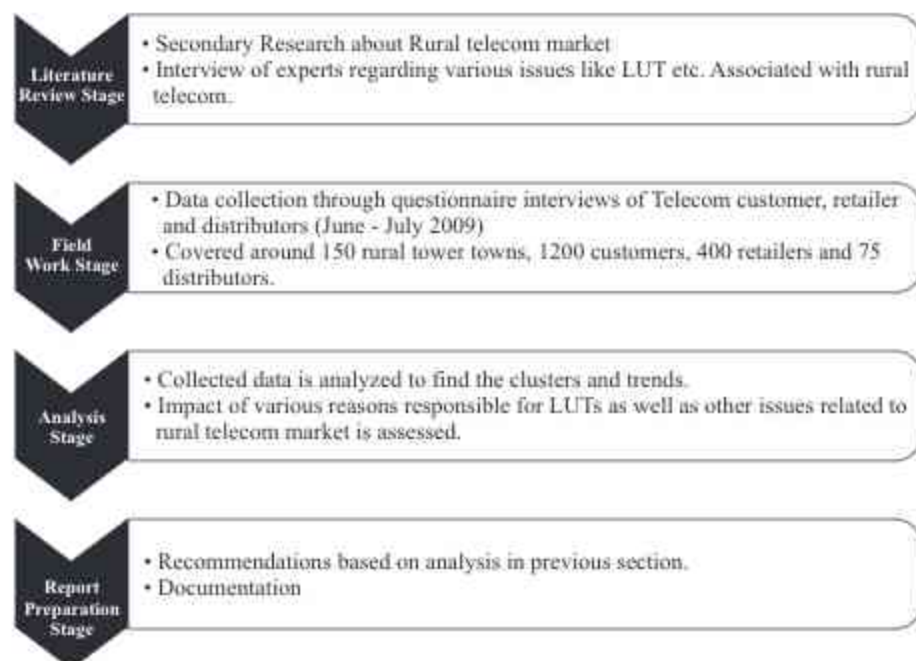


Fig: Methodology of survey

Figure no-1 Research Methodology

Results of the Survey:

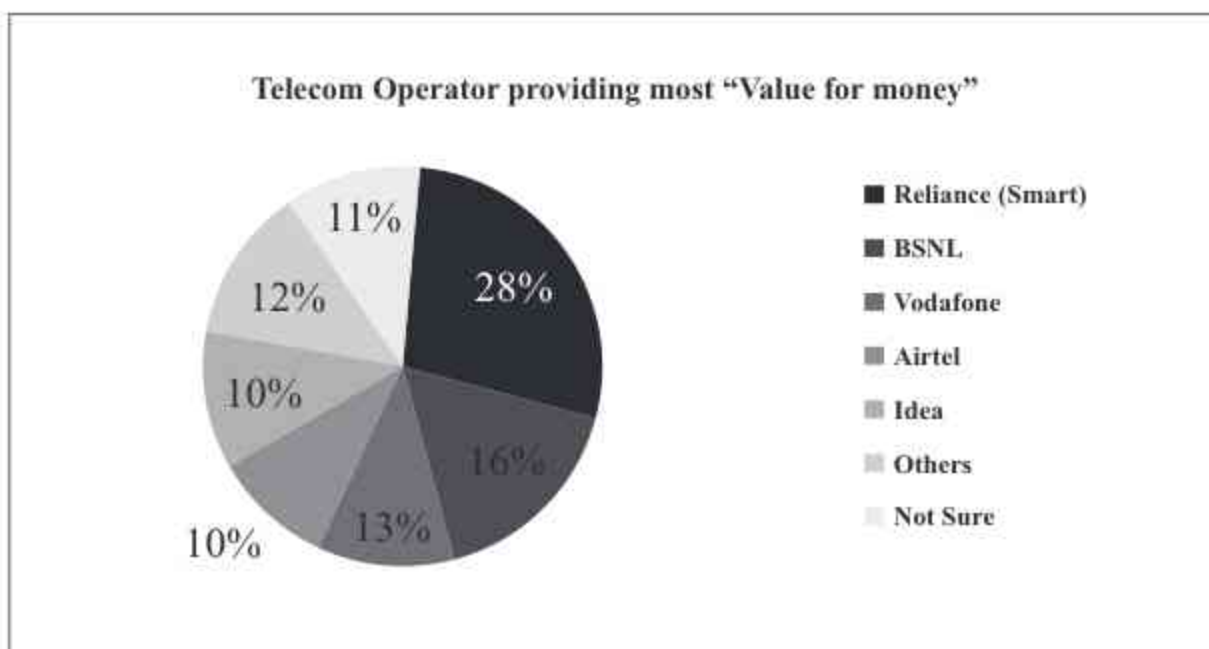
According to survey conducted the top 5 consideration for rural customer while going for any telecom connection are as follows:

Top 5 Priorities for Rural Customer:

S. NO	Priorities	1 st Choice by Respondents (%)
1	Low Tariff	33
2	Same connection as people they know like friends, family, village	20
3	Better network coverage	17
4	More Schemes	14
5	Good Distribution	13

Table no-3- Priorities of Rural Customers

The survey clearly indicates that the Low Tariffs are highest priority for rural customer followed by caller group preferences and a close third is better network coverage provided by the operator. This clearly indicates that the rural customer wants a cost effective service with decent network quality. Then we asked the customers about which is the telecom player that delivers the highest value for their expenditure. Reliance Communication was voted as the highest value offering telecom provider followed by BSNL, Vodafone, Airtel and Idea.



Satisfaction Ratings:

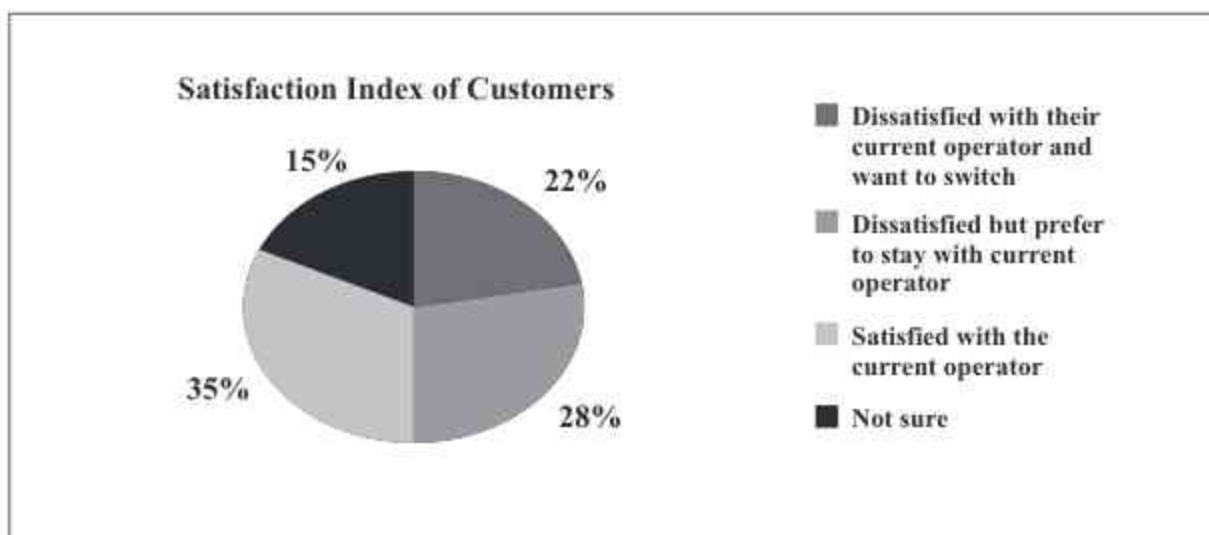
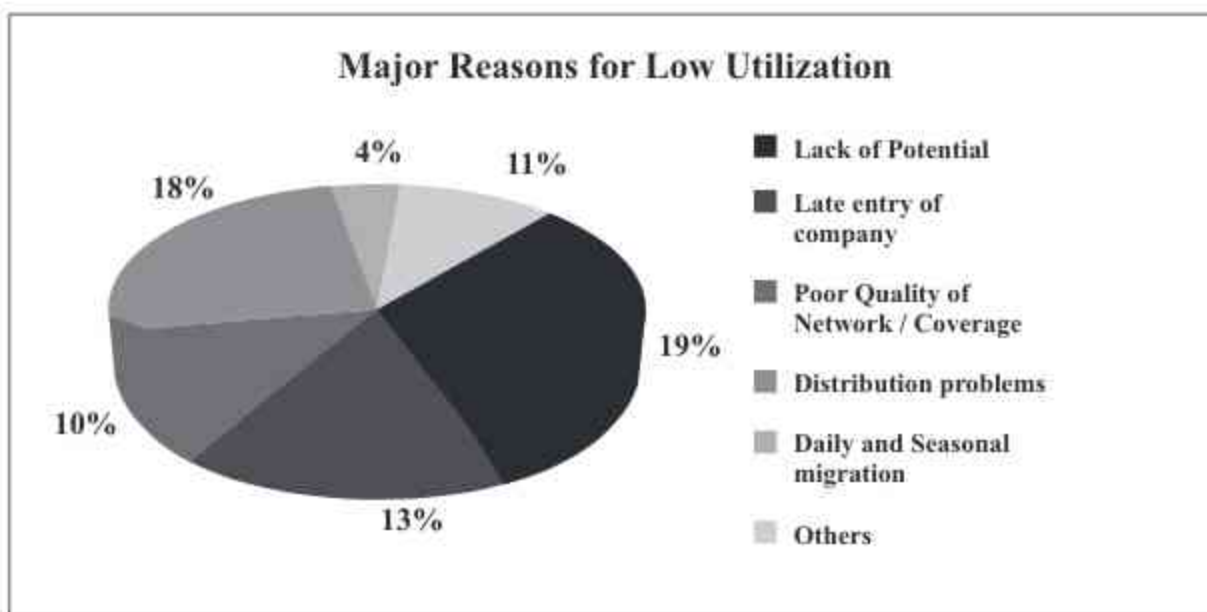


Figure no-3 Satisfaction Index of Telecom Customer

About 22 % of respondents were found unhappy with their current operator and wanted to switch to other mobile operators. 28% respondents also found the current operator's services unsatisfactory but preferred to stay with current operator if some improvements were made and about 35% responded in favor of their Telecom operator while 15% were unsure about this.

Although a Tower town can be classified as LUT for different reasons in isolation or for a combination of all these reasons, some of the factors that emerge as the key reasons behind the low utilization of telecom services are as follows:

**Figure no-4 Major reasons for low utilisation**

These reasons bring out important points for consideration for the telecom operator to ascertain the true potential of a town so as to avoid making unproductive investments. The important questions to be asked are:

1. Whether the town/village has a sufficient population and what is general trend of mobile usage by customers in that town?
2. The majority of mobile users in these villages are males more than 15 years of age. Hence, the telecom usage in any town depends on the population of the town, the number of males more than 15 years of age in the town?
3. What is the average per capita income or in general prosperity of the village?

Major reasons for low utilization of telecom services:

1. **Entry of the company in particular location:** Whether the company was the first entrant in a particular location or it has entered there after its competitors. Generally these towns have limited number of potential users. So the entry timing is important for company to acquire sufficient customer base. Not only is the entry in particular town important but also the entry and coverage in nearby areas affect the subscriber base of the company, especially the Telecom operator who enters the major village/ town in the region, where weekly **Haat** is organized is found to be successful in acquiring substantial market share in nearby smaller villages whose trade and weekly purchase is dependent on the main village/town. So it is very important to be among the first 1-2 players in the region to capture a significant market share as the early adopters in the villages are prosperous sections like big farmers and Traders, who generally do not change their operators. They are also the highest ARPU or revenue providing group in the rural areas. The success of the company in rural areas also depends on such groups that have considerable influence on the people around.

2. **Quality of Network and coverage:** Sometimes the villages/town towns with sufficient potential and usage are also found to be classified as LUT. The reasons for this are issues related with network and coverage. There may be a case where the tower in the village is not functioning due to network maintenance issues as well as due to power shortage (though most of them are powered by diesel generators) or the range of tower is reduced to such a level that it is unable to cover the entire village as well as adjoining fields. In this case the tower will report less traffic and the town will appear as a LUT with low traffic or usage. There could also be the case of "Tower Cannibalism", which means two towers of the same operator have been placed in an area where only one tower would have been sufficient considering the covered area and population. As a result the traffic would be shared between the two towers and so either of the towers or both will report low traffic volumes and hence the town would be classified as a LUT. This also leads to problems like increased call drop rates etc. Most of the problems related to the functioning of tower have been seen on shared sites, so before going in for tower sharing with other telecom operator, the company should ensure the reliability of the partner.

3. **Distribution network and service provided by the company:** If there is any distribution lapse in the particular town related to activation of sim cards, availability of recharge as well as retail outlets in particular town along with handling of customer's complaints, it can also be a cause that leads to presence of a town in the LUT list. The rural market is very much based on trust, mouth to mouth publicity and it is highly price sensitive. Most of the rural telecom subscribers except for businessmen are not interested in retaining their number and so they are more likely to change their number and hence the operator. The company should therefore not only ensure proper pricing of its services but also maintain a healthy and swift distribution network that can ensure sufficient availability of recharge, sim cards etc. as their absence will lead to negative publicity about the company and it may see a huge dip in its market share within small frame of time. As the distributor margins are thin in the telecom sector it is now a better strategy to have small and focused distributors rather than large distributors to cater to the needs of a rural area efficiently.

- 4. Daily and Seasonal migration of the residents of the town:** The degree of daily and seasonal migration from the town/ village has a huge impact on the telecom usage in that village. The extent of seasonal migration of labor also has a huge impact especially in rural areas of states like MP, Chhattisgarh, Jharkhand, Bihar, Orissa etc. where large number of labourers consisting of both male and females migrate to cities or other states in search of work. Sometimes, about 50%-60% of the population migrates in the migration season and returns only at the time of sowing and harvesting of crop. Hence, sufficient business is available only during these periods. Daily migration occurs when majority of the male population from the village goes to nearby town for work and other activities. As they represent the majority of customers, this daily migration leads to underutilized tower capacity in the day time. Villages situated near inter-state borders are found to have prevalent sim connections of other states; this presents another problem to the operators. This is caused mainly due to inter-state trade relations. This also reduces the usage as call charges and other service charges while roaming are very steep.

Recommendations:

- To offer special schemes at least for a duration of one week when the rural customer go for shopping basically in local "Haat" and this is the time when most of the recharge sale is being done in that particular area.
- More Incentives on closed user group calling as well as better schemes should be offered on Intra Network calls to promote peer influence for choosing particular operators.
- More visibility through marketing with special focus on marketing and Van activities during "Haat" day
- To solve the problem due to migration and cross border SIM cards, the company should either launch a SIM card that functions in 2 neighbouring states or should offer recharges that make roaming charges less (or equivalent to local call charges).
- Better research should be done on market potential of a particular area before erecting a telecom tower and towers should be placed at proper distance and suitable height to get maximum coverage and prevent "Tower Cannibalism".
- Stricter Service Level Agreements (SLAs) should be negotiated while opting for sharing of towers as shared towers are reported to have most network related issues.
- As the Trade channel margins are getting feeble by the day (2.5 % for retailer, 1.5% for distributor), the operators should pitch in for smaller distributors especially those related with distribution of FMCG products in that particular territory as it will be easier for them to manage the entire territory at lower costs and will be more dedicated for providing the service.

Marketing Issues in Rural Telecom

Aithal and Mukhopadhyay (2007) have given a framework to address the issue of the urban and rural gap and reaching to the rural masses can be addressed by falling back on the Bottom of the Pyramid (BOP) marketing strategies as advocated by **Prahalad (2004)** and the 4 A's Availability, Affordability, Acceptability and Awareness (**Anderson and Biliou, 2007, Kashyap and Raut, 2005**). The BOP marketing strategies basically talk about aggregating the demand of consumers who have low individual purchasing power and are spread out. The basic commercial infrastructure suggested by **Prahalad and Hart (2002)** for the bottom of the pyramid markets constitutes of four things, creating buying power, improving access, tailoring local solutions and shaping aspirations.

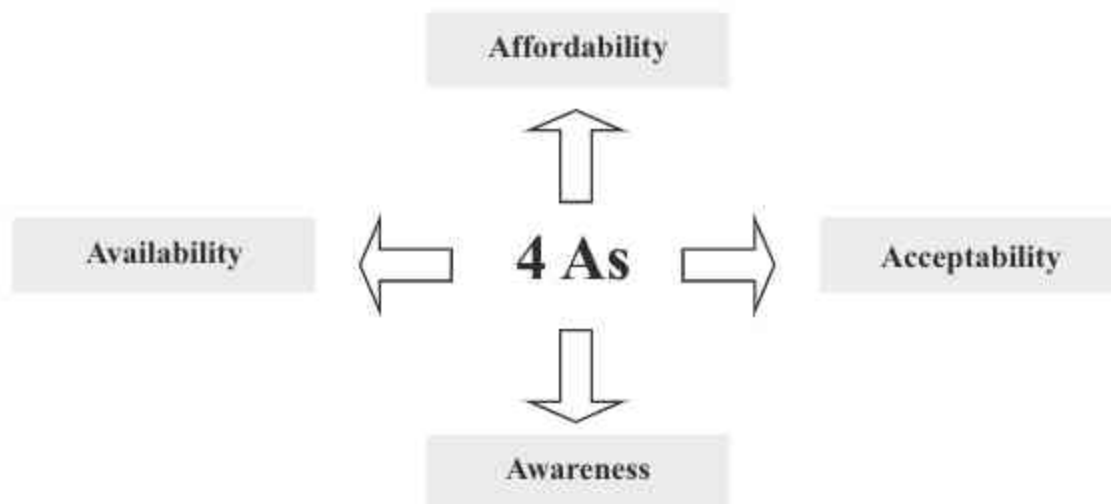


Figure 1: 4 As Model

The 4 As model described in Figure 1, is explained in the context of rural telecom. Each of the “A” s is detailed out below.

- Availability:** it is about making the product/ service reach the consumers and in the case of telecom services, studies have shown this to be the biggest barrier to be overcome (**Anderson and Biliou, 2007**). It has been acknowledged by many that distribution systems are the most critical component and a barrier which needs to be overcome (**Prahalad & Hammond 2002**) for success in marketing in rural areas. The task of distribution in these areas is considered to be more difficult than in urban areas (**Mandira, 1977**), low density of population and inaccessibility makes the problem of servicing villages individually difficult and often uneconomical. Direct delivery of goods even to the top one percent of villages costs twice as much as servicing urban markets (**Ganguly 1985**). To overcome the difficulties posed in distribution, a phased spread of the services is recommended, wherein bigger villages can be targeted first, then the ones which are near a small town and connected and last would be the remote villages. In the distribution the importance of small town markets cannot be ignored and need to be given importance, as besides being a point of distribution they can also be used for promoting products as villagers tend to come to the town frequently for either purchase of agricultural inputs or sale of their produce.

- Affordability:** Affordability issues in telecom would include two sets of issues, the first being a fixed cost, and an initial barrier for a villager to start with the service needs to be brought down and many companies including the market leader Nokia are working on low cost handsets which could be of use in rural areas. Within the product too there is a need for customization in terms of language and user-friendliness. The fact that among the rural population the level of literacy is very low needs to be taken into consideration before coming out with the product. The features that would be included in the product need to be rethought; the needs of rural consumer need to be taken into consideration. In terms of handset feature in a rural area a mobile- radio combination might make more sense to the rural consumer than perhaps a mobile-camera combination. And while designing the phone one needs to keep the problems related to the power shortage in the villages. The second component of recharging of the handset battery also needs to be tailored according to the needs of rural masses. The availability of disposable income in rural areas is related to cyclical agricultural activities and thus the recharge coupons provided in the urban areas might not be suited to the needs to farmers and hence the promotions and schemes for the rural markets also need to be in accordance with the agricultural cycles. And it has been shown through the success of single use small packs that the cost per-use is more important than the cost of the overall product or service.
- Awareness:** The last A, Awareness is linked to the issues of promotion of telecom services in rural areas. The promotion of the services also needs to be adapted to the village environment; the language and means of communication used should be in the local language. The best places to promote the services could be the local haats and melas which are frequented by the villagers, the local festivals should also be included in the promotional plan, so should the agricultural cycles.

Conclusion:

Studies have shown that the communication needs of rural consumers are limited. In a study done by **ICICI (1998)** they found that nearly 70% of the outgoing traffic from rural areas is meant for a destination within the district. Of this 40% remained within the Taluka. Only 20% traffic goes to another district and hardly 10% to another State. International calls represent less than 1% of the traffic. The needs would go beyond basic commutation needs and initiatives like one by Reliance Telecom services which helps farmers ascertain market prices (**Beshouri, 2006**) should provide us with a pointer.

Lastly, issue of proper segmenting and targeting of village consumers should also be addressed. Rural India is not a homogenous mass, but there are pockets of prosperous villages and areas in the country and within villages the purchasing capacity of the villagers vary and the products to be offered need to be tailored to their needs.

The rural telecom market will lead the future and growth of telecom industry in country. Due to improved communication means, people in rural India are not only better connected but have also used it for multiple advantages. Farmers use mobile phones to know the prices of various agriculture output for getting better prices. Labourers use it for knowing the demand of workforce in different region which save their time and energy in searching jobs. But the telecom operators should not look at the rural markets for the revenue generation from day one. They should nurture the market which is still in its nascent stage of growth. They should launch schemes and services keeping in mind the various aspects of rural customer's needs and aspirations. This way they can create a huge growth potential platform for the future.

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MVAS New Growth Engine for Telecom

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The views expressed in this paper represent the author and not his employer.

