If you win, you can lead! If you lose, you can guide!
— Swami Vivekananda

Advance Praise for *Next Generation Mobile Communications*

In today's competitive telecommunications industry, high standards of business management are essential. The companies providing infra and the ones serving the end consumer need to learn and anticipate the evolution in telecom business management to be able to respond quickly. This book provides the right insights and strategies for Indian Telecom Business Management, something lacking as study material in India. Rishi's 21 years plus experience in electronics and telecom industry lends due credibility to the text and context … a must read for all aspiring and existing telecom professionals

A G Rao
Group Managing Director
Manpower Group

Sometimes you come across initiatives that make you realise there are industry verticals where sources of learning are very limited for students, faculty and professionals alike. Indian telecom industry is such a domain where very insignificant study material is available. Rishi's experience of two decades in the telecom industry lends strong credibility to the textbook he has penned. The insights will be extremely useful to academic pursuants and telecom industry aspirants.

Anil Sardana
Managing Director
Tata Power

India has a unique telecom position with fierce competition and ever-evolving technology landscape. The academia and industry had been eagerly waiting for a book that enumerates details of Indian telecom ecosystem, its present and future. Rishi's immense telecom industry experience is evident in the book he has penned. I would recommend this literature to be adopted by academia and industry alike. All the very best to Rishi.

P Balaji
Director
Vodafone India

India has achieved a commendable growth rate in telecom in terms of accessibility and connectivity throughout the country. However, the challenge remains to sustain this growth in a competitive world of today. The explosive growth coupled with the daily innovations in telecom is throwing not merely technical but also a whole lot of management challenges. It is imperative that students, academicians and

professionals need to keep abreast with the latest developments in the telecom sector. This also becomes significant in light of the indigenous manufacturing initiative of 'Make in India' by the union government.

The author Mr Rishi Kappal, who has been personally associated with me for a few projects, has created the manuscript that will highly benefit aspirants willing to gain knowledge in telecom to charter a successful carrier in this domain. This compliments the objective of TCOE India for capacity building as well.

Cmdr J Jena
TCOE India

The telecom sector means different things to different people—infrastructure sector to some, consumer marketing or services to others, while some see it as a technology/innovation sector. But I think telecom is the ultimate 'Management' sector. Like a 5-day test match, every skill is stress-tested against some of the world's largest and smartest companies and brands. For a telecom operator to remain relevant in tomorrow's world and drive growth, one has to embrace technology for operational excellence and be customer-centric to meet customer needs across the socio-economic pyramid. Leadership today is about foresight, dogged determination, courage to declare the future before others can seek it and have the self-belief to make it happen. With a career of over two decades spanning across geographies in Indian and multinational telecommunication companies, Rishi has drawn upon his experience to highlight the nuances of the telecom management in an engaging and eloquent manner.

Himanshu Kapania,
Managing Director,
Idea Cellular Limited

In the last two decades telecom sector has witnessed a massive change. With the ever-changing technology and therefore customer needs, Rishi has come out with an initiative in the form of a book that captures broad trends in the field of telecom business management. It is a very good read, wherein some of the nuances about the business are very well articulated.

Kartik Nagarajan
Director—Avaya Global Services

Rishi has had a ringside view of the Indian telecom market, first as from the telecom infrastructure and network perspective at Ericsson, and subsequently as a partner with mobile carriers when he was with Qualcomm. He manages to chronicle key moments in the growth and evolution of this industry in his book, which will be invaluable to any student who wishes to understand the telecom business. Rishi's sharp insight coupled with a deep understanding of the telecom industry has made the book both an exhaustive yet lucid chronicle of Telecom in India.

Lloyd Mathias
Marketing Head
Printing and Personal Systems
Hewlett-Packard India

Rishi Kappal is a veteran in the telecom management field. This book provides a first of its kind insight into the world of Indian telecom business management. With

the boom in the telecom industry, this book will be a knowledge trove for students, career aspirants, as well as researchers and individuals interested in understanding the telecom sector.

I wish Rishi and this insightful book on telecom business management a huge success!!

Sanjay Bhatnagar
National Head—Corporate Human Resources
Sony India Pvt. Ltd

Rishi Kappal forms a new breed of Indians who have made a mid-career shift from business to the classroom. The telecom sector has exploded, before academics could catch up. Rishi's is a contribution to bridge that gap.