Abstract:

The paper explores the Mobile Value Added service (MVAS) market in India vis-à-vis global markets. It identifies the key growth drivers in this market and the key challenges this sector would need to overcome. Currently around 10% to 15% of operators' revenues come from MVAS, but typically, these revenues are high margin, and more critically, enable operators to differentiate their brand from other players in the market.

With 3G/Wimax auction due in December, this category is going to see unprecedented growth. Multitude of services will be offered through this medium and the telecom industry landscape is on the cusp of change.

The paper estimates the potential market for these services in urban areas and esp. in untapped rural India. It covers the various innovative ways in different categories such as Entertainment, M-Commerce & information which are acting as catalyst for MVAS in India.

The paper analyzes the strengths and weaknesses of the current business model of MVAS i.e. revenue sharing model. In the end the paper describes the future of MVAS in India & how MVAS will make its presence felt in every nook & corner of the country & how it will change the way the people communicate in India.

Why MVAS?

Indian Telecom Industry is witnessing a trend of the sharp increase in the wireless subscriber base. To take a pie, many more operators are launching their services in the market, resulting in more & more competition among the operators, which in turn is pulling the call rates more & more down. Putting it in different words: there has been an increase of 48.95% in the wireless subscriber base over the period of June 2008 to June 2009, while on the other hand, there has been a sharp decline of ARPU (Average revenue per user), 22.7% over the same period for GSM operators. Another challenge popping up for the operators is the decreasing MOU (minutes of usage) which has shown a decline of 10.2% over the same period.

Decline in ARPU can be largely attributed to the competition among the operators & to the various marketing initiatives by the telecom companies such as ½ paisa per second & lifetime validity plans. As voice has become more commoditized, the challenge is to retain customers. Further, customer retention has also become increasingly difficult, as loyalty is getting diluted given the low switching costs between service providers. The constant decline in tariff structures over the past few years has led to the creation of a large subscriber base; however, MOU is going down.

As voice has become more & more commoditized, keeping the dependency of revenue just on the voice would be risky business for the telecom companies. Telecom companies have to distinguish themselves in the market.

In the wake of the changing dynamics of the Indian telecom industry, mobile operators in India have been faced with two clear challenges:

- to retain customers in a predominantly pre-paid, high-churn market.
- to develop alternative revenue streams and create a basis for differentiation as voice becomes commoditized.

These are the key challenges which are giving more & more push to MVAS. As voice has become a commoditized service, it's only MVAS which gives a differentiating edge to the operator. This is where the MVAS emerges as the rising sun.

MVAS:-

The Indian Unified Access Service License (UASL) defines mobile value-added services (MVAS) as "enhanced services which add value to the basic teleservices and bearer services for which separate license are issued." MVAS, in other words, are those end user services that are not part of the basic offer. Of course, the regulatory perspective and the market perspective on what constitutes "the basic offer" change at different rates. For example, person to person Short Message Service (P2P SMS) is still categorized as a mobile value added service, but with mass adoption most consumers see it as a part of core/basic mobile service.

The Internet and Mobile Association of India (IAMAI), the primary industry association for MVAS players, segments the business as shown in the following chart.

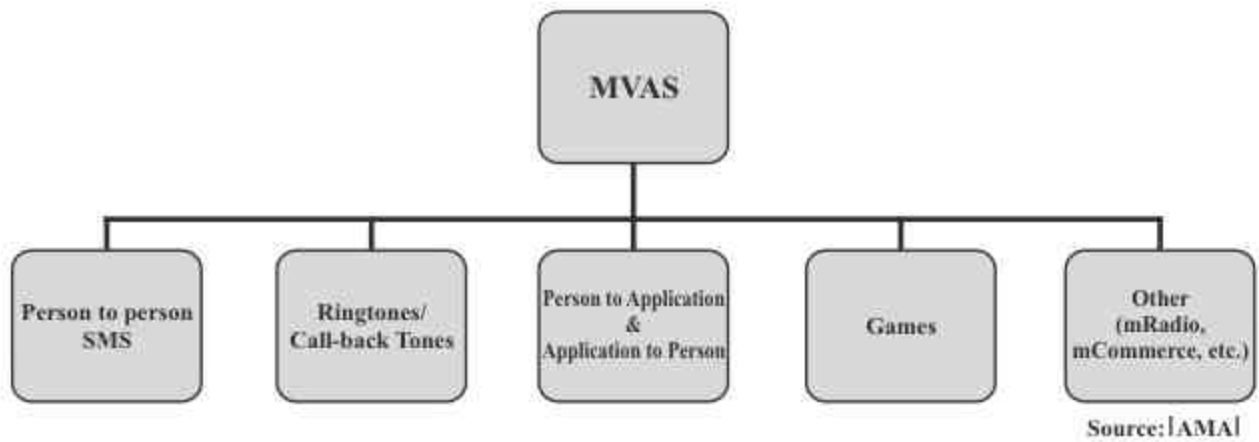
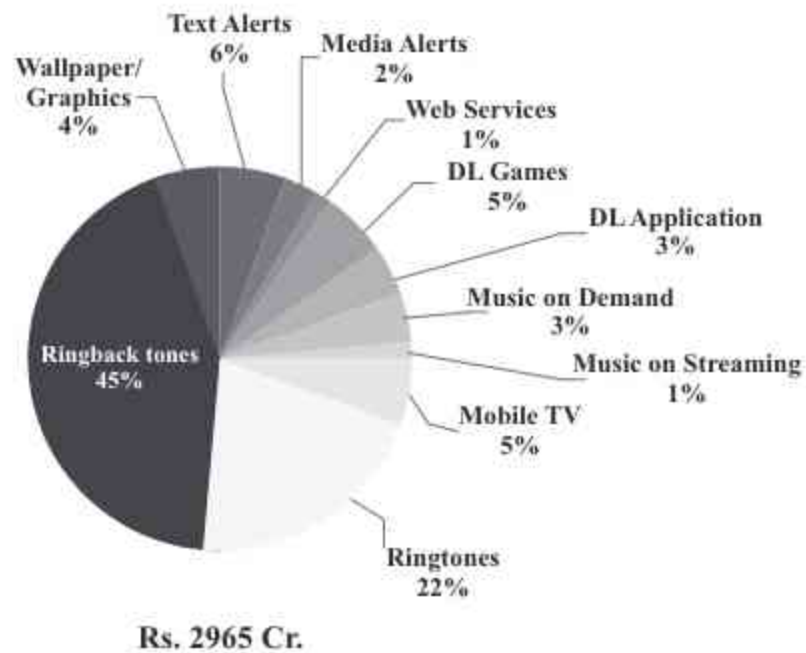


Figure 1:- MVAS Classification.



Source: Strategy Analytics, Wireless Media Strategies

Figure 2:- Non SMS Consumer MVAS spending, 2008.

MVAS Business Model

MVAS has also resulted in the emergence of an entirely new business eco-system giving rise to supporting industries such as content development and aggregation. There are multiple stakeholders playing across the MVAS value chain, many with overlapping roles and functions.

A well demarcated value chain of MVAS is yet to evolve.

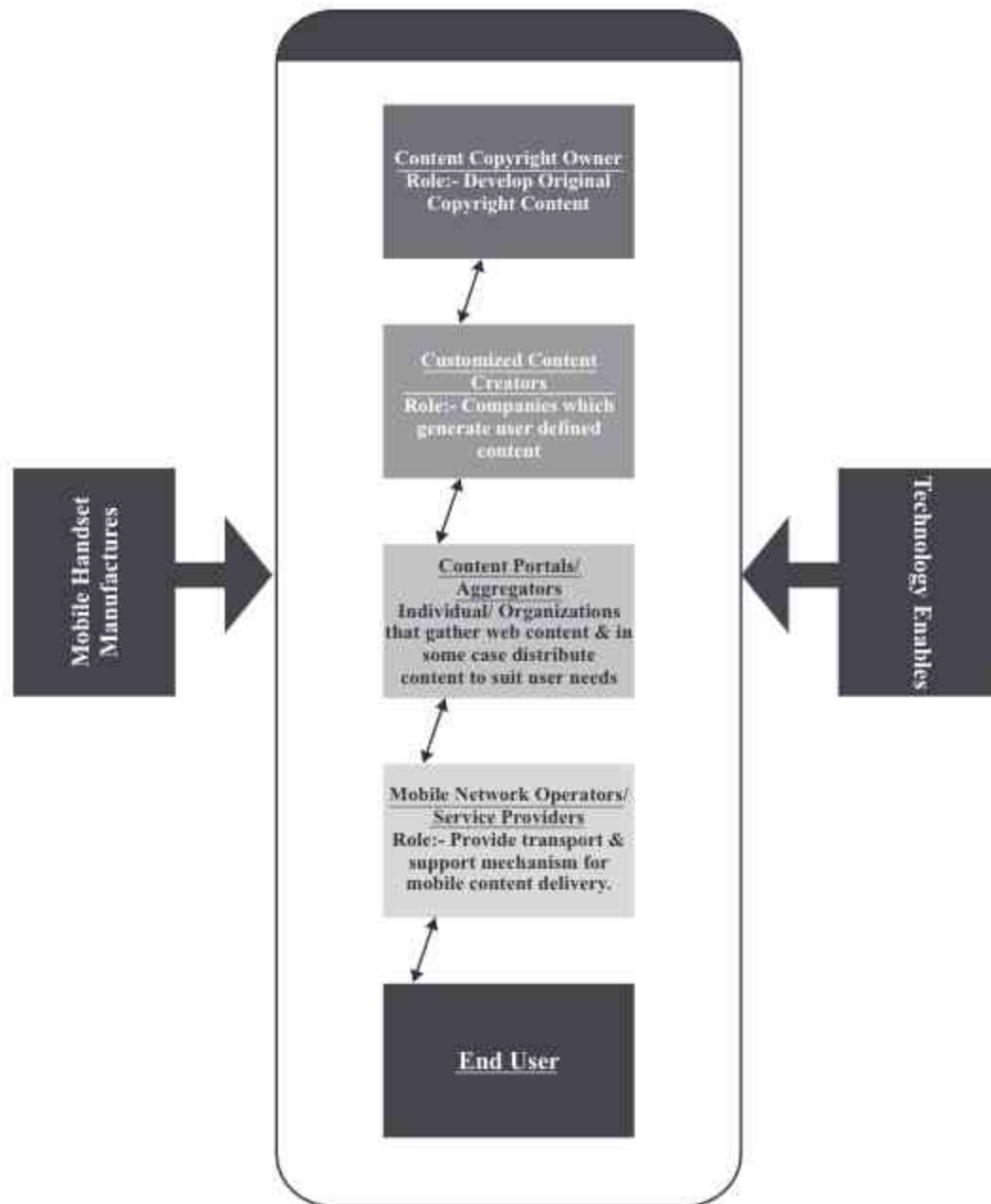


Figure 3:- MVAS Industry Value Chain.

The main stakeholders involved in the VAS value chain are:-

Content copyright owners: At the first level of the MVAS value chain are the content copyright owners, which develop original copyright content. Examples include music production houses (SaReGaMa, Sony), Bollywood production houses (Yash Raj Films), and media houses (Sony, Star, Zee, etc.)

Customized content creators: Refers to companies that generate customized content for users through their own portals. Examples include Mauj, One 97, and Hungama Mobile.

Content portals/aggregators: These are individuals/ organizations that gather web content and in some cases distribute content to suit customer needs. Examples include Indiatimes and Hungama Mobile.

Mobile operators: They provide transport and support mechanisms for delivery of mobile content. Examples include Airtel, Reliance, BSNL, MTNL, Hutch, Idea Cellular, etc.

Technology enablers: On the other end of the value chain are technology enablers. These provide technology platforms that enable access to MVAS. Players include OnMobile, Bharti Telesoft, Webaroo, etc.

Handset manufacturers: Mobile handset manufacturers have also started playing an important role, through their interaction with all other stakeholders across the value chain. Their activities include embedding software links in their handsets, allowing direct access to content portals, creating services customized to the need of certain regions, etc. Key players in the Indian market include Nokia, Motorola, and Samsung.

The value chain is dominated by operators, who retain 60 -80% of total revenue, with the balance divided between other stakeholders as described further; 1525% for the content aggregators and 1015% for content creators, royalties paid out to the copyright owner accounts for 1015% of the total revenues.

Growth drivers

The growth in the market will be propelled by operator initiatives, as well as by the following macro-economic factors.

- 1) **The flourishing Indian economy:** India has emerged as one of the fastest growing economies in the world, with spending on infrastructure and consumption growing at a rapid pace. Growing employment opportunities have resulted in a significant increase in disposable income, leading to a growing acceptance of new technologies and expenditure on communication.
- 2) **Increasing user comfort with basic mobility services:** The Indian mobile telephony market has attained critical mass due to the increasing affordability of mobile services, as well as the increasing comfort with basic mobility services. A large chunk of users are comfortable with operating their mobile phones, and would progress into demanding more value-add beyond basic voice applications, driving the next phase of growth.

- 3) **Personalization of content and devices:** For a large number of subscribers, the mobile phone has become an extension of their persona. The success of “caller ring back tones” is evidence that users are willing to adopt services which offer them the possibility of personalization.
- 4) **Low Tele-density rural markets:** The Indian telecom industry has seen unprecedented growth during the last decade. According to the Telecom Regulatory Authority of India (TRAI), overall tele-density of India increased from 6% in 1998 to 37% by the end of March 2009. Much of this growth can be attributed to growth in urban markets. As of March 2009, urban tele-density in India was 89%. However, more than two-thirds of India's population lives in rural areas where tele-density was 15% as of March 2009. Hence, with urban markets saturating, much of the next wave of subscriber growth in the Indian telecoms market can only come from rural areas. While this will add 150 million new potential MVAS users, reaching them will require services designed for that market, such as:
 - Services that incorporate IVR (Interactive Voice Response) for rural areas where the literacy rate is low
 - Locally relevant content:- Agricultural information services that would, for example, equip the farmer with a choice to make decision as to where to sell his produce based on rates available from multiple markets.
 - Applications should be developed in the local language for example Google launching its search engine in Hindi & other regional languages to broaden its reach. On the similar lines Wikipedia & Financial Times launching their sites in Hindi.
- 5) **Declining Tariffs:-** The call tariff is declining continuously, local call tariff which used to stand at Rs. 15 for 1 minute call is now less than Re. 1. STD call between Delhi & Mumbai which used to cost at Rs. 37 per minute; now costs at Re. 1 i.e at the rate of local call. ISD calls to American Continent which used to cost at Rs. 75 per minute now costs at less than Rs. 7.

Challenges:

1. **Revenue Sharing model between Operators & Content provides is hampering content innovation:** At present, the revenue share between operators and other content stakeholders is 70:30, which essentially restricts innovation in content generation from content providers. This is totally different from advanced wireless markets such as Japan and Korea, where the revenue-sharing agreement is normally 15:85 between operators and content providers. VAS providers are reluctant to invest in R&D because such investment doesn't justify their ROI, considering the fact that operators take the major chunk of the revenue
2. **Feature rich handsets are still high priced:** High-end data services such as internet access on phones and other high-end VAS such as IVR are not available on low-cost phones, whereas more than 50% of mobile phones sold in India are low-cost phones of less than Rs. 2250. Also, general packet radio service (GPRS) features have not been embedded in low-cost phones.
3. **Ease of Use:** Users are not comfortable with navigating and searching for content on handsets, which has actually made them reluctant to use such content. Users must take several steps before they can reach the application they are looking for. Users look for easy navigation.

4. **Awareness among users about high-end data services is abysmal:** Many users do not use MVAS services as the Telecom Industry is still very new in India. People need to be educated on the usage of mobile phones. Mindset of the people is still that mobile phone are for making the voice calls; still people need to be educated that the apart from voice calls there is much more to be made use of.

Entry of 3G in Indian Markets:

3G is just beginning to come on the radar for Indian markets. Operators in Indian markets can learn from the 3G rollouts and successes beyond Japan and Korea as Europe and now US are ramping up. It is expected that it will take time for operators in emerging markets to prioritize which 3G applications will work given their competitive and market realities. Asian markets, especially the ones, where population is in abundance like China, India, Bangladesh and Pakistan are yet to migrate to 3G whereas countries like Indonesia and Sri Lanka are already on 3G but have yet to realize significant success.

Markets like Sri Lanka, Indonesia and Malaysia where 3G was deployed some years back have seen moderate success. The most prominent reasons being the high price of 3G devices and premium prices for services. 3G remains the preserve of a very niche class that can afford to pay premium for data services.

There is no doubt that 3G will strengthen the portfolio of data services but as most of the emerging markets are hugely price sensitive, operators will have to redesign the business models to suit the data affordability of the subscribers.

Today operators charge a premium for data services and these data services currently Contribute 8-10 % to their overall revenues. Operators will have to creatively package devices, application and payment approaches if they are to see significant uplift from 3G.

Undoubtedly 3G holds immense potential for all the operators. As voice ARPU is declining, operators are relying heavily on data services for revenue contribution. At present data services contribute barely 8-9 percent to operators' overall revenues, while operators are hopeful that after the 3G launch, data services will get the required boost.

Like many other emerging markets, high price 3G devices could be a major bottleneck in the adoption of 3G in India. Low-cost phones (< Rs. 2000) which rule the Indian market do not have features like Internet access and other high-end value added services. Indeed even GPRS features are missing from these phones. Operators will face the challenge of delivering rich media equipped high end devices capable of supporting music, video, games etc and also delivering entry or midrange 3G devices which will entice mainstream users to upgrade to 3G. 3G is likely to be targeted to niche customer groups at first with the usual slow adoption until device prices and tariff levels reach mass market levels.

Voice ARPU is declining and operators have no option but to push data services in the market. But this push is required from all the stakeholders involved. Launch of 3G will give more negotiating power to the content providers to increase their share of revenue. In the near term, 3G will be limited to metros and to some A class cities only. In the class A cities, handset prices are not an issue. In B and C class city subscribers would neither be able to afford 3G devices nor the 3G services without a subsidy for one or the other. It is not a viable business proposition for operators to launch 3G in low-spending areas right now.

Conclusion:

At the end the author would like to mention that the MVAS have still not penetrated to every section of Indian Society. Reasons are many starting from low awareness of services to the difficulty in the use of the services. Following are the recommendations to further advance of the MVAS market & its usability among everyone:-

- a) **Innovation:** - Innovation is the key to the advancement of any technology, market & society. In the current scenario of Indian market the revenue share model between the content providers & operators is obstructing the innovation in the market. In the current scenario when the content providers are not getting proper share then definitely it has to have an impact on the innovation. Current revenue share model where the distribution of revenue between operators & content providers is 70: 30 approx should at least reverse. More shares to content providers in revenue would result in more & more investment flow in the R&D of newer & customized services for the local markets.
- b) **Services at Free trial:** - A very successful method of promotion which has not been widely used in the telecom sector, i.e services at free trial. In other words the services such as colour Ring back tones, jokes, ringtones download should be allowed to be downloaded/used/subscribe for a period of time free. Later on, let's say after one month there could be some charges as applicable. This step will make people more aware of the services & people would not hesitate to subscribe it for the first time. Once a particular service is used by people then there is higher probability that they will use it in future too.
- c) **Granularity of Subscriptions:-** Operators should work on providing the services with more granularity i.e. the subscriptions of services should be available for one week or fortnight basis than the current model of at least one month subscription. Again this would enable more & more users hooked up to the MVAS.
- d) **Education of VAS:** - Most of the mobile-users in the network are not more than 5-6 years old in the network. Users are still new on the network. Users still do not know how to send the SMS or due to the complexity of usage they do not send or to subscribe a MVAS. The Users should be educated further in this direction so that they can enable themselves to MVAS.
- e) **Rural Market:** - Customizations of the services should be done as per the need of the local market need. Rural markets which highly dependent on their local language for communication would use the services only if it is their local language which they can understand. Hence the more & more content or services should be designed in the local languages.

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Mobile Infrastructure Sharing

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Introduction:

The Indian telecommunications industry, especially the mobile communications sector, is abuzz! Constantly grabbing headlines from measures being taken to increase the otherwise miniscule rural tele-density to the enormous overall monthly net subscriber adds in the country; from the never-ending war on spectrum to the allocation of licenses to new-entrants; from the basic issue of establishing nationwide operator connectivity to the advent of 3G services the Indian telecommunications market is most certainly, the place to be!

One aspect of the Indian telecom arena that has been gaining in importance over the past few months is mobile infrastructure. This segment has witnessed a sinusoidal wave of sorts in terms of the level of attention and effort that has been shown by mobile operators. When mobile communication first came into the country, operators entered into a race to increase their network connectivity and use it as a differentiating factor to attract customers. Then, not so long ago, came the age of independent infrastructure providers (IP-1 players) which saw a host of tower companies cropping up across the country. Mobile operators were keen to hive off infrastructure build-up and day-to-day operations and concentrated solely on their core business of customer acquisition and retention. Today, operators have realized the enormity of the infrastructure business, and have set-up their own infrastructure arms to roll-out massive numbers of cell sites on ground.

This paper talks about the basic concepts of mobile infrastructure sharing, various business models that exist today and the impact that infrastructure sharing will have on the fastest growing wireless market in the world.

Quick Facts: Indian Wireless Market

- Second largest wireless market in the world, with a subscriber base of 441.66 million (as on 31 July 2009)^[1]
- Fastest growing wireless market in the world, with monthly net subscriber additions of 14.83 million (as on 31 July 2009)^[2]
- Overall teledensity in India stands at 41.08% at the end of July 2009, compared to a meager 8.2% just 5 years back
- Rural teledensity stands at only 16.5% offering a huge potential for future growth
- Number of towers on ground today is over 2,50,000
- Estimated tower requirement in India is 5,54,000 by 2015^[3]

In addition to the numbers mentioned above, one needs to keep in mind that although the overall teledensity in the country has crossed the 40% mark, rural connectivity contributes a small percentage of that figure. With around 70% of Indian population constituting the rural segment, there is an enormous opportunity (and an equally great challenge) for the service providers to tap this market. While the opportunity is in the sheer volume of potential business, the challenge in reaching these masses is daunting. Infrastructure sharing will play a vital role in addressing this aspect in the days to come.

Benefits of Infrastructure Sharing

- Reduction in investment as the capital and operating expenses of cell sites get shared among the service providers / IP-1 players
- Faster network rollout which translates into quicker inflow of revenues for operators
- Improved in-city coverage, especially in congested areas, resulting in improved QoS and customer satisfaction levels.
- Optimal usage of resources and improved economic efficiency
- Enhanced business case for operators to concentrate on rural connectivity
- Reduced operational issues associated with setting up of towers, such as land acquisition, government body clearances, obtaining electricity connection etc.
- Improved landscape - avoiding multiple towers being deployed around the same location for individual operators.

Types of Infrastructure Sharing

Infrastructure sharing can be broadly classified into the following two categories:-

- **Passive infrastructure sharing** implies sharing of non-electronic infrastructure, namely, tower, shelter, air-conditioning, diesel generator set, battery, electric supply, technical premises etc.
- **Active infrastructure sharing** refers to sharing of electronic components at a cell site like antennae, BTS, microwave radio equipment, transmission equipment etc.

In India, only passive infrastructure sharing was allowed traditionally. However, with the Department of Telecommunications (DoT) approving TRAI's recommendations to allow service providers to share active components as well, operators will be able to reduce their expenditure tremendously and in turn lower the tariffs to end-customers. Although sharing of spectrum is still not permitted, the move to allow active sharing will help operators to expand their reach throughout the country, especially in the rural areas. Moreover, any new-entrant being allocated spectrum can now rollout services much faster by simply riding on the infrastructure of existing service providers. This arrangement will lead to increased competition based more on service innovation rather than network coverage.

Infrastructure Sharing Models

Although the concept of infrastructure sharing has been prevalent around the world for sometime now, it has just about picked up in India over the past couple of years. Even about 3-4 years back, operators were hesitant about the idea of sharing their resources with the competition, and looked at their network infrastructure as a differentiating factor for customer acquisition. This is fairly apparent from the fact that at most places across the country one finds multiple telecom towers within a few meters of each other. This leads to wastage of capital and resources.

For the sake of convenience, let us classify infrastructure sharing models in India into two broad categories:

1. **Operator Owned Infrastructure:** Various models may exist amongst operators for sharing of their cell-sites, right from a one-to-one exchange of lat-longs (latitudes and longitudes of prospective tower sites) at the individual circle level, to a blanket agreement done at corporate offices for pan-India cell sites. However, in terms of managing the infrastructure, operator-owned infrastructure sharing model can be further classified as under:
 - **Single Operator Owned:**
 - Towers initially designed and constructed for only a single operator that are now being modified to house the equipment of an additional operator on a leased basis. This acts as a new stream of revenue for the host operator at almost no additional cost, charging the lessee for space and services rendered (O&M).
 - Mobile operators have started separate infrastructure wings, the likes of Bharti Infratel and Reliance Infratel, to cash in on the opportunity of infrastructure sharing by providing ready-to-use infrastructure setup at their cell-sites to other operators.
 - **Tower Pooling:** A new development in the Indian mobile communications sector came in with the formation of Indus Towers, where the three leading GSM players of the country, Bharti Airtel, Vodafone and Idea Cellular, joined hands to setup an independent tower company. The idea was to merge existing passive infrastructure of all three operators across 16 circles in India, and operate it under an independent entity. There are approximately 96,000 towers currently operated by Indus, offering infrastructure and related services to other carriers.
2. **Independent Infrastructure Provider Owned:** The erstwhile tower companies worked on a Build-Operate-Transfer (BOT) model, wherein operators defined the site location, tower specifications and even acquired the sites and necessary clearances. The tower company, in most cases, was thus responsible only for setting up of the tower structure, and then moving out after site handover. However, various tower companies have since got into the Build-Own-Operate (BOO) space in the recent years, namely GTL Infrastructure Ltd., Quipo Telecom Infrastructure Ltd. (now WTTIL-Quippo), India Telecom Infra Ltd., Xcel Telecom (recently acquired by American Tower Corporation) etc. The operators, too, were happy in transferring their load onto these 'infrastructure specialists', while themselves concentrating on their core business - marketing, customer acquisition and customer retention.

With the formation of operator-owned infrastructure companies, the business case of IP-1 players in the country stands threatened. However, many in the industry believe that the volume of work in this space is large enough to keep all parties busy for a long time to come.

SWOT Analysis of Operators vs. Third Party Providers owning the shared infrastructure

	Operator-owned Infrastructure	Third Party Provider owned Infrastructure
Strengths	<ul style="list-style-type: none"> • Ready infrastructure base through tower pooling, barter etc. • Entry barrier into infrastructure business is nil for existing operators • Site sharing among the top operators being done for years at certain sites - so, basic framework is in place 	<ul style="list-style-type: none"> • Specialized infrastructure players. • Will lay focus on industry best practices and latest technology deployment • Fairly operator-independent approach, i.e. provides equal access to all the operators
Weakness	<ul style="list-style-type: none"> • Operators' core focus has not been on infrastructure • Some operators still consider network coverage as a competitive edge - so may be averse to sharing key (difficult-to-acquire) sites from their portfolio • Possibility of incumbent operators forming a cartel to dominate/keep out new entrants 	<ul style="list-style-type: none"> • On-ground tower numbers are quite low at the moment • Profit Margins of 3rd party will increase costs, diluting the entire cost-saving story • Customers are few, i.e., success is dependent only on a select few
Opportunities	<ul style="list-style-type: none"> • Provides an additional revenue stream to operators • Entering new geographies becomes a quicker/simpler process 	<ul style="list-style-type: none"> • Growing number of operators being granted licenses in India • 3G to increase tower requirements further • Rural connectivity initiatives of the government
Threats	<ul style="list-style-type: none"> • Increased competition will hurt the smaller, regional operator • New entrants would prefer a neutral third party over incumbent operators 	<ul style="list-style-type: none"> • Heavy initial investment with long-term payback periods presents high business risk • Consolidation among operators • Technology upgrades might render today's infrastructure like mobile towers worthless

Sharing Scenario in India:

The telecom regulator, TRAI, in its recommendations to the DoT in April 2007, indicated that even though the benefits of infrastructure sharing are abundant, only about 25-30% of the cell sites were being shared among operators. Various initiatives have been taken by the central governing bodies of Indian telecom over the years to promote the concept of infrastructure sharing among the carriers:

- **Project MOST (Mobile Operator Shared Towers):** In 2006, Project MOST was initiated under which GSM and CDMA operators agreed to share transmission towers. Flagship sites were announced in Delhi and Mumbai, with up to six operator-sharing sites being planned.
- **TRAI recommendations to DoT:** In its recommendations to the DoT in April 2007, TRAI lobbied for sharing of passive, active and backhaul networks among operators. TRAI sought an amendment in the license condition to allow active infrastructure sharing limited to antenna, feeder cables, Node B, Radio Access Network and transmission systems. Also, it recommended that service providers be allowed to share their backhaul from BTS to BSC. Most of these recommendations were accepted by the DoT.
- **USO Fund:** For enhancing rural connectivity, in 2007, the government awarded 8,000 sites in 81 clusters across the country to telecom operators and standalone tower companies for setting up on BOO basis, with financial assistance under the Universal Service Obligation Fund. Another 11,000 sites are expected to be built out in the second phase.
- **BSNL's Tower Sharing Initiative:** India's incumbent mobile service provider, with an enormous pool of around 40,000 towers across the country, announced its interest in sharing passive and active infrastructure with existing and new telecom operators. This will help BSNL generate additional revenue from its existing widespread infrastructure assets, and enable the private carriers to reap the benefits of BSNL's rural presence.

The American Infrastructure Story

Several industry analysts suggest that India should look to USA for the way forward in mobile infrastructure sharing. Firstly, the number of operators in India is high, as is the case in USA, providing similar conditions for benchmarking. Also, infrastructure companies in the US have been more successful than their counterparts in Europe.

Statistics:

- Between December 2003 and June 2008, the number of wireless service subscribers in US increased from 158.7 million to 262.7 million, representing an increase of approximately 65% and market penetration of approximately 86%.
- During this period, the number of cell sites (i.e., the number of antennas and related equipment in commercial operation, not the number of towers on which that equipment is located) increased approximately 35% from approximately 163,000 cell sites to approximately 220,500.
- Top 3 independent infrastructure providers (SBA Communications, American Towers Corporation and Crown Castle International) have average tenancy ratios ranging between 1.5 and 2.5.

- Approximate Tower Portfolio (as of 31 December 2008) in the US:
 - o Crown Castle International 22,300
 - o American Tower Corporation 19,600
 - o SBA Communications Corporation 7,854
- Operators engage in the sharing of both passive and active elements

When the US telecom market was booming, companies started acquiring huge tower portfolios based on unrealistically high tenancy projections and expected revenues/site. The operators, looking to drastically expand their footprint at the time, readily engaged these tower companies for quicker network rollout. In the late 1990s, upon a slow down of the market, operators started becoming cynical about the high rentals and annual escalations, and started to look at other options like building their own towers or working

Crown Castle International Corporation 2008 Annual Report
 American Tower Corporation 2008 Annual Report
 SBA Communications Corporation 2008 Annual Report

with other carriers. Moreover, tower companies striving to keep the revenues pouring in, could not lower their lease rates because of high fixed costs and low tenancy rates.

Tower companies had to rethink their strategy, and graduated from a period of rapid capital and asset accumulation to one of improving operational efficiencies adding customers, servicing them better, reducing costs, improving margins and returns through:

- Maximizing utilization of tower capacity lending additional antenna space on existing towers
- Complementing their core business of leasing antenna space on multi-tenant towers with services like network design, RF engineering, antennae and line installation, maintenance and tower monitoring
- Exchanging/buying/selling of towers with other tower companies acquiring towers in regions of insufficient coverage and exchanging/selling towers in areas which did not provide economies of scale
- Reducing the year-on-year increase in number of towers built, and focusing on building cell sites that would provide higher occupancy

Going Forward

Developing markets possess the luxury of learning from the experiences of the developed ones trends / events / critical success factors / business models that worked, models that did not etc. Although the Indian infrastructure picture looks promising right now, there are a few aspects that infrastructure companies, especially independent tower companies, will need to be cognizant of:

1. **Tenancy Projections:** With the growing number of operators entering the market, there is bound to be consolidation going forward. Tower companies need to work out realistic and long-term tenancy projections for their cell-sites accounting for such eventualities.
2. **Service Differentiation:** Owing to the fact that the initial cost of setting up the infrastructure is borne by tower companies and that their contracts with operators are long-term, typically with 10-15 year payback periods, the business risk that the independent providers face is enormous. Moreover, with operators starting their own infrastructure companies, the bargaining power that operators have with independent tower companies has increased even further.

To safeguard the investors' money and maintain operators' interest in providing additional sites in the long term, tower companies will have to demonstrate:

- greater deployment speeds
 - improved operational efficiency
 - enhanced standards in overall site quality and services rendered, and
 - technological advantage over the in-house operator(s) infrastructure arms / companies
3. **Innovative Business Models:** With active sharing being approved by the regulator, business models will start to get more complex. Infrastructure providers need to look at new models to safeguard their capital investment - shorter payback periods, initial investment shared being with operators, revenue sharing model etc.

Joint venture between tower companies and communication service providers is another plausible option. For example, in January 2009, Quippo Telecom Infrastructure Limited and Tata Teleservices (with its hived-off tower company - Wireless Tata Telecom Infrastructure Limited) entered into a strategic partnership, wherein the Tata group firm and Quippo swapped 51 % & 49% stake respectively in the infrastructure business held by them. Quippo will make upfront cash payment of Rs. 2,367 crore for 49% stake and management control of the merged entity.

Revenue sharing has always been a sensitive issue with operators - mobile operators would much rather pay a fixed and predictable monthly/annual amount to tower companies than share a percentage of their revenues. However, in case of sites where passive infrastructure is provided by an independent tower company and active components are shared among multiple operators, revenue sharing is an option that tower companies should definitely advocate.

Conclusion

Infrastructure Sharing is not only the call of the hour, it is the future. With the slew of new operators poised to enter the scene, and with existing operators intent on hiving off their tower business, the next three years will see dramatic changes in the ground status. It is assumed that by 2011, there will be just 2 to 3 independent infrastructure providers (IP-1s) left standing. How things finally shape up will depend upon how strong ones commitment is, and how deep ones pockets are.

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Mobile Number Portability: the mystery yet to be uncovered

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Introduction:

The much hyped and speculated Mobile Number Portability (MNP) is finally ready to make its arrival in India. Indian mobile users will now be able to retain their existing mobile telephone number when they switch from one access service provider (telecom operator) to another, irrespective of mobile technology, or from one technology to another, of the same or any other access service provider. The awaited roll out of MNP has once again been delayed and now MNP will be available only in 2010. The roll out is slated to be in phases, starting from the metros and moving towards other parts of the country in the succeeding six months. To enable number portability in India, DoT/TRAI has selected the All Call Query approach (ACQ). In the ACQ approach, number portability information exchange between operators is assisted by the MNP clearing house (MCH) and Centralized Number Portability Data Base (CNPDB) platform. Through inter-operation between operators and MCH/CNPDB, number portability can then be realized.

The DoT guidelines envisaged geographical division of the country into two Number Portability Zones (zone 1 and zone 2), each consisting of 11 licensed service areas; While Syniverse Technologies (I) Pvt Ltd was granted licence for operating in zone 1 (Northern and Western India), MNP Interconnection Telecom Solutions(I) Pvt Ltd was granted licence for MNP Service Zone 2 (Eastern and Southern India) to set up a centralized system - Mobile Number Portability Centralized Clearing House (MCH)

Why all the hype?

Elevated competition:

CDMA launch and the entry of new players helped industry grow many-fold since year 2000. The number of players increased from 2 per circle in 2000 to 5 in 2008. This number has since gone up to 12, as the TRAI has allowed entry of more players into the industry. With the 3G license auctions on their way (*now postponed further*), many new players are eyeing this as an opportunity to break into the mind set of Indian mobile phone users. These new entrants look at MNP as a great opportunity to lure away the customers of existing operators in the country.

Major beneficiaries of MNP implementation could be MVNOs and greenfield operators, as they can target high ARPU corporate subscribers who otherwise adhere to the existing operator to retain their number.

Customer is the king:

Free mobility from one service provider to another, without changing the mobile number is the basic advantage of MNP implementation. Apart from this, MNP can lead to price competition in the Indian market where the customer is highly price sensitive. A recent example would be the price wars started by Tata DOCOMO's innovative plan of per second billing. This made not only the competitors but also the regulatory body to put on the thinking cap. Plummeting prices and cleverly designed tariff plans will rule the market for quite some time.

However, price is not going to be a differentiator for a very long time, as many experts have already commented. Competition among service providers will lead to improvement in quality of service and product innovation, in order to retain and expand the customer base. Many value-added services may be offered by service providers to attract customers, either free or at low costs. Customer experience and customer satisfaction will be the buzz-words.

Opportunities for Telcos:

MNP increases competition by allowing consumers to switch service providers, yet retaining their old mobile phone number, which helps telecom operator to improve its product line and services. It provides a fair chance to all the service providers. Player with better quality of service and innovative products can sustain in the long term while the incumbents will have to stretch themselves to retain their customers.

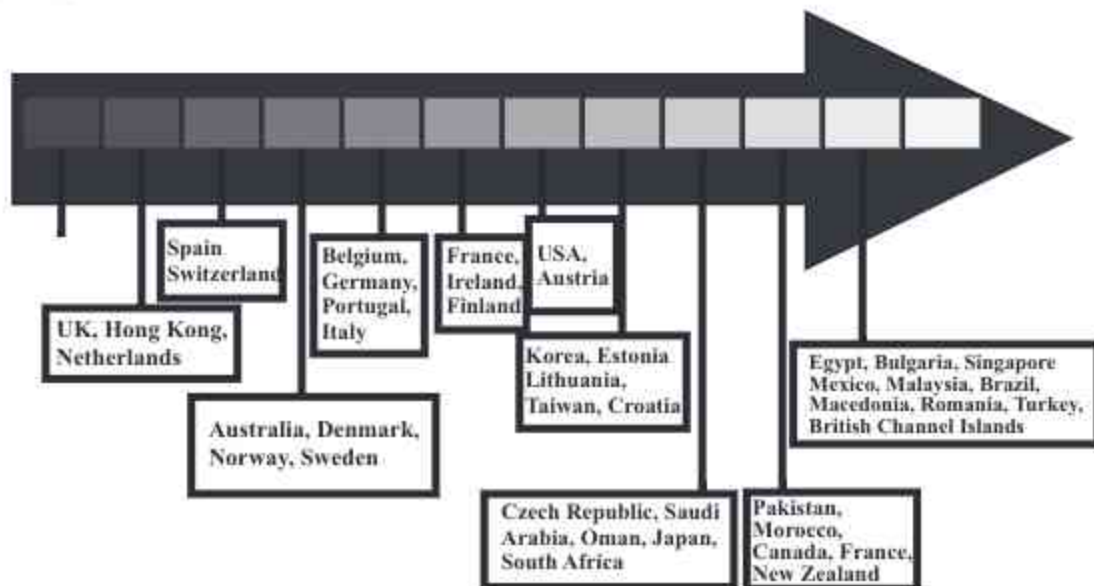


Fig 1: MNP launch across various countries

MNP was implemented in Hong Kong and UK in 1999, Spain and Switzerland in 2000 and Australia in 2001. Many other countries then jumped into it. Asia, a late mover, joined the wagon only after 2005-06. However, number portability brought a mixture of joys as well as sorrows.

MNP Implementation and its Impact in some key Countries Across the Globe						
Country	Operator	Penetration	Competition	Awareness	Porting Time	% Porting
Australia	4	80%	High	High	0.3	7.5
Belgium	3	86%	Medium	High	2	4.6
Finland	3	105%	High	High	5	10.6
France	3	78%	Low	Low	30	0.6
Germany	4	91%	Medium	Low	6	0.4
Hong Kong	5	125%	Very High	High	1.5	14.6
Ireland	3	102%	High	High	0.2	6.5
Malta	2	80%	Low	Medium	0.5	3.6
Spain	3	105%	High	High	6	7.8
Sweden	4	113%	High	High	5	6.1
UK	6	111%	High	Low	7	2.5

Table 1: MNP Implementation & its Impact across various countries

MNP worked well in South Korea and Hong Kong, while it was quite ineffective in Taiwan (with 9 operators), Japan (5 operators) and Singapore (3 operators).

The response to MNP in Hong Kong was positive. However, it should be noted that the number of players there was very low as compared to the Indian scenario and both lesser porting time and comparatively lower porting charges were its advantages.

The success of MNP in Australia can be attributed to its lowest porting time which is about 3 hours.

In Finland, initially the implementation was viewed as a success due to dearth of minimal contract periods and high migration incentives, however, the operators failed to sustain the momentum. It did not bear fruit in the UK, France, Germany, Pakistan, Ireland, Malta, among others.

An April 2003 statement by Wind Telecomunicazioni in Italy said that MNP had not fully taken off in Italy due to long, drawn out procedures, with transfer times established by current operator's agreement being over 15 days, which is way in excess of other European countries, despite the regulator's explicit intention to reduce that to five days.

In the recent examples of MNP deployment, Malaysia offered nationwide MNP services in October 2008 and almost 150,000 mobile numbers have been ported till January 2009 from a subscriber base of around 23 Mn (83 % prepaid).

Singapore has around 6.4 million mobile subscribers and 75% of them are prepaid. During the first 8 months, 60,000 ported their mobile numbers.

In our neighbouring country Pakistan too, where number portability was implemented in March 23, 2007, the results are not very delightful. Though the service providers are compelled to improve the quality of service to retain customer; MNP could not be a huge success due to infrastructural constraints, ignorance amongst customers and long porting time. The pitiable customer service and time consuming process during porting the number also discouraged many possible customers. Pakistan has over 90 mn cellular subscribers with approximately 95% of them pre-paid. This is comparable to Indian telecom scenario where around 90% are pre-paid subscribers.

Considering the churn rate, as per the industry estimate (COAI) the monthly churn rate of mobile subscribers in December 2008 was 3.4% for pre-paid subscribers and 3.39 % for postpaid subscribers. However, extraordinary activity is not anticipated in the first 18-24 months of the MNP launch.

The enthusiasm of subscribers to port numbers will rely hugely upon the charges that are levied for porting.

In the countries where the Mobile Number Portability (MNP) has been introduced, there are mixed practices in terms of payment by the porting subscriber to the service provider. The countries where implementation of MNP has been funded by regulator/Govt./Consortium of operators, the porting charge, prescribed, are negligible. In USA a subscriber pays monthly porting charges. In Hong-Kong, porting and dipping charges are approved by the regulator (OFTA).

Country	Porting Charges (US \$)
Bulgaria	4
Pakistan	1 - 4
Egypt	14
Brazil	1.8
Mexico	1.64
Malaysia	7.5

Table 2: MNP porting charges across various countries

If we take a look at the porting charges across the globe, in the table (courtesy- consultation paper from TRAI) above, the porting charges in Brazil are as high as 14 \$, whereas a subscriber in Pakistani has to pay a sum equivalent between 1-4 USD. Huge porting charges will give a dampening effect to the subscribers' porting decisions. Will a subscriber be able to forego an amount of 3-4 \$ where the ARPU in India is well below 4\$?