Sanjeev Aga
Board of Directors
Aditya Birla Group

As India looks to catch up on technology besides being the second largest telecom market, the evolution of the Indian customer will drive the technology adoption and hence the business. The greatness of the Indian telecom industry is evident in the fact that the evolving technology is coming to embrace the consumer and move ahead in joint strides with him.

It is in this light that statistics, trends, technology and consumer perspective presented in the book makes a very interesting and informed read indeed, best wishes to Kappal.

Vikas Jain
Co-founder and
Director
Micromax India Pvt Ltd

The names have been added in alphabetical order.

Next Generation Mobile Communications

Mobile, Infra Technology, Management, Data

Next Generation Mobile Communications

Mobile, Infra Technology, Management, Data

Rishi Kappal
Assistant Professor and Chief Executive—Program Innovations
MIT School of Telecom Management
Pune, India

Milind Pande
Professor and Director
MIT School of Telecom Management
Pune, India

McGraw Hill Education (India) Private Limited
NEW DELHI

McGraw Hill Education Offices

New Delhi New York St Louis San Francisco Auckland Bogotá Caracas
Kuala Lumpur Lisbon London Madrid Mexico City Milan Montreal
San Juan Santiago Singapore Sydney Tokyo Toronto

McGraw Hill Education (India) Private Limited

Published by McGraw Hill Education (India) Private Limited
P-24, Green Park Extension, New Delhi 110 016

Next Generation Mobile Communications: Mobile, Infra Technology, Management, Data

Print Edition:
ISBN (13): 978-93-392-2149-2
ISBN (10): 93-392-2149-4

eBook Edition:
ISBN (13): 978-93-392-2150-8
ISBN (10): 93-392-2150-8

Managing Director: *Kaushik Bellani*
Head—Products (Higher Education and Professional): *Vibha Mahajan*

Assistant Sponsoring Editor: *Koyel Ghosh*
Sr. Development Editor: *Renu Upadhyay*

Manager—Production Systems: *Satinder S Baveja*
Desk Editor: *Jagriti Kundu*
Senior Graphic Designer—Cover: *Meenu Raghav*

Senior Publishing Manager (SEM & Tech. Ed.): *Shalini Jha*
Assistant Product Manager (SEM & Tech. Ed.): *Tina Jajoriya*

General Manager—*Production: Rajender P Ghansela*
Manager—*Production: Reji Kumar*

Typeset at Mukesh Technologies Pvt. Ltd., Puducherry, India 605 008 and printed at

Cover Printer:

Foreword

This book has been well written for the readers interested in technology, management and application concepts for Indian telecom. This work uses well thought out material including practical examples that reduce the complexity of the subject matter for both academia and industry. The foundation of this book is to deliver practical knowledge with an ease to understand design and structure of Indian telecom. The initial chapters provide a much-needed overview of the Indian telecom ecosystem and strategic inputs important for understanding the industry. The terms introduced are extremely apt for new-age learning about next generation mobile and broadband communications. The successive chapters focus on each element of telecom industry right from devices, infrastructure, data and semi-conductors. This unique mix of engineering and management makes the book content not just unique but also reader-friendly. The penultimate chapters dealing with mobile health and careers in telecom are essential to expand the horizon of audience since the chapters incorporate real-world scenarios, merged with best-in-class theory. This book is a must read and is recommended for anyone either already or expected to be associated with the Indian telecommunications industry. Equipment and service providers will find this book very relevant along with students and telecom training providers. My best wishes to the authors.