Moreover, the lock-in period of 3 months where in a subscriber will not be able to change operator within 3 months of the porting or activation of services will also have a negative impact.

Why telcos oppose mobile number portability?

The technical and regulatory complexities accompanying the implementation of number portability are putting the Indian telcos off. As per the MNP service licence, the MNP Service licensee is required to design, install and maintain the requisite network consisting of both Mobile Number Portability Clearing House (MCH) and Number Portability Database (NPDB) so as to facilitate MNP in its designated zone. The Licensee Company will operate the MNP system based on 'build, operate and own basis'. Thus, as per the MNP licence, the capital expenditure (CAPEX) and operational expenditure (OPEX) for the installation and maintenance of the requisite network shall be incurred by the MNP Service Licensee. The MNP Service Licensee shall recover costs by way of port transaction charge for facilitation of porting of the subscriber's number. There are also two types of charges/fees which can be charged by the MNP Service Providers from the Access/Long distance service providers; namely 'Per port transaction charge' and dipping charges.

While ascertaining the pros and cons of MNP, the TSPs have to ponder upon the following points:

1. **COST BENEFIT ANALYSIS:** comprehensive cost-benefit analysis to ascertain the implementation of the technology would prove to be profitable for the operator.
2. **NETWORK UPGRADATION:** Cost aspects such as the upgradation of existing networks, software modifications and assessment of effective call routing mechanism are some of the areas where operators need to focus their attention.
3. **DATABASES:** Operators have the option of providing MNP through a centralised or distributed database of ported numbers. Accordingly, operators will also have to assess the initial costs with regard to the setting up of such databases and also the cost associated with maintaining the same on a periodic basis. Costs associated with calling a ported number are also to be evaluated by the operator as these costs would be recurring in nature and would be incurred every time the database is queried/interrogated.
4. **INTERCONNECT SETTLEMENTS:** The interconnect settlement is a significant part of the day-to-day operations of an operator. Accordingly, operators need assurance from the new technology that the changed billing system would be capable of addressing interconnect and roaming settlements; and also, that the same would be flexible to incorporate changes whenever necessary.
5. **ADMINISTRATIVE COSTS:** 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.
6. **PORTING TIME:** Operators should ensure that the time within which a customer can be ported-out/porting-in is not significantly greater than the time required for obtaining a new connection. Some sources say that the porting time in India can be anywhere between 2 days to 1 week. A lengthy porting period is likely to create extra costs for users in porting, or simply discourage them from porting at all. A short porting period, however, may allow insufficient time for proper checks at all stages of the porting process and must be avoided to prevent fraud and ensure the proper completion of a port.

Why customers may be reluctant?

Telecom operator charges porting fees in many countries. These charges comprise of administrative fees and recurring monthly fees for number porting services. In India, the porting charges, which are yet to be finalized, can be anywhere between Rs 20 to 200. Looking at the typical Indian consumer, the dipping ARPU and the lack of awareness amongst the Indian crowd regarding the MNP, these porting charges may act as a discouraging factor to many of the users. Often, there is a waiting period for mobile subscribers to get their number successfully ported. This waiting period ranges from 1-2 working days in Hong Kong, to 4-7 working days in Taiwan and Singapore, resulting in too much inconvenience for subscribers.

In cases where handsets are 'locked' to networks, the customer will require to incur additional costs for a new handset, which could become a hidden barrier to MNP. Also, the criteria of lock-in period may affect subscribers' decision to port a number.

Name of Country	Customer Porting Charges (\$ PPP)	Time taken for porting
Australia	\$ 5.59	90% within 3 hours, 99% within 2 business days
Germany	\$ 25.5	4 working days + 2 further days
Hong Kong	\$ 0.38 plus dipping charge of \$ 0.8 per cell	1 - 2 days
Netherlands	\$ 0 - \$ 8.89	4 - 60 days
Singapore	\$ 0 - \$ 13.37	7 days
United Kingdom	\$ 14.31 - \$ 42.92	5 days

Table 3: MNP porting charges & time across various countries

As it has been discussed earlier, MNP was successful in Hong Kong and Singapore. It can be seen that these countries presented a well balanced combination of low porting time and lesser porting charges in addition to a high teledensity at the time of MNP introduction, effective government involvement and awareness amongst the customers.

Conclusion:

Various key issues relating to MNP implementation in India:

Major factors of the Indian telecom industry include geographical structure, demographic profiles, revenue patterns, competition and quality of service. The revenue generated from the metro circle (more than 90% penetration) and the remaining part of the country where the teledensity is low is not comparable. In addition to the consistent tariff cuts, shift in the focus of telecom operators from Metro to lower income B and C Circles is one of the major reasons for deterioration of ARPU.

MNP is effective in those markets which are highly competitive, with high penetration levels. However, the dwindling ARPUs and the increasing minutes of usage cannot be neglected.

India is a highly competitive market with a price sensitive customer. MNP brings an array of possibilities. Experts opine that MNP will not hit India in a big way, though a slightly high churn rate will be observed in the beginning. However, MNP will surely lead to an intense competition among the operators and an improvement in the QoS. In the nut shell, number portability may prove to be beneficial as it may lead to service differentiation and new product offerings as the pricing pattern is almost identical in Indian operators.

To achieve positive results, the mobile service providers will have to upgrade their infrastructure to enable appropriate rerouting of calls to subscribers who have ported out of their network. Investment across the diverse additional investment needs like infrastructure for implementation and operation of MNP, infrastructure for improving quality of service, and ongoing additional expenditure for marketing and customer attraction and retention in an increasingly competitive market will also play an important role.

There is no comparable market in the 50-60 countries which have adopted number portability as the pre-paid subscriber base in the country is almost 90% of the total subscriber base and has low ARPU (average revenue per user). It remains to be seen whether the MNP turns out to be bang-on success or simply fails to sustain in the Indian telecom market.

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Indian Telecom: Survival of the Cheapest

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Abstract

Price war between companies affects not only the value of companies on bourses but also their market share and their perception in the eyes of customers. Some companies adopt this strategy to penetrate the market or for increasing their market share. Profits can be made either by deciding prices of your own, which is the old way (pre 1991), or by getting more consumers under your umbrella. India has 23 telecom circles each having an average of 11 players not to mention the new players who have recently acquired licenses. Tata Docomo has changed the entire pricing scenario in telecom. With so many players around and with the proposed launch of Mobile Number Portability operators expect increase in the churn rate, and hence they would want to retain their existing subscribers as well as acquire new ones. The launch of per second billing by Tata Docomo has started a price war with most of the players are reducing tariffs. This paper studies the impact of price war on key industry indicators like ARPU, ARPM & MoU for leading operators. It also highlights the change in market share due to this pricing strategy.

Introduction

It is common understanding that the price war has been started by Tata Docomo. But, it was actually was initiated by Aircel. They came with the scheme '**more you talk the less you pay**'. The Lifetime Validity prepaid plan available for Rs 99 with Starter Kit would allow users to make local calls at Re.1 for the first minute, 50 paise for the second minute and 30 paise for the third minute onwards every day. With this plan, STD calls would be at Rs.1.50 for first minute, Re.1 for the second minute and 75 paise for the third minute onwards every day. Local SMS cost is Re.1. This scheme was one of its kinds. But Tata Docomo really presented a different version of billing to customers that shook the entire telecom market.

The TTSL Game plan

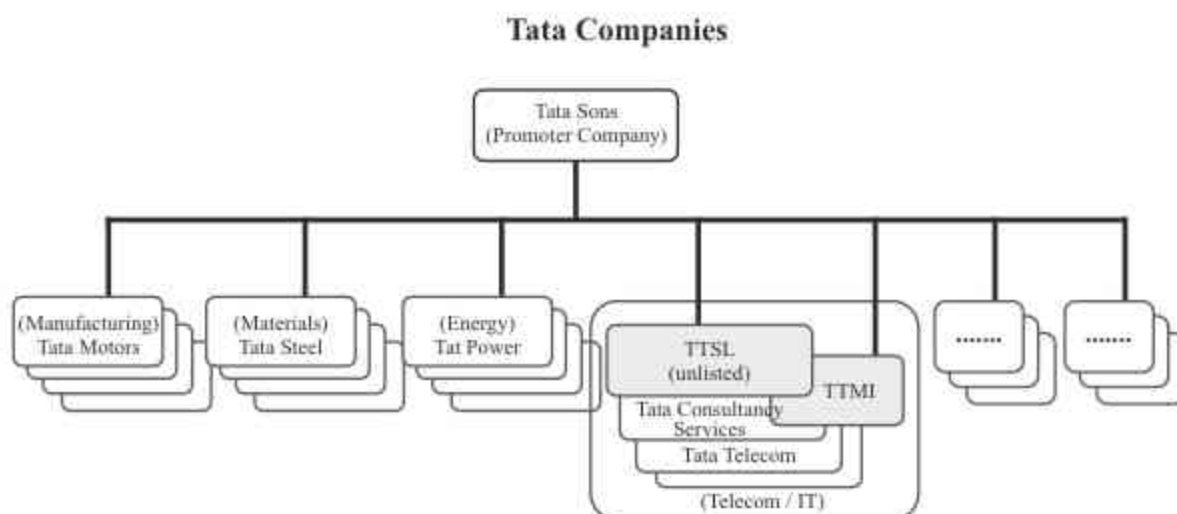


Fig 1

Source: http://www.nttdocomo.com/pr/files/20081112_attachment.pdf

Tata Teleservices Provides mobile services under 3 Brand names

- Tata Indicom
- Tata DoCoMo
- Virgin Mobile

On 12th November 2008, companies including TTSL announced their agreement on a strategic alliance in India, under which NTT DOCOMO will acquire 26 per cent of TTSL's stock for approximately Rs 13,070 crores (US \$2.7 billion). On 26th March 2009 Tata Sons Limited, the promoter of Tata Teleservices Limited, announced that its transaction with NTT DOCOMO, under which the Japanese telecom company was to acquire 26 per cent of the common shares of Tata Teleservices Limited in accordance with the capital-alliance agreement announced by the parties in 12th November 2008 has been completed.

The war is declared

Tata Docomo became the first Indian Telecom player to think out of the box in Indian Telecom market by launching pay per second scheme. Tata Docomo launched its operation in Chennai and Tamil Nadu under the name '**pay-as-you-use**' on **24th June 2009**.

For Chennai

Month	TTSL	Airtel	Reliance
June'09	433548	2320577	1410620
August'09	796882	2421853	1421900
Customer Added	363334	101276	11280

Figure 1

Source: TRAI press releases of June and August 2009

As is evident from the table within a period of two months TTSL added three times more subscribers than the market leader Airtel. This shows that the Indian market is price sensitive. And Tata Docomo used this price sensitiveness of Indians in the most efficient way. After 2 months of its launch in Southern India, it created a difference in acquiring new customers. Airtel, the leader in Indian Telecom lost its position in terms of rate of acquiring new customers. This was the case of only one telecom circle. Tata Docomo continued to launch its services in a short span of time. On the very next day, i.e. 25th June 2009, Docomo launched its services in Kerala. Later on, various states got added under the empire of Tata Docomo including Orissa, Karnataka, Andhra Pradesh, Mumbai, Rest of Maharashtra, Madhya Pradesh, Chhattisgarh, Haryana, UP East, UP West, and Bihar.

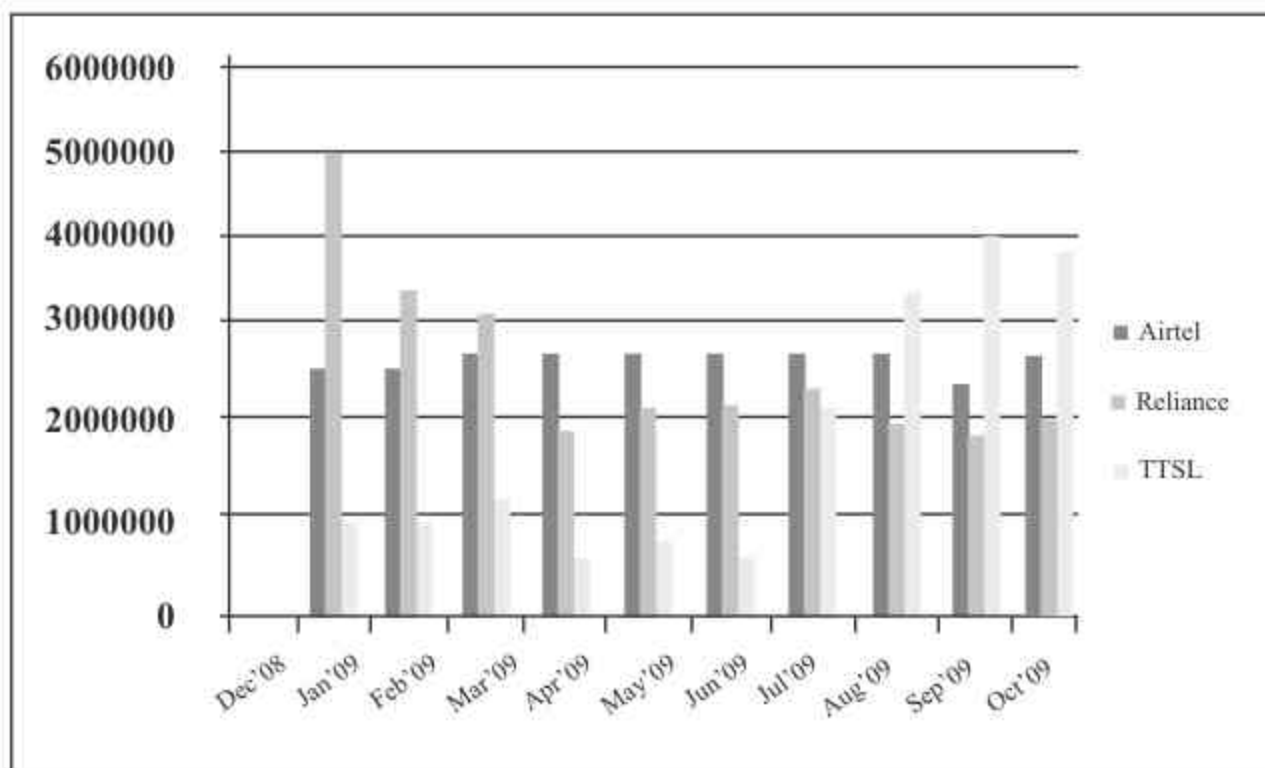


Figure 2

Source: TRAI press releases from December 2008 to October 2009, Trai.gov.in

We can observe that at the beginning of year 2009, customer additions of TTSL were far below its competitors but by the end of the year it became the market leader in terms of subscriber addition.

This pricing strategy of Tata Docomo forced other players to lower the tariffs in order to keep churn rate low. So various other players followed a 'per second' billing system to meet the competition. Airtel, MTS, Idea also followed per second tariff.

Let's have a look at subscriber's addition graph of Airtel from the time of launch of Tata Docomo.

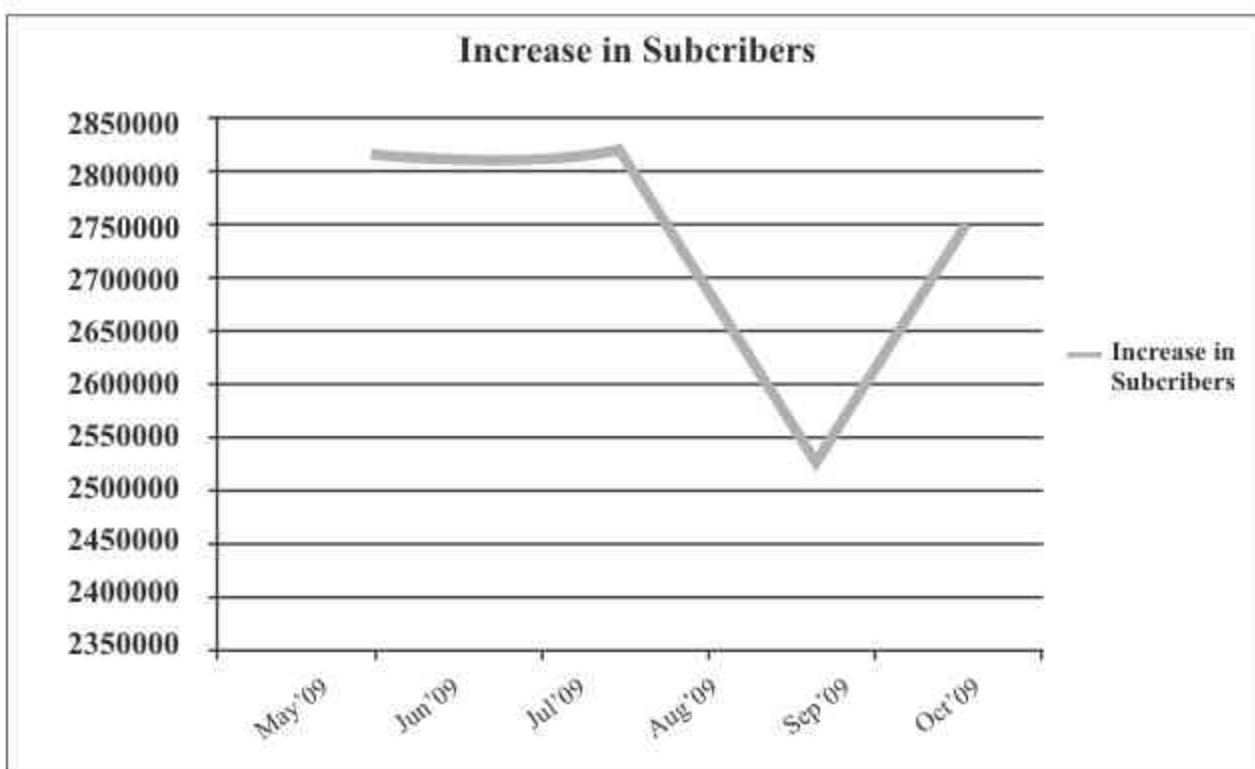


Figure 3

Source: Trai press releases from May 2009 to October 2009

We can see that Airtel was unable to maintain the steady increase in its subscriber additions after July i.e. after the launch of Tata Docomo. But every player had to adapt to changing market scenario and so they too joined tariff war to arrest the decrease in subscriber base.

Finally Airtel, the market leader was also forced by the market competition to reduce the tariffs and follow the 'per second' scheme on 30th October. Bharti immediately followed this scheme because its market share fell to 23.5 percent, from 24.6 percent a year earlier. Bharti Airtel joined the tariff war at the end of October with the launch of 'Freedom Plan'. The plan offered one second pulse plan for its customers. In the 'Freedom Plan', Airtel customers were to be charged 1 paisa per second for all Local and STD calls to Airtel numbers and 1.20 paise per second for local and STD calls to other network. The reduction in tariff was to adversely impact the Average Realization per Minute (ARPM) in the coming quarters. This pricing competition is unlikely to come to an early end. The table below highlights the effects of the price war on Airtel from December '08 to September '09.

Parameters	Unit	Sept 2009	June 2009	March 2009	Dec 2009	Sept 2008
Consolidated						
Customers	000's	113,440	105,196	96,649	88,270	79,989
Employees	No.	18,598	23,789	24,538	25,553	25,616
Mobile Services						
Customers	000's	110,511	102,360	93,923	85,651	77,479
Pre-paid customers as % of total customers	%	95.2%	94.7%	94.2%	93.5%	92.9%
Post-paid customers as % of total customers	%	4.8%	5.3%	5.8%	6.5%	7.1%
Bharti's mobile subscribers market shares	%	23.5%	24%	24%	24.7%	24.6%
Average Revenue Per User (ARPU)	Rs.	252	278	305	324	331
Average Rate Per Minute (ARPM)	Rs.	0.56	0.58	0.63	0.64	0.63
Average Minutes of Use Per User	Minutes	450	478	485	505	528
Post-paid Voluntary Churn	%	0.9%	1.2%	1.2%	1.1%	1.1%
Post-paid company Initiated Churn	%	1.0%	1.3%	1.4%	1.2%	1.4%
Pre-paid Churn	%	4.6%	3.5%	3.2%	2.9%	3.2%
SMS Revenue as % of total Mobile Revenues	%	4.9%	4.3%	3.7%	4.1%	4.3%
Employees	No.	7,322	7,646	7,832	8,115	8,133

Figure 4

Source: www.business-standard.com/pdf/bharti%20airtel_041109_01.pdf

The graphs show the change in ARPU, ARPM and Average minutes of use per user of Airtel

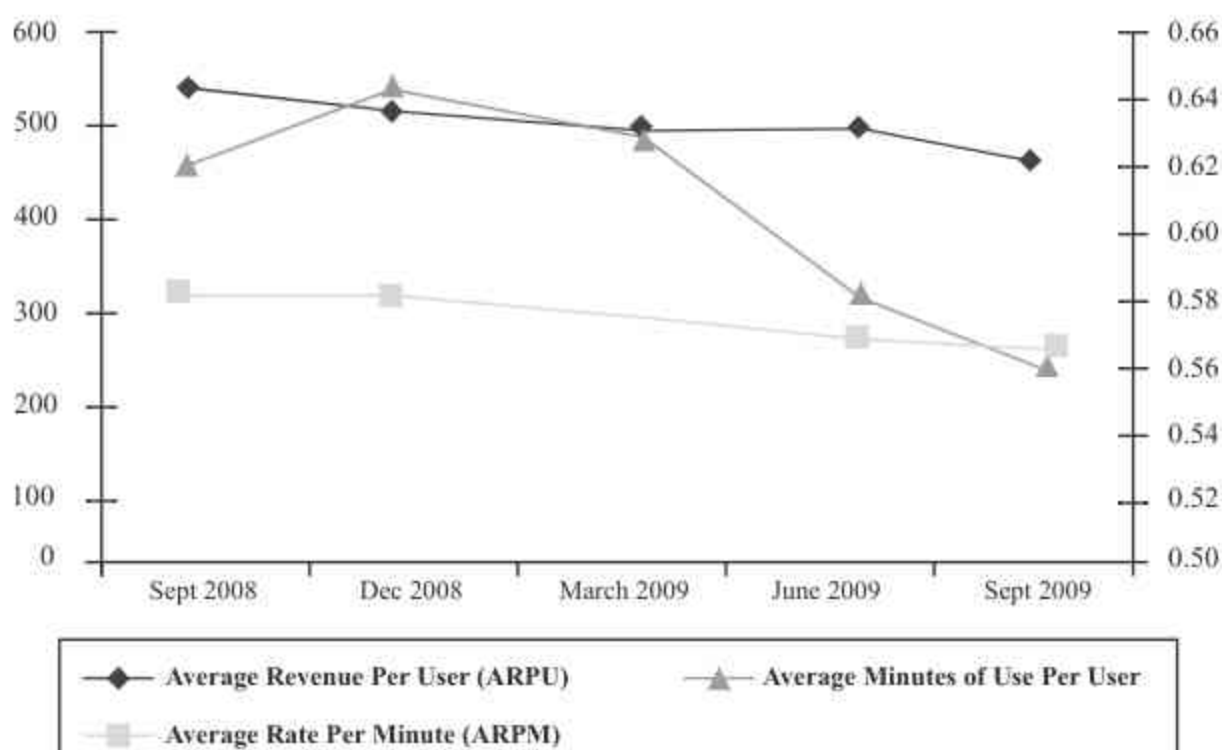


Figure 5

Source: http://www.business-standard.com/pdf/bharti%20airtel_041109_01.pdf

Although number of subscribers has increased as compared to the previous year but we can note the decline in market share, post-paid customers, ARPU, ARPM as well as employees. The Pre-paid churn has also shows an increase over the previous quarter.

Reliance, being a deep pockets player, responded in October 2009 by launching the Simply Reliance scheme that offers tariffs even less than those offered by Tata Docomo i.e. 50p/m local and 75 paisa for STD call .The positive effect of change in the pricing strategy is clearly visible on the in this graph

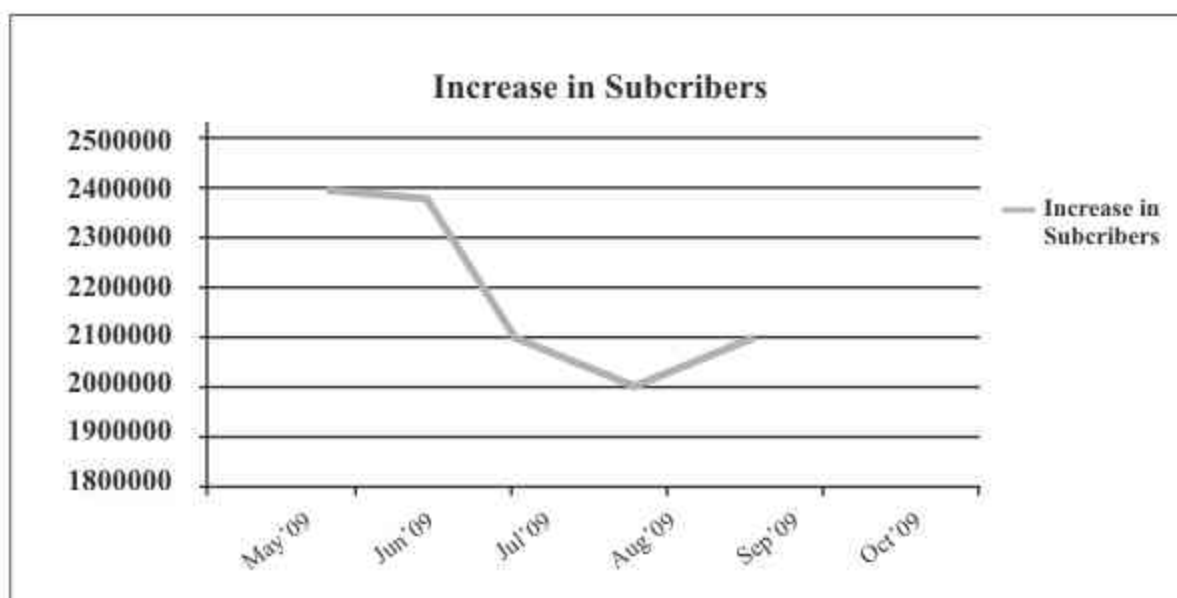


Figure 6

Source : TRAI reports from month of May' 09 to October' 09

Docomo launched its operation in June-end and by September Reliance too had witnessed a considerable dip in subscribers additions but in October Reliance launched the Simply Reliance scheme after which subscriber numbers started increasing.

SMS War

The Price war strategy of Tata Docomo not only restricted itself to voice but it also spread its wings in the SMS field. They launched a new scheme named **diet-sms**. The cost of any 'diet-sms' will be only 1 paisa per character used, thereby providing complete value to customers. Furthermore, there will be no charge for spaces between words. Reliance again came up with a different strategy that offers only 1 paisa per SMS by buying Rs. 11 monthly voucher or by unlimited SMS's by paying Rs. 1 per day.

Roaming War

Now let's have a look at the price war outside circle i.e. in roaming areas. Bharti Airtel enjoyed the initial advantage of being the first player who reduced roaming call tariffs. It allowed users to receive calls at 60 paise a minute while roaming, and they can make calls at 60 paise a minute within the Airtel network and at 80 paise a minute for calls to rival networks. In response to this step of Airtel, Tata Docomo came up with 'Pay-for-exactly-what-you-use' pricing paradigm to roaming services as well, introducing per-second billing for all calls made or received while 'roaming' across the country, at its existing tariff of 1 paise per second for both pre-paid and post-paid subscribers.

International Calling War

Bharti Airtel became the first player to take the tariff war to the international level. Bharti announced the pay-per-second plan on its virtual calling card service 'Airtel Call Home', for its U.S subscribers. Airtel Call Home has so far been available in the US, UK, Canada and Singapore.

Effect on Share Market of Bharti Airtel & Reliance

Let's study the effect of price war on the shares of Airtel and Reliance. Cutting down the tariffs badly affected the position of companies on bourses. This fact can be clearly seen from the graph clearly interpreting the affect on Airtel's closing prices. These values are plotted from the date of launch of Tata Docomo in June 2009 to 30th November 2009. Within a month of the launch Airtel share price fell to half of what it was valued in June 2009. In July Airtel too joined the price war, this gave the much needed stability to its share price.

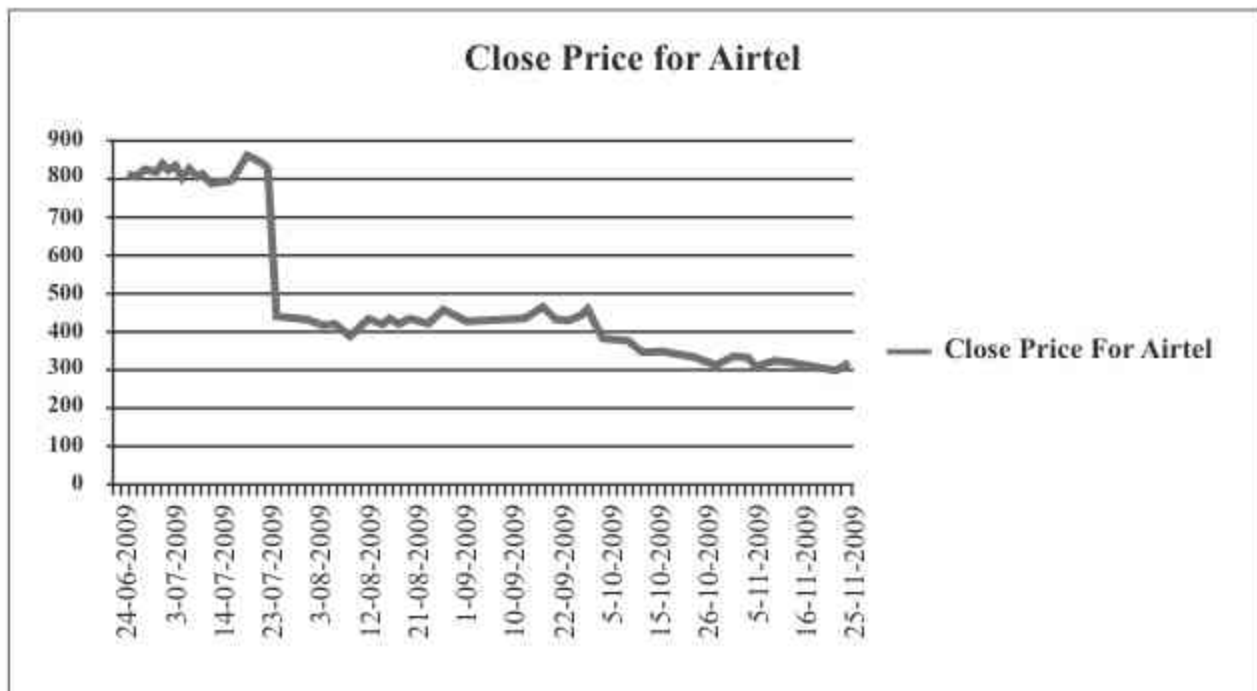


Figure 7

Source: <http://www.airtel.in/wps/wcm/connect/About+Bharti+Airtel/bharti+airtel/investor+relations/shares/share+price/historical+share+price/>

Similarly, results for Reliance are shown in the graph from 24th June'09 to 24th November'09.

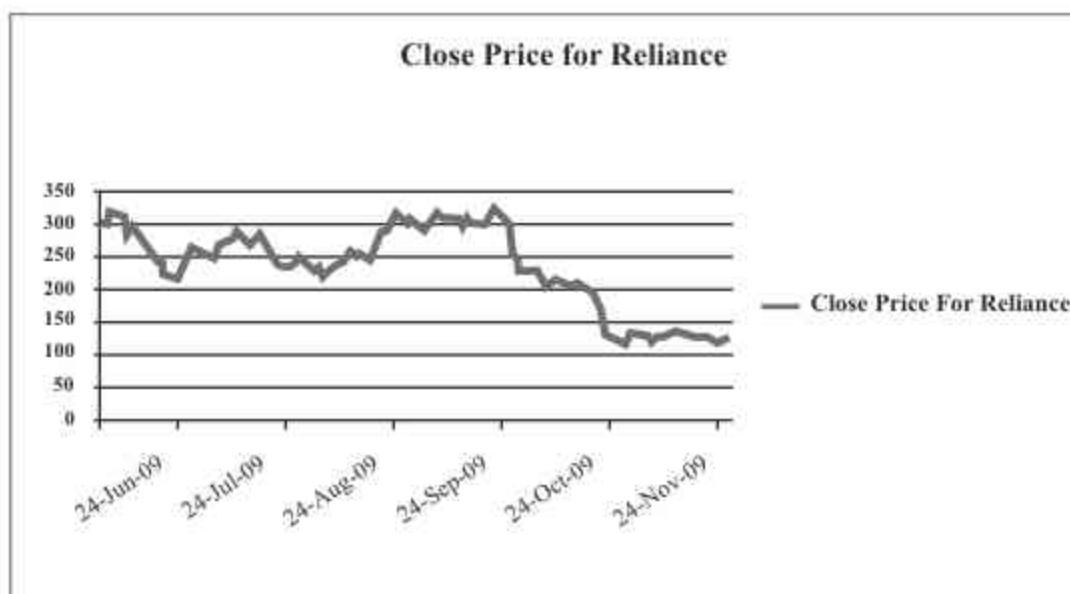


Figure 8

Source: <http://www.nseindia.com/companytracker/cmtracker.jsp?symbol=RCOM#>

Rate of fall of Reliance shares is less as compared to Bharti Airtel because of the fact that Reliance judged the conditions earlier than Bharti Airtel and hence moved into price war to earlier.

HHI:

Hirschman-Herfindahl Index (HHI) is based on the total number and size distribution of firms in an industry. It is computed as the sum of the squares of the market shares of all firms in the industry. The HHI ranges from 0 in a market with many very small firms, to 1 in a pure monopoly. HHI takes into account the relative size and distribution of the firms in a market. HHI increases both as the number of firms in the market decreases and as the disparity in size between those firms increases. Let's calculate the HHI index for Indian market.

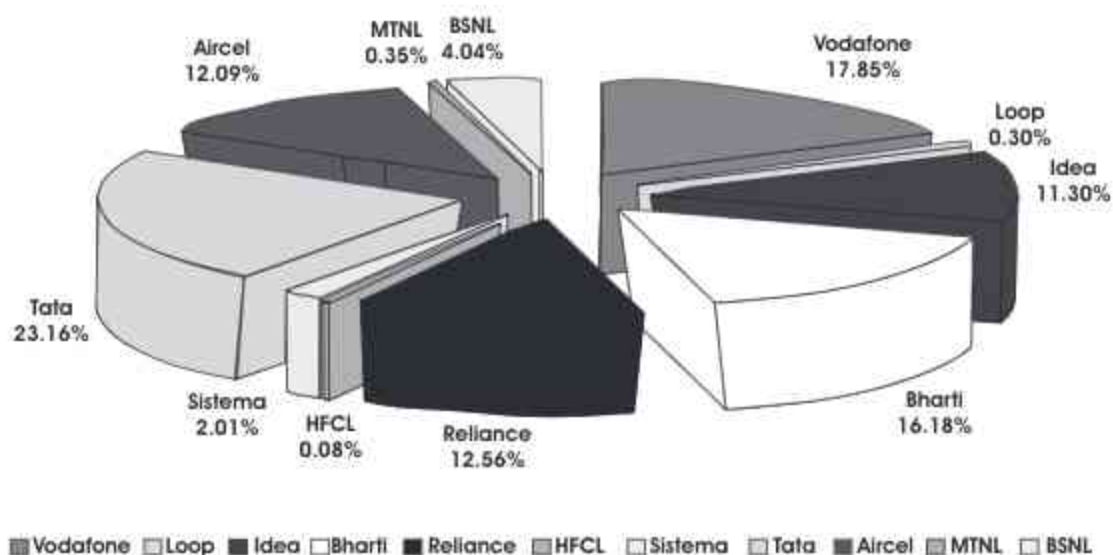


Figure 8

Source: <http://www.trai.gov.in/WriteReadData/trai/upload/PressReleases/711/pr21nov09no78.pdf>

Market Share for October'09

Company Markets	Market Share	Square of Market Share
Tata	.2316	0.05363856
Aircel	.1209	0.01461681
MTNL	.0035	0.00001225
BSNL	.0404	0.00163216
Vodafone	.1785	0.03186225
Loop	.0030	0.000009
Idea	.1135	0.01288225
Bharti	.1618	0.02617924
Reliance	.1256	0.01577536
HFCL	.0008	0.00000064
Sistema	.0201	0.00040401

Figure 9

Source: <http://www.trai.gov.in/WriteReadData/trai/upload/PressReleases/711/pr21nov09no78.pdf>

Sum of squares of market share = 0.15701253

HHI is computed as the sum of the squares of the market shares of all firms in the industry. $HHI = 0.396248$. It shows that it is far less than 1 that represents a monopolistic market.

Price war together with MNP (Mobile Number Portability) will lead to more competition. Price war can obviously be advantageous or harmful for customers and operators depending on whether it is for short term or long term. If the price war is for short term, it is beneficial for customers and harmful for operators. On the other hand, if it is for long term, it will consolidate the operators in market and result in variation in HHI index of market.

Consequences and Learning from the Price war

The telecom operators can use this pricing strategy as an important tool for penetrating the rural market or lower income group. The bottom of the pyramid, as explained by management guru C.K. Prahalad, can be cashed as the average minute of usage is not more than half a minute (25 to 30 seconds). Thus in this symbiotic activity, both subscriber and the operator are benefitted. The untapped rural population can be connected by adopting this strategy.

We feel telecom market is witnessing the game of innovation for new entrant and anticipation for the incumbents. Here, Tata Docomo is the innovator and other Indian telecom players are anticipators. Indian wireless market has been through several stages from its inception in 1994. First phase included huge investments, when willing operators make huge investments for license, and more importantly, for capital expenditure (capex) like Bharti Airtel and Reliance. When these firms started making good profits, other operators started copying them in hope to gain similar returns from the telecom industry. We can note that India has got a large number of operators like Vodafone, Idea, BPL, Aircel, Spice, TTSL, MTNL, MTS, Uninor, Datacom, Stel, Loop, HFCL, Etisalat etc. Moreover, Indian telecom has seen large number of foreign players entering the market. India is divided into 23 circles and every circle has almost 11 players and 4 new operators are also willing to enter the market, competition is immense. This has driven the tariff so low that Indian telecom tariffs are the cheapest in the world. This is second phase called competition stage. Presently India is going through the third phase that is of hyper competition. In this stage, operators are willing to suffer losses. As operators reduce tariffs to get more subscribers, only those having deep pockets or international presence will survive. Indian telecom market is the middle of this stage after which weak operators that are unable to survive initiate talks for mergers, acquisitions and take-overs. At the end of this stage the market will consist of a few top players, and hence make Mr Sunil Bharti Mittal's statement true, that "Only 4 telecom players will survive in India".

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Tables

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Comparative Cashflow Statement Analysis

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Abstract:

The financial statement analysis is primarily applied on Profit & Loss account and Balance Sheet. The financial statement now a day also includes Cashflow statement. The shareholders can analyse the impact of decisions taken by management on the basis of financial statements. The financial statements are not prepared on cash basis i.e. these are prepared on Accrual System of accounting. In this system, the entire profit reported by the Company may not be realized in cash. Hence to provide information of transactions on cash basis 'Cashflow Statement' is prepared. In accordance with compliance to Accounting Standard 3, companies prepare & present a Cashflow statement. The Cashflow statement appears in Company's Annual Report. As there are different tools to analyse Balance Sheet and Profit & Loss Account, there are various ways in which cashflow statement can be analysed. This article attempts to 'analyse cash flow statement on comparative basis.' (Hence the title "Comparative Cashflow Statement Analysis").

Introduction:

The financial statements of a Company include Income Statement (i.e. Profit & Loss Account) and Position Statement (i.e. Balance Sheet.) The Balance Sheet indicates financial position as on a particular date and Profit & Loss account indicates net profit or loss during the year. The company's overall operations for the year are reflected in the financial statement. There are various tools which are applied on the financial statements for appraising the overall performance.

"Profit is just an opinion. The real happiness is cash in the bank."

Mr. N.R.Narayan Murthy quoted in Annual Report of Infosys 2005-06. This quote indicates the importance of cash for any organization.

Financial Statement:

The financial statement reflects the impact of financial decisions taken by Company. The financial statements are prepared on accrual basis. In the balance sheet, 'Liabilities' are called as 'Sources of funds' and 'Assets' are called as 'Application of funds'. Thus the Balance Sheet indicates the net position of shareholders and the stakeholders. Profit & Loss account indicates income and expenses along with appropriation of profits. Apart from these two statements, one can evaluate the performance and decisions of the Company on the basis of Cashflow statement also.

Limitations of Financial Statement Analysis: One can analyse only Profit & Loss Account and Balance Sheet however there are a few inherent limitations;

- The financial statements are prepared on accrual basis one may not understand the cash generations for the period;
- There are various ways in which funds are raised in business and used. The exact cashflows may not be traced from these two statements where cashflow statement is useful;
- Cashflow statement may help to identify the gaps while analysing the financial statements and leads to further analyse;
- For accounting purpose various provisions are made, in some cases certain financial items do appear in financial statement however its impact on cashflows may not be accurately analysed e.g: Deferred tax asset etc. The Cashflow statement may remove such elements to make position very clear.
- There can be inter-firm comparison. It helps in inter-firm comparison since cashflow statement eliminates effect of adoption of different accounting treatment to same type of transaction like depreciation, valuation etc.

Structure of Cashflow Statement: (Preparation & Presentation of Cashflow Statement) The cash flow statement is prepared on the basis of Balance Sheets of two different dates and Profit & Loss Account during that period. It is prepared in accordance with requirements of Accounting Standard -3. The cash flow statement reveals cash inflows and outflows from three main activities i.e. ***Cashflows from Operating activities, Cashflows from Investing activities and Cashflows from Financing activities.*** In a cash flow statement, cash outflows are indicated in brackets whereas cash inflows are indicated without brackets. The net balance of inflows and outflows under each activity is shown separately. The total of three activities' net balances indicates increase or decrease in cash and cash equivalent during a given period. Such increase or decrease also indicates the difference between opening and closing cash. The cashflow statement can be prepared under direct method and indirect method.

Objective and benefits of Cashflow Statement:

There are various benefits of Cashflow statement. It provides information about ability of an enterprise to generate cashflows alongwith utilization of cashflows for specified purpose(s). To know solvency, liquidity position, which need not necessarily depend upon profits of an enterprise (cashflows are not equal to profits in a given period). Sometimes there can be a situation in which nothing is 'Right' on the 'left' hand side of the Balance Sheet & nothing is 'left' on the 'right' hand side of the Balance Sheet of a Company. This may be mainly due to accounting on accrual method. The Cashflow statement may give answers to such situation.

Methods of analysis:

There are different methods of analysing Profit & Loss Account and Balance Sheet in which Comparative Analysis is very useful and fundamental. (Since Companies Act, 1956 and Companies Bill 2009, require presentation of data of two years to facilitate comparison). Even Cashflow statement is presented for two years to facilitate comparison. The following paras indicate how to carry out comparative cashflow statement analysis.

Cashflow Statement can be compared on isolated basis i.e. one year analysis. However there are certain limitations which can be overcome with comparative cashflow statement analysis.

Comparative Cashflow statement analysis:

In this case we prepare a comparative cashflow statement of two years. In this, two Cashflow statements of the firm are presented simultaneously in columnar form. It consists of cashflows statement of two years alongwith increase or decrease in absolute terms of cashflows over a period. (One can also calculate percentage increase / decrease to facilitate comparison). The cashflow statement of two companies can be useful for inter-firm comparison. It helps in inter-firm comparison since cashflow statement eliminates effect of adoption of different accounting treatment to same type of transaction the same case is true in case of intra firm comparison for two years if there is a change in accounting policies.

The comparative cashflow statement analysis helps in;

- One can assess companies ability to generate cash from operations over a period;
- It provides information about timing and more important is certainty of generation of cashflows (especially from operating activities) since comparison is of more than one year;
- It identifies reasons and trends of changes in the cash generated from different activities;
- One can assess the short term as well as long term liquidity position of the firm
- It facilitates in periodic comparison;
- Since the company is 'Going Concern' analysing cashflow statement of one year may not be sufficient. The validity of 'Going Concern' can be authenticated with the help of such analysis;
- One can also calculate percentages of periodic changes to find out proportionate changes in cashflows under different activities;
- To understand company's ability to manage working capital effectively (Like convert stock and sundry debtors & other advances into cash.)
- To understand company's investment plans, commitment & consistency;
- To assess company's payment ability to pay dividend, interest servicing, taxes from operating cash flow.

- To evaluate the use of financing cashflow pattern and utilisation.
- To understand company's cash retention policy;
- To evaluate efficiency of resources for its conversion in cash inflow and better utilisation of cash outflows for future cash inflow;
- To understand whether long term financing cash inflow is used for payment of short term cash outflow or for operating cash outflow.

Non financial person may understand that organisation has earned a profit by reading the financial statements but he may not understand how much profit is actually represented in cash or cash equivalents. The financial statements with improved profitability and that too in cash increases wealth in multiplier effect. The reason is simple to understand as an organisation earning all its profit in cash (100% cash profit with no outstanding debtors and creditors) is carrying very low financial risk which gives multiplier effect in wealth enrichment.

Preparation and presentation of Comparative cashflow statement;

On the basis of the available data one can prepare following statement;

Particulars	Cashflow of 2009	Cashflow of 2008	Increase/Decrease in Rs.	Increase/Decrease in %
Refer the Annexure Below;				

Note: It is observed that Tata Consultancy Services in its Annual Report indicates above type of statement alongwith analysis. (Without % increase/decrease)

International Financial Reporting Standard: Considering the importance of cash flows accounting regulators have suggested to disclose Cash Flow Statement along with other financial statements. The Institute of Chartered Accountants of India has issued Accounting Standard -3 for Cash Flow Statement which is similar in many ways to International Accounting Standard (known as IFRS) IAS-7. Besides defining the cash flow, operational activities, investment activities etc; IAS -7 prescribes how to present cash flow statement. It requires reporting cash flow classified by operating, investing and financing activities. IAS-7 considers the cash flow of Operating Activities as Key Indicator of cash generation from core business operation and capacity of the entity to use for payment of dividends, repayment of loans and for new investments. IAS-7 specifies the importance of cash flow of Investment Activities as it represents cash outflow for future income and cash inflow generation. According to IAS-7, financing cash flow informs claims on future inflow. In fact, presentation of cashflow statement is a part of complete Financial Statements under IFRS. In India, for SMEs, cashflow statement does not form of complete financial set however under IFRS cashflow statement is mandatory.

Limitation of Cashflow Statement Analysis: The cashflow statement analysis should be done along with balance sheet and profit and loss account. Any transactions, which do not result in cashflows, should not be reported in the statement. Eg: Issue of bonus shares. In some cases investing and financing activities that do not involve cashflows are excluded from Cashflow statement.

This article illustrates how comparative cashflow statement analysis can be useful at the basic level. However based upon users' needs and professional requirement the analysis can be done in depth for which expert's opinion is required.

For exhibiting the importance and the way an analysis can be done, *an example* is given in Annexure - 1. The objective is not to analyse a company; the objective is to apply comparative cashflow statement analysis tool on a cashflow statement for analysis. For detailed analysis it is preferred to discuss with an expert.

The salient observations on comparative cashflow statement analysis are done hereunder;

ANNEXURE 1

Note: For actual Cashflow statement please refer to Annual Report of Idea Cellular Ltd. Following is an extract of Cashflow Statement for the purpose of analysis;

Section	Particulars	2008	2009	Difference	% Change
A	Cashflow from operating Activities				
	Net profit after tax	10443	10012	431	4
	Adjustment for Non-cash items of income/ expense & non-operating activities	13009	17718	4709	36
	Operating Profit before Working Capital Changes	23452	27730	4278	18
	Adjustment for Working Capital Changes	1998	-7792	9790	490
	Cash generated operation	25450	19938	5512	22
	Tax Paid	428	1300	-872	204
	Net cash operating activities	250522	18638	6384	26
B	Cashflow from Investing	-59562	-76554	16992	-29
C	Cashflow from Financing	21313	76390	-55077	-258
D	Net increase in cash	-13227	18474	-31701	240

Observations:

- The net profit decreased by Rs. 431 million whereas cashflow from operating activities increase by Rs. 6384 million. It is observed that although there is marginal increase in net profit, net cash from operating activities increased by large proportion.
- The non operating and non cash items of incomes and expenses in 2009 were larger than 2008 by Rs. 4709 million due to this operating profit before working capital changes increased in 2009 compared to 2008.
- Working capital changes in 2009 showed more application of funds since huge amounts were applied in debtors, inventory and highest in loans and advances - mainly due to deposits with body corporate.
- In 2008, working capital showed release of funds thereby contributing to cash generated from operations. However in 2009, working capital showed investment of funds thereby reducing cash generated from operations.

- e) The Company has sufficient cash generated from operations to meet its working capital requirements, tax paid, interest payment.
- f) Any item increasing the cash generated from operations is always favourable like:
 - i. Increase in Net profit
 - ii. Adjustment towards non-cash and non-operating items of incomes and expenses
 - iii. Working capital changes leading towards release of funds
 - iv. Tax saved / tax planning leading to tax saving
- g) In 2008 and 2009 cashflow from investing activities, has shown huge outflow it indicates incremental expenditure on acquisition of fixed assets and intangible assets (including capital WIP) Similarly in 2009, Company has spent for purchase of shares.
- h) In 2008, against raising of Rs. 21313 million from financing activity and Rs. 25022 from operating activities it has applied Rs. 59561 million towards, investing activity.
- i) In 2009, Company has raised 76390 million from financing activity and used 76553 million in investing (in fixed assets and shares) thereby cashflows from operating activities contributed to having Rs. 23444 million as cash on hand.
- j) In 2009 appears to be more towards liquid cash balance as compared to 2008, with increase in cash balance by Rs. 31701 million It is indicated that company is growing. The growth is financed largely by financing activities in 2009 whereby in 2008 it was from operating and financing.

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Operations Support System, Business Support System & it's Business Implications

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Abstract:

The field of telecommunications has witnessed a tremendous growth in recent years churning revenues approximately Rs. 390 billion till the last quarter. Critical success factors for a nourishing business depends upon improving operation efficiency and this is achieved by cost control and rationalization, maintaining QoS to satisfy customer's demands, and increasing new service innovation. OSS/BSS significantly defines the critical success factors and are the today's market initiators.

This paper aims to highlight details on the

- Evolution of the concept of OSS BSS
- The importance of OSS/BSS for the service providers
- Different aspects of OSS/BSS i.e., service activation, provisioning, customer care, billing, Business Intelligence, fraud management etc.
- The link between SaaS, Cloud Computing, TM Forum, OSS/BSS
- The possible new systems developed to manage SaaS and Cloud Computing
- Relevance of e-TOM and SIM in NGOSS
- Security Issues
- Possible solutions to overcome the threats

All in all, in detail, the hypothetical description of the next generation OSS (NGOSS) will be answering the new potential areas of development highlighting the weaknesses and providing resolutions. The resolutions would be provided by the Java initiative OSS, i.e., OSS-J. Under the best of the conditions, the growth of Indian OSS market and the plans to tap the same are highlighted in the due course of the paper.

Definition:

The term **Operations Support System** (OSS) refers to the system that deals with processes like maintaining network inventory, provisioning services, configuring network components, and managing faults of a telecommunications network.

The term **Business Support System** (BSS) refers to the business systems dealing with Business Intelligence, Fraud Management, Churn Management, and Billing issues.

Evolution of OSS/BSS:

Prior to 1970s there were no OSS/BSS applications and manual administration ruled the process^[1]. However, it became apparent that this manual activity had to be replaced by computers. During the next couple of years much of this activity has been replaced by computer systems and software applications paving the way for the evolution of OSS/BSS. During the 1990s, new OSS architecture definitions have been deployed by the ITU-T in its Telecommunications Management Network (TMN). The revered ITU-T has come with a significant 5-layer model which covers^[1]

1. Business Management Level (BML)
2. Service Management Level (SML)
3. Network Management Level (NML)
4. Element Management Level (EML)
5. Network Element Layer (NEL)

The network management was further defined by the ISO using the **FCAPS** Model^[2] Fault, Configuration, Accounting, Performance and Security.

- F Fault Management
- C Configuration Management
- A Accounting Management
- P Performance Management
- S Security Management

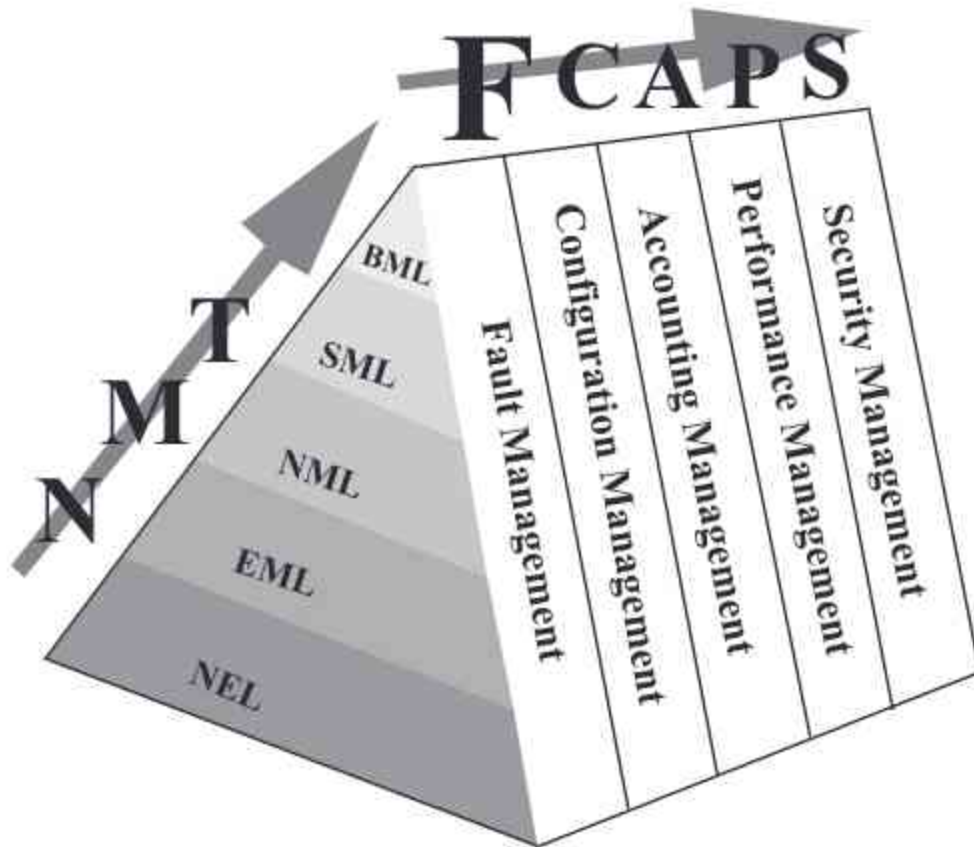


FIG 1: 5 layer TMN Model

Layers :

1. **Business Management** It manages the overall business process, i.e., it performs the functions related to business aspects, analyzes trends, and quality issues. For example, achieving ROI, provide basis for billing and other financial reports, market share, community and government goals etc.
2. **Service Management** It performs functions for the handling of services to the customers in a network. For example, meeting customer service levels, service quality, cost maintenance.
3. **Network Management** It manages and distributes the network resources and systems that deliver services. For example, configuration, control, congestion, diversity, supervision of the networks.
4. **Element Management** It contains functions for the handling of individual network elements and the systems. For example, alarm management, handling of information, backup, logging, maintenance of hardware and software.
5. **Network Element Layer** Network Element *Layer* acts as the interface between the ECSP (Environment Change and Security Program) tasks and the Network Element hardware. Basically a network element provides agent services, mapping the physical aspects of the equipment into the TMN Framework.

FCAPS Capability ^[3]

Fault Management	Configuration Management	Accounting Management	Performance Management	Security Management
Alarm Handling	System turn-up	Track Service Usage	Data Collection	Control NE Access
Trouble Detection	Network Provisioning	Bill for Services	Report Generation	Enable NE Access
Trouble Correction	Auto Discovery		Data Analysis	Access Logs
Test and Acceptance	Backup and Storage			
Network Recovery	Database Handling			

Significance of OSS/BSS for Service Providers

OSS can be viewed as a set of systems that can be consolidated on a single platform. Unfortunately most of these services are not integrated. It's tough time for the industry experts to work on systems which are not integrated and the current trends signify that the industry is rapidly moving towards an integrated system from a spaghetti system.

With the growing number of disparate systems that provide enhanced services to the subscriber and enhanced network capabilities, it is really essential for the Service Providers to manage these complex systems effectively. The service provider uses OSS/BSS applications in the functional areas mentioned below.

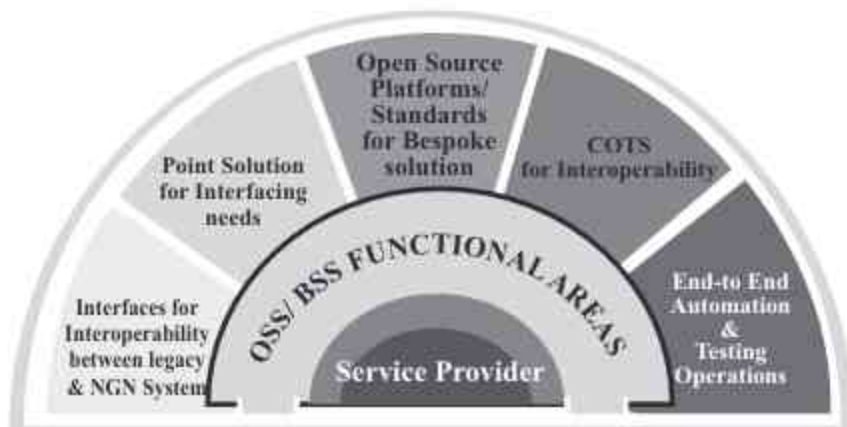


FIG 2: Service Providers' scope

Framework of OSS/BSS

The framework completely describes how user interface is connected to the management environment.

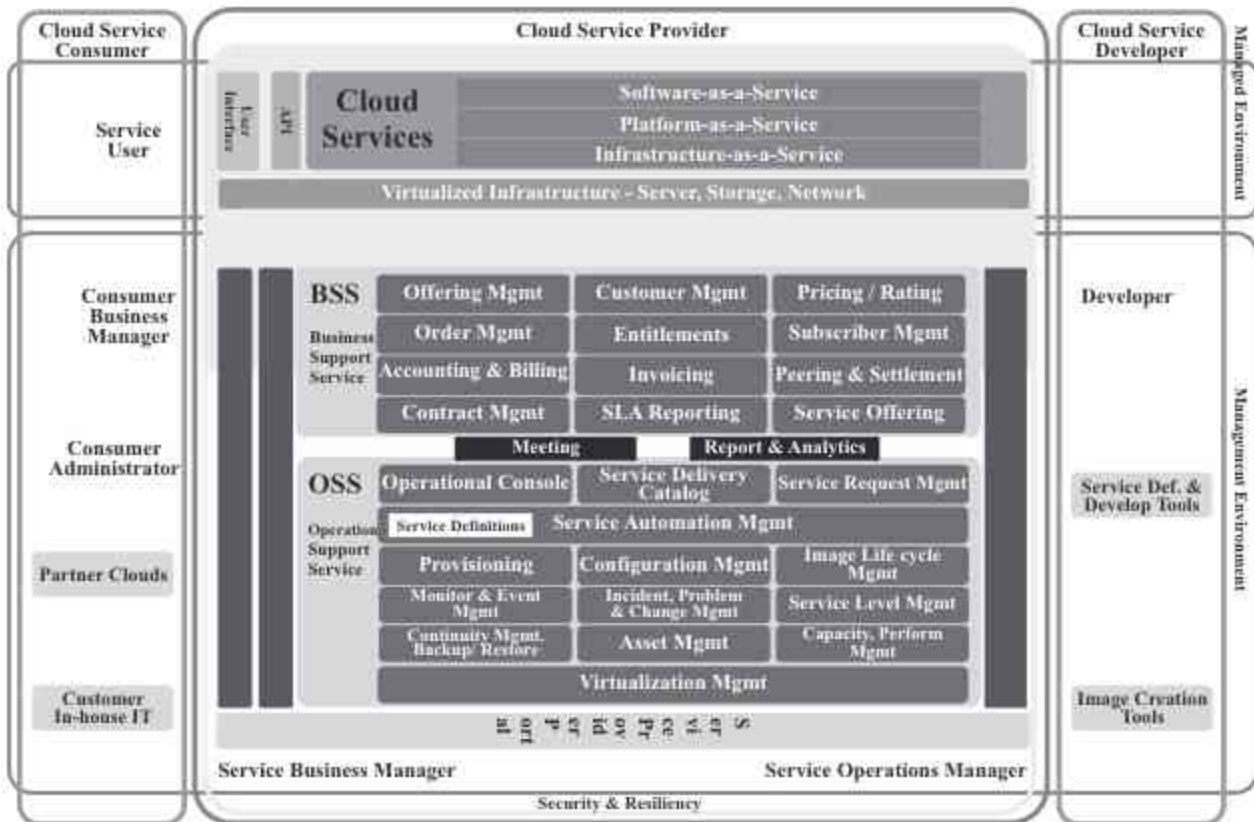
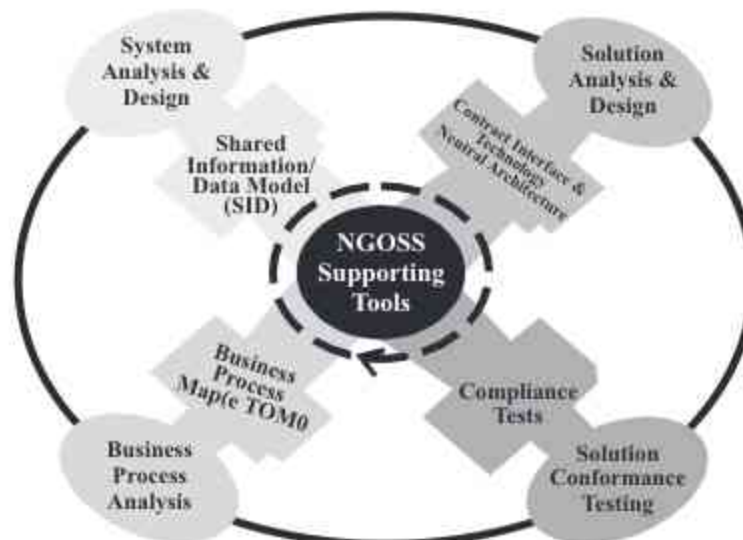


FIG 3: Framework of OSS/BSS

NGOSS (Next Generation Operations Software And Systems):

FIG 4: NGOSS Framework ^[5]

NGOSS is the TMF business solution framework for creating next generation OSS/BSS software and systems^[6]. NGOSS delivers a framework for producing next generation solutions, and a collection of documentation, models, and guidelines to support these developments.

Today's service providers are required to manage complex set of products, networks, and services in a dynamic market. The present day market demands innovative features, worldwide interoperability, and automation of services within the Telecom industry. So, operators have developed the next generation network technologies to implement appropriate architecture for operation and administration to achieve the desired result.

NGOSS is a component based framework consisting of the following elements:

- The enhanced Telecom Operations Map (eTOM)^[7] is a business process framework.
- The Shared Information Data (SID) model^[8] is a comprehensive data model that is specialized for the needs of a particular organization.
- The Technology Neutral Architecture (TNA)^[9] and contract interface are the components that make up the heart of the NGOSS integrated framework.
- TNA is an architecture that is sustainable through the technology changes.
- The contract interface defines APIs for interfacing across the architecture from different software vendors.

Relevance of eTOM & SIM/SID in NGOSS:

1. Enhanced Telecom Operations Map® (eTOM)^[10]

The Enhanced Telecom Operations Map® (eTOM) is the ongoing TM Forum initiative to deliver a business process model or framework for use by service providers and others within the telecommunications industry. The TM Forum eTOM describes all the enterprise processes required by a service provider and analyzes them to different levels of detail according to their significance and priority for the business. For such companies, it serves as the blueprint for process direction and provides a neutral reference point for internal process reengineering needs, partnerships, alliances, and general working agreements with other providers. For suppliers, eTOM outlines potential boundaries of software components to align with the customers' needs and highlights the required functions, inputs, and outputs that must be supported by products. The eTOM Business Process Framework represents the whole of a service provider's enterprise environment. The Business Process Framework begins at the Enterprise level and defines business processes in a series of groupings. The framework is defined as generically as possible so that it is organization, technology and service independent, and supports the global community.

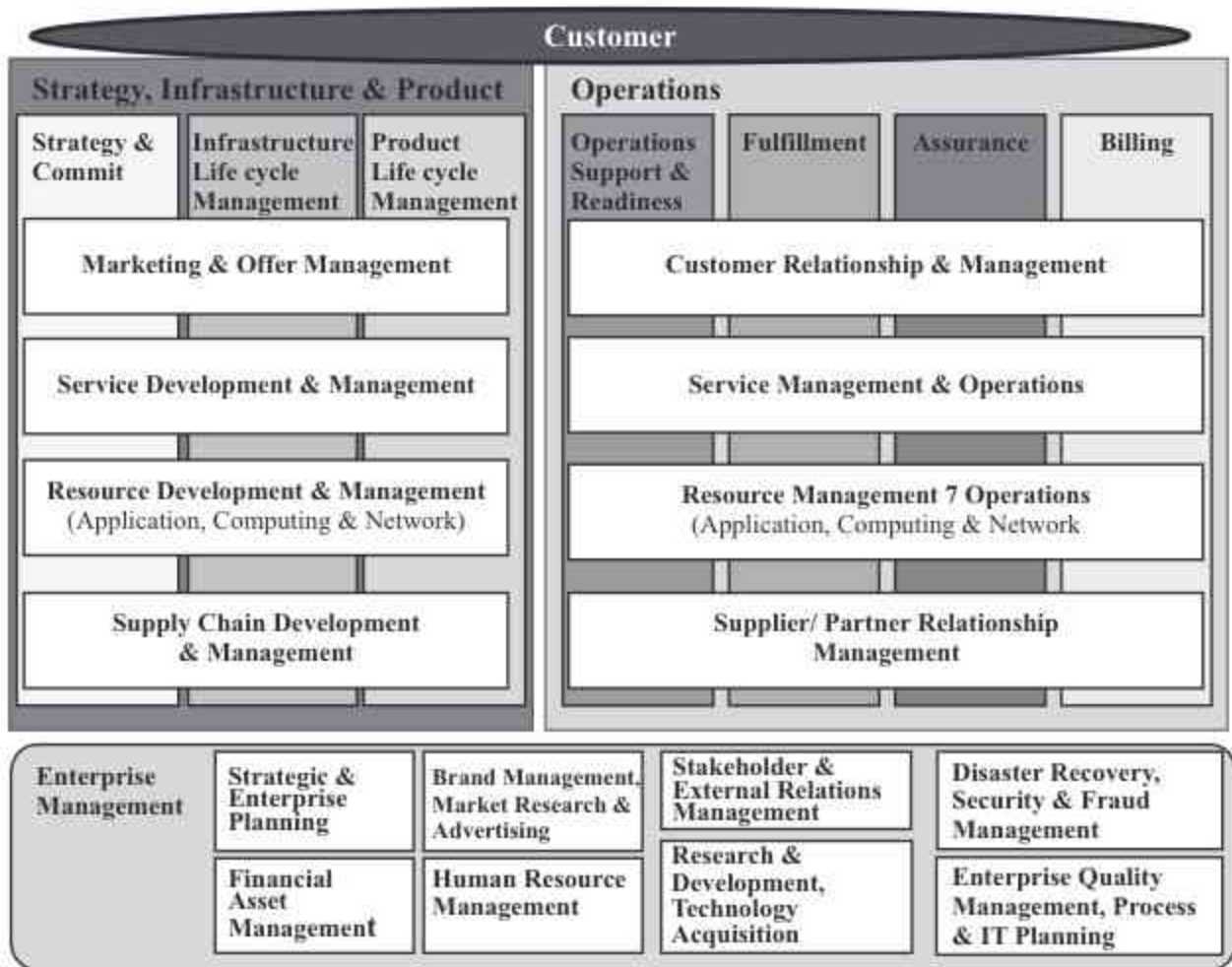


FIG 5: Enhanced Telecom Operations Map ^[11]

2. Shared Information/Data Model (SID / SIM)

The shared information and data model provides a “common language” for software providers and integrators to use in describing management information, which will in turn allow easier and more effective integration across OSS/BSS software applications provided by multiple vendors. The SID provides the concepts and principles needed to define a shared information model, the elements or entities of the model, the business oriented UML class models, as well as design oriented UML class models and sequence diagrams to provide a system view of the information and data.

How eTOM and SIM complement each other?

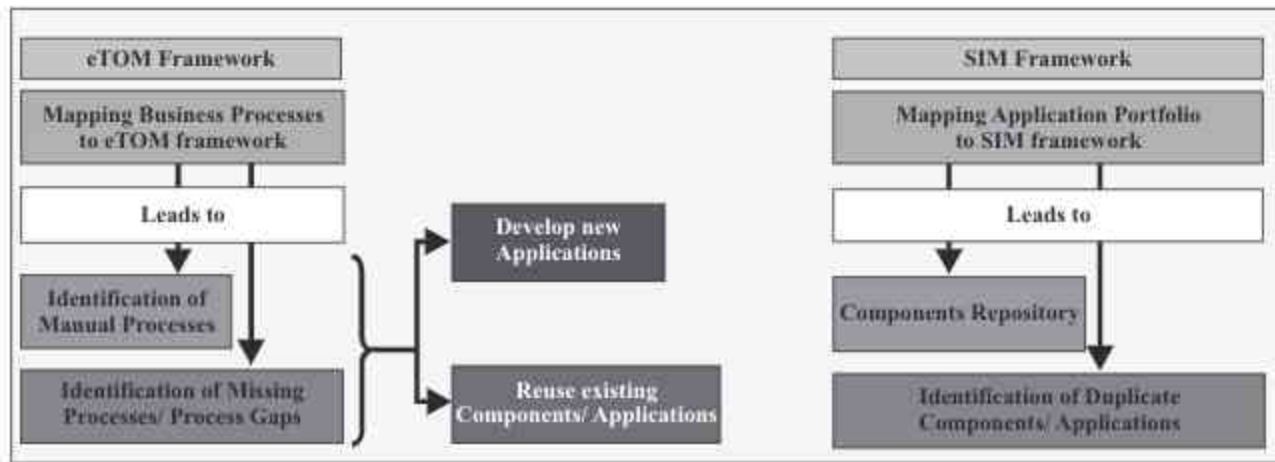


FIG 6: FRAMEWORK eTOM & SIM

Significance:

1. eTOM and SIM complement each other in rationalizing OSS Infrastructure
2. eTOM and SIM help rationalising the IT portfolio of a service provider

The Challenges Ahead:

Across the past 20 years different OSS systems have been deployed by multiple vendors and service providers. All these systems may or may not be compatible and the glitch lies here. These OSS systems are complex and are characterised by high CAPEX and OPEX.

1. As a sum-up the main challenges for OSS would be:
 - A large number of different OSS systems deployed have different kind of standards, architecture, and implementation technologies.
 - Non availability of a standard architecture and interface.
 - Huge integration costs
2. Business Impact of OSS/BSS Solutions
 - QoS It is quintessential for a proper quality check of the services delivered.
 - Data Warehousing Repositioning the whole database efficiently

- Operational Efficiencies Effective implementation of the standards and make sure errors to be less efficacious.
- Flexibility The flexibility of the multiple OSS systems to be integrated onto a single platform.

3. Business Scenario

From a day where basic voice mail services ruled the world to today when those services have become obsolete the industry has developed many applications. Applications like VoIP, IPTV, Video Streaming, LBS, and A2P SMS etc have been developed and deployed. Huge revenues have been generated from these services.

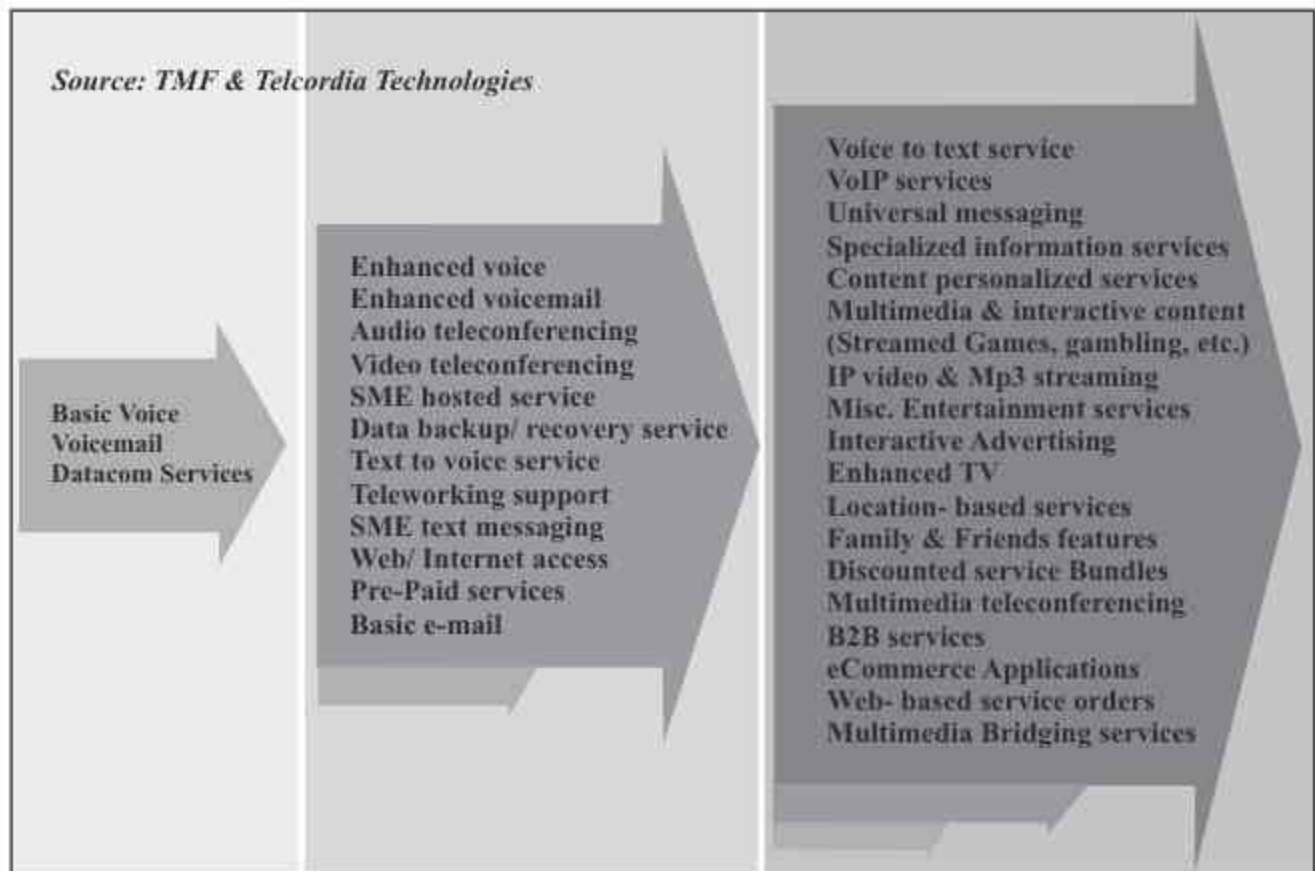


FIG 7: SERVICES THE FUTURE AHEAD

4. How to solve OSS/BSS problems?

Carriers and service providers are facing new challenges to their Operational Support Systems (OSS) and Business Support Systems (BSS). The service providers can address these by using product methodology and a portfolio of OSS/BSS tools that will allow them to profitably and productively manage their customers and services. Integrated Element and Network Management solutions can overcome the hurdle and boost improved performance.

Many a heterogeneous management, provisioning and reporting elements in network infrastructures pose service providers a number of challenges. Without the ability to gain a complete service overview or an automated way to switch on customers' services, they need to turn to expensive integration and development. In addition, it is essential to coordinate the delivery of customer services where discrepancies between applications occur, requiring a massive amount of human intervention and service delivery.

Conclusion:

Continuing Engineering & Optimization Services

- System Studies
- Operational Analysis
- Optimization & Tuning
- Operations & Security Audits
- Periodic Check-Ups
- Disaster Preparedness
- Revenue Recovery

Deployment & Configuration Services

- Software & System Installation
- Network Connectivity
- Network Element
- Desktop Configuration
- Data Migration
- Provisioning
- Staging
- Test & Turn Up



Integrated Solution Planning Services

- Implementation Planning Architecture
- Requirements Definition
- Physical Architecture
- Functional Architecture
- Specification Documents
- Operational Flows
- Systems Integration
- Multi vendor Integration

Custom Software Development Services

- Requirements Definition, Specification Documents
- Additional Functionality For Existing Software
- Customized Interfaces & Reporting
- Operational Flow-Thru
- Software Adaptations for Systems Integration &/or Multi vendor Integration
- Security Management

FIG 8: OSS/BSS Integration Services cover the Entire Life Cycle

Ideally, an OSS application enables work to flow swiftly across the different levels of organization, providing visibility to the processes and resource utilization. It ensures the application components reuse and also functional re-use of business process components. Finally a common middle ware OSS system i.e., a technology neutral system framework helps in effective implementation and execution.^[12]

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Spectrum Auction Process for 3 G Mobile Services in India

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Abstract:

In continuation of the previous paper, titled “Spectrum for 2 G & 3 G Mobile Services” which appeared in the second issue of TBR in January 2009 ; this paper deals with the details of the planned 3 G Spectrum Auction Process in India and compares with situation in other countries. Causes leading to deferments of this 3 G auction till now and its implications are also analyzed.

1. Introduction:

Following the Telecom Regulatory Authority of India (TRAI)'s recommendations in September 2006, there was a lot of excitement and expectations about early completion of 3G Spectrum Auction process and launch of 3 G service in India. These hopes were belied as serious divergence of views amongst the concerned govt. departments emerged on the details of 3 G spectrum availability , reserve price for spectrum, license conditions etc. As a result, the auction originally planned for October 2008 was first postponed to 16th January 2009 & then further postponed to January 2010. This also now stands deferred to August/September 2010 as per news items on 29th/30th January 2010. The difficulties and complexities in 3 G auction , have mainly arisen from shortage of spectrum on account of non-vacation of concerned bands by Defence , in adequate quantity and without firm indication of any time frame of present and future vacations . There are 3 different chunks of spectrum available at 800 MHz, 2.1 Ghz and 2.3 GHz in the planned 3 G Auction. Separate bidding process by electronic means (e-Auction) will take place for each of them. Details of these processes are discussed. It is hoped that readers of this paper will be facilitated to watch further developments on 3 G auction process in the country in more enlightened manner. The success of 3G auction, in the context of original expectation of revenue generation of Rs. 35,000 to 40,000 crores to the exchequer, now appears to be in doubt.

2. Frequency Spectrum for 3 G:

2.1 It is recapitulated that the Recommendation M.1036 of the International Telecommunication Union (ITU) specified the following bands for 3G Spectrum:

- 1885-2025 & 2110-2200 MHz as finalized at its World Administrative Radio Conference (WARC-1992)
- 806-960, 1710-1885, 2500-2690 MHz as decided at its World Radiocommunications Conference (WRC-2000)
- Other Bands as per a country's choice are not ruled out.

Under the International Mobile Telecommunications (IMT-2000), the ITU adopted a family of standards. In 1999, ITU approved five radio interfaces for IMT-2000 as a part of the ITU Radiocommunication Sector (ITU-R) M.1457 recommendation; Worldwide Interoperability for Microwave Access (WiMAX) was added in 2007.

Typically, 5 MHz bandwidth per carrier is required for 3 G mobile service providing high speed data, multi-media capabilities and a host of other features.

2.2 The Government sought TRAI's recommendations on 3G spectrum allocation and pricing which were expeditiously provided by the TRAI in Sept. 2006 of which the following were the main features.

- 3 G Spectrum, NOT to be continuation of 2 G spectrum allocation due to severe shortage of spectrum, even for 2 G service, on account of the uncertainty about the vacation of the 2 G & 3 G spectrum of reasonable bandwidth by existing occupants viz, mainly Defense Services.
- 450 MHz (for Rural areas), 800, 2100 MHz bands to be used for 3 G.
- PCS 1900 MHz band is near future possibility, based on trials and vacation by incumbent users.
- 25+25 MHz Spectrum to be used for 3 G allocation in blocks of 5+5 Mhz

2.2.1 Pricing of the Spectrum

On Spectrum Pricing, fee basis approach was suggested by the TRAI for 450 / 850 MHz band. For 2.1 GHz band, Simultaneous Ascending Auction with Reserve Price was favored by the TRAI. 1 % of Adjusted Gross Revenue (AGR) as Spectrum Fee after 1 year was also advocated by the TRAI. It also suo moto recommended a number of frequency bands for Broadband Wireless Access (BWA) systems which were viewed as complementary to the development of 3 G service.

3. How 3 G Spectrum Auction became inevitable?

Considering the high spectrum bids realized in other countries in the recent past, for 3G Spectrum Allocation, the auction process was inevitable unlike the earlier 2 G Metros and Telecom circle-wise license awards done by tendering process in 1994 and 1995-1998 period *respectively*. Besides, Department of Telecom (DOT)'s issuance of 120 **Unified Access Service licenses (UASL)** with 4.4 MHz start-up spectrum again by tendering process, at a cumulative fee of Rs. 8,966 crores based on 2001 fees, attracted sharp criticism from the Ministry of Finance, which placed its valuation at Rs. 31,452 crores, based on revenue growth since 2003 & the U.S.A. Auction data. Allegations regarding a loss of Rs 22,000 crores thereby to the government were made and other key ministries also seem to endorse this view. The **Central Vigilance Commission (C.V.C)** raised questions as to why spectrum auction process was not held for award of these 120 UASL licenses in 2008. Against this backdrop, for 3 G Spectrum Allocation, *it was considered* that there was no other alternative but to undertake the auction process.

4 Delays in 3 G Auction Process :

- 4.1 Following the TRAI Recommendations in mid-2006, there was lot of excitement and expectations about early completion of 3 G Spectrum Auction process and launch of 3 G service in India. But, the concerned government departments had divergent views on some key issues like quantum of the available 3G spectrum, reserve price for spectrum, license conditions, eligibility of foreign/ global players etc. Anomalies in the proposed auction process were pointed out by the CVC and the bidders also sought a number of clarifications. The pre-bid conference too got poor response from global players. GSM lobby alleged favourable conditions to CDMA providers in the auction process planned.
- 4.2 As a result, the auction, originally planned for October 2008 was postponed to 16th January 2009. The empowered Group of Ministers (e-GoM , constituted in 2007), continued its deliberations for reconciliation of divergent views on spectrum release by Defence , spectrum fee and other conditions etc. without any consensus leading to further postponement of Jan., 2009 auction date to Jan., 2010 ; which also now stands deferred.
- 4.3 Following general elections in mid-2009 , the new government again took up this issue and the DOT finally on 23rd October 2009 issued a revised Information Memorandum , running into 163 pages, on the proposed 3 G Spectrum Auction Process for the information of likely bidders. This updated the earlier DOT guidelines on 1st August, 11th September 2008 & also substituted earlier Information Memo of 12th December 2008 ; all of which were intended for 16th January 2009 auction. The October 2009 Information Memo envisaged issue of Notice Inviting Applications (NIA) for auction participation on 4th January 2010 and actual conduct of auction on 14th January 2010. However, as stated earlier, these dates have also passed by, without the start of Auction Process with no firm indication of the next date of issue of NIA, being available so far.

5 Spectrum Auctions: Advantages & Disadvantages

5.1 Before the Indian 3 G Spectrum Auction Process is discussed in detail, it will be useful to briefly recapitulate the merits / demerits spectrum auctions, in general and the lessons of spectrum auctions, in the past, held elsewhere.

5.2 Compared to the traditional fee based , first cum first served , comparative hearing & bidding approaches for spectrum allocation ; in the recent period, realizing market price of the spectrum by auction process has become popular with the governments in view of high amounts raised by this process. This method is considered better than administrative decision making and also makes good use of "spectrum scarcity (artificially created ?) paradox". Like real estate scarcity in some locations, spectrum scarcity is used to get high value. Advantages of the auction approach are that those who are best able to use the spectrum *get it*; it promotes flexibility, economic efficiency & development of new technologies. The foremost advantage however is that it maximizes the state revenue.

5.2.1 On the negative side, it is argued that spectrum auction favours bidders with deep pockets and runs the risk of monopoly/oligopoly. The winner, who generally tends to bid very high, suffers from "Winners Curse", as later on such high bids may not become economically viable.

5.2.2 Game Theory has been deployed to develop auction procedures. A well designed auction process is the key to an auction's success. It is shown that game theory is generally a better cash generating machine, than alternate ways of negotiating a sale. A reasonable number of serious bidders are also essential for the success of auction process. Simultaneous Ascending Auction Format is most commonly deployed.

(Game theory is a branch of applied mathematics which relates to strategy and prediction of behavior; a complicated science with a diverse range of applications Game theory is, essentially, a form of mathematics which attempts to predict behavior in any sort of strategic" environment, whether it be the decisions made by armies on a battlefield, the trends within a financial marketplace, or the growth and development of animal species in certain environments.)

6 Spectrum Auctions: Some Historical Examples:

The following historical examples of spectrum auctions make interesting and educative reading owing to their divergent results.

- 6.1 In New Zealand as per new 1989 Act, TV, AM / FM, Cellular Licenses were auctioned using “Vickrey” method (second price sealed bid). This resulted in low revenue & large differences in revenue realized for same types of licences. For *subsequent* auctions, improvements in the process were carried out.
- 6.2 In Australia, in the auction done as per 1992 Act, loopholes were left, intentionally, and as a result the Minister had to resign.
- 6.3 In USA : 1st Auction held in 1994 for 3 X 1 MHz spectrum blocks in 900MHz band for nationwide 10 PCS Licences, raised US \$ 650 million.
 - 2nd Auction in 1995 for 15 +15 MHz spectrum in 1900 MHz band for 5 nos. of PCS licences ran for 47 rounds in 4 days and raised US \$ 7.740 m
 - In April 1997 for a similar auction, less than 1 % was raised as firms learnt how to avoid competition.
 - The FCC of USA held 34 auctions from mid-1990s to 2001. The latest auction in March 2008 (108 MHz spectrum in 700 MHz band, vacated by TV Channels) raised US \$ 19 billion. Critics accused Google of influencing the holding of the auction and that the band 700 MHz was being not very suitable for the purpose intended.
- 6.4 The UK got the distinction of holding the first & the most successful 3 G Auction in Europe. The Auction process was developed after extensive simulations done by London University, 4 Existing 2 G Players + Class A Licence (New Entrant) participated for five 3 G Licences with spectrum blocks of 25 MHz to 35 MHz. The auction began on 6th March, ended 27th April 2000 after 150 rounds of half hourly, Internet based bidding, in seven weeks. “New Bid or Withdraw “procedure was used. The auction raised UK £ 22.5 Billion, broke all records and this money was sufficient for the UK government to halve the basic rate of income tax for a year. It also exceeded total revenues of all USA spectrum auctions in previous 6 years. The reasons for its success can be attributed to its careful design & implementation making good use of the wealth of experience of other countries. That the auction was held at the right timing i.e. at the peak of “Technology Bubble” was also a contributing factor.

- 6.5** Auctions held in the European Union countries thereafter got very high, unrealistic bids. As a result, later on telecom companies reportedly lost UK £ 400 billion in their stock value in next two and half years. Many people blamed auctions for the woes of telecom companies without realising that the most seriously afflicted firms did not win or participate in EU auctions. The 3 G license winners such as Vodafone, remained successful firms, sadder and wiser after the telecom bubble but still perfectly viable.
- 6.6** Telecom executives cursed the UK auction since 3 G remained commercially unproven, at that time, and is also threatened by competing technologies like Wi-Fi and Wi-Max. However, one has to admit that the 3 G licenses offered tremendous scarcity value and these auctions secured a fair price for that apparent value. Game theory was used to achieve one of the most spectacular, if controversial, policy triumphs that economics had ever seen.
- 6.6** The UK's 2001 3G auction raised \$ 580 per inhabitant. Auctions done in the period 2001 2006 in Europe, Turkey, Taiwan, Uruguay etc. raised \$ 2.94 to \$ 65 per inhabitant. High price bids before 2002 were result of 3G market being not properly understood and were for grabbing of the spectrum. International average price for 3 G spectrum allocation after 2002 was nearly \$ 1.5 per Hz compared earlier UK & German auctions \$ 251 & \$ 316 per Hz, *respectively*.

7 Main Features & Conditions of the Indian 3G Spectrum Auction Process: (as stated in the DoT's October 2009 Information Memorandum)

7.1 Objectives of the Spectrum Auction:

- Obtain a market determined price of 3G / BWA spectrum through a transparent process;
- Ensure efficient use of spectrum and avoid hoarding;
- Stimulate competition in the sector;
- Promote rollout of 3 G and B.W.A. Services;
- Maximize Revenue proceeds from Spectrum
- Resolve 2G Spectrum congestion issues

Likely, possible future benefits to 3 G Players from award of UAS License, Mobile Number Portability, More Spectrum later on, Tax Relief on External Commercial Borrowing (ECB) have been also mentioned to attract bidders.

7.2 Auction Bidders' Eligibility conditions:

7.2.1 For 3G (2.1 GHz) Spectrum

Any entity (i) that holds a UAS/ Cellular Mobile Telephone Service ("CMTS") licence; or (ii) that: (a) has previous experience of running 3G telecom services either directly or through a majority-owned subsidiary; and (b) gives an undertaking to obtain a UAS license through a New Entrant Nominee UAS Licensee as per DOT Guideline etc can bid for 3 G Spectrum

7.2.2 For the spectrum in 800 MHz band ("800MHz Spectrum"):

Any existing UAS licensee that is entitled to provide services in the 800 MHz frequency band in a telecom service area ("UAS-CDMA Operator") can bid for 800 MHz Spectrum (subject to other provisions of the Notice) in that telecom service area.

7.2.3 For the spectrum in 2.3GHz band ("BWA Spectrum")

Any entity: (i) that holds a UAS/ CMTS licence; or (ii) that holds an Internet Service Provider ("ISP") licence (category 'A' or 'B'); or (iii) that gives an undertaking to obtain a UAS licence through a New Entrant Nominee UAS Licensee as per the DoT guidelines before starting telecom operations; or (iv) that gives an undertaking to obtain an ISP license shall be eligible.

7.3 The e-Auctions Process

In effect, there will be three separate and distinct spectrum auctions by electronic means (e-Auction) for the award of 3 G spectrum, 800 MHz spectrum (for existing 2 G, CDMA players) and BWA (**Broad band Wireless Access**) Spectrum. Each of the auctions will be a simultaneous ascending e-auction, run over the Internet. Bidders to use their own IT Infrastructure to access the Electronic Auction System (EAS) to be in the Auctions using standard web browsing software. Pre-qualified Bidders will be issued with authentication tokens on CD ROMs to allow secure access to the EAS as well as they will get a Manual for how to use the EAS. In view of the specialized nature of the auction, the DOT appointed NM Rothschild & Sons (India) Private Limited and DotEcon Limited as Advisers to the Government on the auctions as well as to manage the day to day running of the auctions. Mock Auctions are also to be conducted a few days before the actual auction for the benefit of bidders. Remedial measures and steps have also been specified in the event of unforeseen snags in the e-infrastructure, during the conduct of auctions.

7.4 Four Stage Auction Process:

7.4.1 Indicative dates mentioned in October 2009 Memo, (which have already been missed) are given below for *background* information.

The deadline for submission of questions for pre-bid conference was 13th November, 2009 to be followed by Pre-bid conference 16th November, 2009. Later on, issue of clarifications, if any to be done by 27th November, 2009.

7.4.2 Invitation Stage for Applications was to begin by issue of the Notice Inviting Applications NIA on 8th December, 2009 with Final date for Applications 21st December 2009.

7.4.3 Pre qualification Stage for Evaluation was to begin by Publication of ownership details of Applicants on 24th December, 2009 & Bidder Ownership Compliance Certificate to be given before 4th January, 2010. Pre-qualification of Bidders to be notified, thereafter, on 7th January 2010

7.4.4 Auction Stage was to begin by Mock Auction 11th -12th January 2010 followed by the start of the Bidding for 3G Auction 14th January 2010. Start of the 800 MHz and BWA Auctions 2 days from the day of close of the 3G Auction.

7.4.5 Grant Stage – Payment of Bid Deposit by Successful Bidders within 5 calendar days of the close of the relevant Auction and payment of the balance amount (Successful Bid Amount less Bid Deposit) within 15 calendar days of the close of the relevant Auction Final Approvals will be issued thereafter.

(Note : Anticipating possible changes in the above time line , the DOT played safe by adding a proviso to the effect that there is no pre-set timetable and the Government reserves the right to determine the overall timetable [may be 2-3 months] of the Auctions or to amend it from time to time.)

8 Spectrum to be auctioned:

8.1 The Auction will confer rights to use spectrum at specified frequencies for duration of 20 years in the following bands without any restriction on choice of technology. Spectrum usage rights shall be awarded separately for specific service areas.

3 G Auction : 2.1 Ghz

800MHz Auction : 800 Mhz

BWAuction : 2.3 GHz (& 2.5 GHz band will be auctioned after the outstanding issues of interference with the Mobile Satellite System of INSAT system of D.O.S. are resolved)

8.2 : For 3 G Auction:

8.2.1 Upto 20 MHz of paired spectrum in the 2.1 GHz band in the telecom service areas where 25 MHz or more paired spectrum is available. In such cases, four blocks of 2X5 MHz will be auctioned, while one block is reserved for BSNL/ MTNL who have already started 3 G services in the country.

8.2.2 In telecom service areas where less than 25 MHz paired spectrum is available in the 2.1GHz band, the actual amount of available spectrum in blocks of 2X5 MHz will be allocated, with one block being reserved for BSNL/ MTNL.

8.2.3 Indicative Number of 2x5 MHz Blocks of 3G Spectrum blocks under Auction

- In Service Areas like Metros Delhi & Mumbai & States like A.P, Maharashtra, Karnataka etc., four Blocks of 2 x 5 Mhz will be available. In border State like Gujarat & Kolkatta Metro only two blocks will be available. For such seven service areas reserve price of Rs. 320 Cr. each, is specified while that for Kolkatta Metro it is Rs. 120 Crores
- In Nine Service Areas like Haryana, Kerala , Punjab , U.P. (East), M.P. Etc. four Blocks of 2 x 5MHz will be available with a Reserve Price Rs. 120 Cr. Each. For U.P. (West), three Blocks, for W.B., one Block and for Rajasthan “ Nil” Block of 2 X 5 MHz will be available.
- In six Service Areas like H.P., Bihar, Orissa , Assam etc. Three to four Blocks of 2 x 5 MHz will be auctioned at a Reserve Price Rs. 30 Cr. each For N.E., no block is available.

Total Reserve Price for 22 Service Areas for 3 G Spectrum thus works out to be Rs. 3,500 Cr. Eligible bidders will have to deposit Earnest Money for 3 G as Rs. 7. 50 Cr to 40 Cr. depending on service area like type A, B or C involved.

8.3 For 800 MHz Auction:

Availability of only **one** block of 2 X 1.25 MHz is indicated for areas like Kolkatta, Gujarat, Karnataka, T.N; Keral , Haryana, U P (East and West), W.B.; N.E. etc while “Nil” availability is mentioned for six areas like Delhi , Mumbai, Punjab , Rajasthan etc.

The Winning Bidder in a service area will be allocated the single spectrum block available in that service area. The Reserve price is Rs. 7.50, 30 & 80 crores depending on the type of service area.

Total Reserve Price for all 22 Service Areas for 800 MHz Spectrum Auction works out to be Rs. 875 Cr.

8.4 For 2.3 GHz BWA Auction:

Two Blocks of 20 MHz unpaired spectrum will be available in all service areas. The Reserve Price shall be Rs. 15, 60, 160 Crores respectively depending on the type of service area. One block of 20MHz unpaired spectrum in the 2.5GHz band has been allocated to MTNL (in Delhi and Mumbai) and BSNL (in all other service areas).

Total Reserve Price for all 22 Service Areas for 2.3 MHz Spectrum Auction works out to be Rs. 1,750 Cr.

8.5 The Government has reserved the right to change the frequency allocations for all winners over the duration of the license period where this may promote spectrum efficiency.

8.6 Reservation for BSNL/ MTNL

8.6.1: 3G & BWA Spectrum

The Government has allocated one block of 2x5 MHz of spectrum for 3 G and one block of 20 MHz of unpaired spectrum in Mumbai and Delhi for MTNL and one block of 2x5 MHz of spectrum for 3 G and one block of 20MHz of unpaired spectrum in the remaining service areas for BSNL. BSNL and MTNL shall not be participating in the Auctions, but will be required to match the Winning Price achieved in the in the respective service areas in the 3G & BWA Auctions, as consideration for the spectrum.

8.6.1.1 The frequencies that have been allocated for use by MTNL/ BSNL in the some of the service areas are typically as indicated below :

For 3 G	Uplink (Mhz)	Downlink (Mhz)	BWA (Mhz)
Delhi, Mumbai, Kolkatta	1962.5-1967.5	2152.5-2157.5	2635-2655
Maharashtra, Gujarat, etc.	1962.5-1967.5	2152.5-2157.5	2535-2545 & 2635-2645
Karnataka & T.N.	1962.5-1967.5	2152.5-2157.5	2635-2655
Punjab, H.P., Bihar, etc.	1937.5-1942.5	2127.5-2132.5	2635-2655

8.6.1.2 The PSU companies, BSNL & MTNL, had thus the freedom to introduce 3G service in the country since Feb., 2009 as they were not subjected to competitive bidding for 3 G spectrum . This, in one view, negates the Govt.'s responsibility to provide a level playing field to all telecom players, in a competitive, liberalized telecom sector.

8. 7 Spectrum Limits for a Bidder:

Not more than 1 block of 3 G Spectrum, 1 block of 800 MHz Spectrum and 1 block of BWA Spectrum shall be allocated to any single Bidder in a service area. This one block of 2 X 5 MHz of spectrum for 3 G service is much less than average allocation of 43 MHz per operator in Europe and 38 MHz per operator in Asia Pacific region. It is also to be noted that even in cases of some service areas where no spectrum block is presently shown available, Reserve Price has been indicated as guidance in the hope of vacation of some spectrum by existing user like Defence etc.

8. 8 The total Reserve Price for all the three , 3 G Auctions adds to Rs. 6,125 crores.

8.9 Earnest Money Deposit : Bidders must make earnest money deposits in proportion to their Initial Eligibility Points desired by them . The same is indicated as below:

For 3 G Auction :	Rs. 7.50 to 40 Crores per service are
For 800 MHz Auction :	Rs. 1.87 to 10 Crores per service area
For 800 MHz Auction :	Rs. 3.75 to 20 Crores per service area

9. Simultaneous Ascending Two Stage Auction Process will have two stages

9.1 Stage 1: Clock Auction (Clock Stage)

9.1.1 Service Area-wise Bidding

- a) The bidding for different Service Areas will start and end at the same time. The bidder shall have Flexibility (subject to Auction Rules) to shift bids across Service Areas in different rounds as per Eligibility Points provided in the Software. Bids are subject to the Activity Rules & Requirement. The latter denotes the percentage of the Bidder's Eligibility Points (rounded up to the nearest whole number) that determines the level of activity that a Bidder must meet in that Clock Round in order to maintain its eligibility in the following Clock Round. This threshold is referred to as the Bidder's Activity Requirement in that Clock Round.
- b) The Clock Stage rounds will stop once (i) for every service area where spectrum is available the number of bids at the prices set in the last completed Clock Round is less than or equal to the number of blocks available; and (ii) there are no opportunities for Bidders to increase their demand allowed by the Activity Rules. This will establish a common Winning Price for all blocks within a service area, and the Winning Bidders in each service area (iii) Duration of a Bidding Round shall be not less than 20 minutes. Initial rounds may go up to an hour or so.
- c) It will be necessary to bid for at least one 3G service area in the first Clock round. Failure to make a bid for at least one 3G service area in the first Clock Round will forfeit bidder's earnest money deposit in its entirety. Price increments as a % increase in bids from previous levels for next bidding rounds have been specified in the predetermined rules of the auction.
- d) During the Clock Stage the following information will be provided to Bidders after each completed Clock Round:
 - the Clock Round price per block in each service area in the last completed Clock Round;
 - the total number of bids received in each service area in the last completed Clock Round; and
 - The Excess Demand in each service area.
- e) Detailed Rules of the Auction have been made available.
- f) The e-auction process will lead to identify winners for each service area and Winning Prices will be determined when no. of bidders is at least equal to no. of MHz blocks for auction in each service area

9.2 Stage 2: Single Stage Bidding (Assignment Stage)

- a. This will be undertaken to assign specific Frequencies in each service area to Winners from Clock Stage when the number of MHz blocks available and the number of Winners are same. Assignment Stage after the Clock Stage will allocate specific frequencies available to the Winning Bidders identified in the Clock Stage in case of service areas where more than one spectrum block is being auctioned. For 3G and BWAuctions, the initial allocation of frequencies shall be randomly done by the software.
- b. The assignments will be announced simultaneous with the outcome of the Clock Stage.

9.3 Auction Process on similar lines shall also be applied for 800 MHz and BWAuction.

10 Financial Liabilities of Winning Bidder:

Besides satisfying a no. of conditions (such roll out time frame obligation etc) of the license that will be obtained by the winner, the main financial implications for spectrum acquisition and its use are indicated below.

10.1 Spectrum Acquisition Fee

- a) Price paid by Winning Bidder will be :
 - Winning price from Clock Stage for that service area
 - Plus incremental bid placed by Bidder in Assignment stage
- b) Winning Price for a Service Area to be Common for All Bidders & will be determined by the maximum price which “clears the demand for Spectrum Blocks in each area at the same time”
- c) Additionally, later on , Spectrum Usage Charge , based on specified % of Adjusted Gross Revenue (AGR) as indicated in 10.2 below will be payable, annually

10.2 Spectrum Usage Charge

A spectrum usage charge (over and above the spectrum acquisition fees) as a percentage of the Adjusted Gross Revenue (“AGR”) shall be payable by the successful bidder as per rules notified by the Government from time to time.

Spectrum in Mhz in 2G	Proposed charges as percentage of AGR
Upto 4.4/2.5*	3
Upto 6.2/5*	4
Upto 8	5
Upto 10	6
Upto 12.5	7
Upto 15	8

**for spectrum in 800MHz band*

- 3G spectrum to be allocated based on auction shall not be counted for calculating the slab of the total spectrum holding by 2G licensee for levy of spectrum usage charges;
- The spectrum charge shall be payable on total AGR of 2G and 3G services taken together;
- There will be moratorium of one year on the payment of annual spectrum charges for the stand alone 3G operator only. However, moratorium of one year will not be applicable to operators holding 2G + 3G spectrum i.e. the existing licensees.

10.2.2 For standalone BWA operators, no annual spectrum charge shall be payable for BWA services in the first year from the date of allocation of spectrum. The operators shall pay an annual spectrum charge of 1% of AGR after a period of one year. The date of implementation of these spectrum charges will be notified subsequently.

11. Will the Auction Succeed ?

11.1 Various news items in the recent period esp. from 22nd December 2009 till 28th January 2010 (i.e. at the time of finalising this article) indicated that the e-GoM is still not able to sort out divergent views of DoT / Defence / Finance etc. on various parameters of 3G auction process. Postponement of Auction Date from January 14 2010 to mid February 2010 was also in the air, this being the fourth one in last one year. Notice Inviting Applications (NIA) originally planned for January 4, 2010 was likely to be issued on January 10, 2010 with the last date for accepting Applications to be January 25. This timeline also did not materialize. One approach talked about was that the Auction may be held now in mid- February 2010 but the spectrum may be released in August 2010; in view of no clarity on the quantum and timeline for spectrum vacated by Defence for 3G blocks in different service areas. This approach called for 25 % upfront payment on completion of auction and balance after the release of spectrum in mid 2010 and would have been helpful to the Finance Minister for reducing the budget deficit for 2009-2010. Industry was not enthusiastic to go along in such uncertain situation about spectrum allocation in mid-2010 which would also imply further delay in the launch of 3G to some time in 2011. To encourage bidders, the government in the last week of January 2010 announced that prospective bidders can raise short term funds from domestic market, which could be refinanced through external commercial borrowings (ECBs) in 12 months. Clarity on tax relief, if any, on this ECBs will come only after the budget to be presented by end of

February 2010. These moves to attract bidders appear to be provide too short time frame for any action by bidders if the auction is held in February 2010. The DOT is also reported to have been toying with the fresh ideas to prohibit 3 G operators' Merger and Acquisitions and also to permit only foreign GSM companies to bid for 3 G spectrum in view of scarcity of spectrum in CDMA bands. The exact nature of various conditions, finally decided, will be known only after the NIA is issued by the DOT to start the auction process.

11.2 Originally, in August 2008, raising of Rs.40,000 crores from 3G auction was hoped for. In December 2009 / January 2010 it was scaled down to Rs. 30,000 crores. In last week of January 2010; the telecom minister further scaled it down to Rs. 25,000 crores. India adds about 12-15 million mobile subscribers per month and this constitutes a potential loss for 3 G market, in near future. The bidders are thus likely to discount the delays in 3 G auctions while bidding, resulting in less funds for the government. Another factor to be noted is that unlike in West, presently in India 3 G will be used mainly for voice services, if one goes by the presently MTNL experience of using 3 G frequencies. This also points to less revenue and bids from 3G. Periodic reports on possible disinterest of foreign players in the auctions have also appeared. As 3 G spectrum being offered is very limited in quantum and is also not in continuation of 2 G spectrum, service providers will have to make more investments to set up 3 G infrastructure. Many conditions stipulated provide, unilateral right of the govt. to effect changes in the license provisions.

12 Conclusion: The difficulties and complexities in 3 G auction have mainly arisen from shortage of spectrum on account of non-vacation of concerned bands by Defence, in adequate quantity. Action for this, on war footing was advocated by the TRAI as back as May -2005 and was also foreseen even earlier in 1990s when 2G spectrum allocation was made. The success of 3G auction, therefore, appears to be in doubt and is a million dollar question. The very fact that it has been postponed repeatedly is a pointer. Some of the problems regarding release of spectrum might have arisen due to lack of political will & leadership and difficulties faced on account of the compulsions in running of the coalition govt. formed by the UPA. India's mobile network, being the second largest in the world is still being denied 3 G service when more than hundred countries have started 3 G service. This reflects badly on the image of the country's telecom sector. Delays in 3 G are also affecting GDP growth and economic development as well as it is sending wrong signals for investment attraction in other infrastructures.

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