Hitesh Shah
Director
BlackBerry India

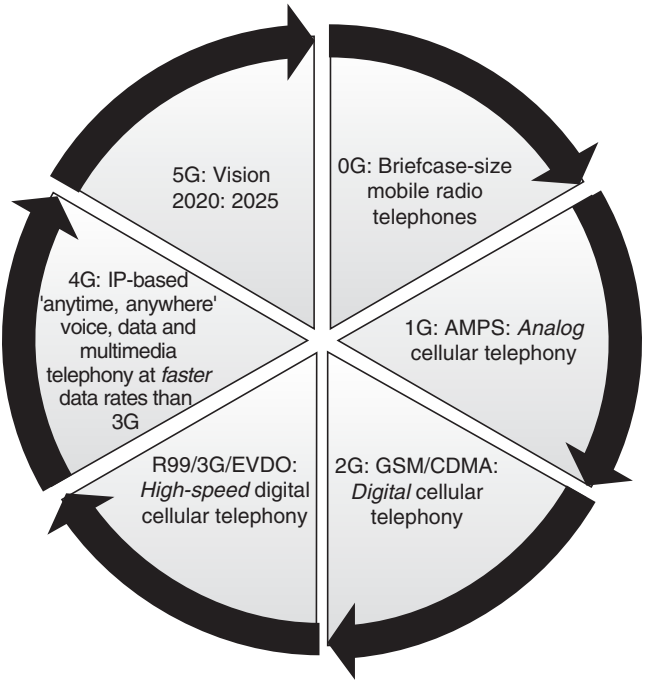
Preface

❒ BACKGROUND

We thank the almighty to have made us a telecom devotee. It is one of the best industries to be associated with.

During the last decade, telecom industry has emerged as one of the most sought after sectors, which is driving major part of the economies of the world in a vibrant way. This vibrancy is reflected within and outside the industry in terms of new approaches of strategic business management and tactical operational execution.

The cellular network generations from inception till now have evolved highly and there is a never ending innovation cycle still going on.



The only way that companies can prosper in the markets is to innovate on technology business front, which includes products and customer service. There may be an urge underneath to evolve new technology-led business models. For more than a decade various companies have been developing innovations and execution process to accomplish profitability and inturn have a positive impact on the sector sentiments

for creating more jobs. However, recently there have been such dynamic changes in market situations that sometimes companies don't seem to have a clue about specific strategy/ies to clinch upon.

This book offers a 360 degree, outside in and inside out, perspective on the technology enhancements and business management essentials of telecom industry. It also veers around to develop an insight from some vital strategic aspects as follows:

- Generational evolution of wireless technology
- Building agility and flexibility with technology and management
- Building and managing telecom assets
- Resource integration and move out from a silo-based approach
- Growth and sustainability in diverse markets—from growth to development
- Innovations and applications as per changing consumer needs

Indian telecom technology and business management is a diverse subject with little formal awareness amongst the stakeholders. This is a reason why prospective career oriented professionals in India do not realise that telecom can be their first career choice, with immense growth potential. From network elements to devices, operating systems to service providers, telecom knowledge development and management is more complex than any industry. This is further complicated by the elements of convergence taking place and evolving as we speak.

There is inherent incompetence built into the "go-to-consumer" approach for solutions positioned to end consumers. For an example, you go to buy a 3G mobile phone and ask the shopkeeper about 3G speeds. His reply would be, "1Ghz". You ask him again about the upload speeds and he would say, "Maybe dual core speed". That is the time one would realise how nascent the telecom awareness is amongst people, while most of the devices in India sell on hardware rather than software and data capabilities. Such episodes happen in various telecom ecosystem requirements and hence the need to create a book for the ones wanting the best knowledge sources about telecom sales, marketing, strategy and careers. Students do not know that towers do not transmit, it is the antennas, and connected to base stations and so on…so how will such students become good B2B business managers? The next level of industry entrants are also learning telecom evolution the hard way. A book of this nature will make a solid foundation for students, faculty, industry as well as training companies.

The next learning was about a lot of telecom careers aspirants in India reading about Global Trends in Telecom and attempting to emulate that learning in local Indian environment. The conflict of interest stems from this learning and execution since India has embraced a more curvilinear telecom path than rest of the world—the obvious comparisons being with China. So we have included those references in this book.

There are multiple facets of Indian telecom business management. The spectrum of the same spans from telecom ecosystem that encompasses regulatory affairs, infrastructure, devices, outsourcing, sales and marketing, and finally competencies required to become an "Indian" telecom professional.

❒ OBJECTIVE

The book is inspired by students who kept asking us to create a high class book on Indian telecom technologies and management.

The motivation of creating this text stems from the requirements of telecom management colleges in India, many of which are instituted in Mumbai and Pune. This book will be a holistic ready reckoner for all the students and faculty. Our industry connects and their encouragement has ensured that we make this book relevant from corporate perspective as well.

Last but not the least, the entire telecom fraternity, right from leaders of service providers, devices companies, talent management organisations to table turners in the infra and VAS industry, have blessed my effort. This motivates me to continue seeking their guidance and support.

❒ TARGET USERS

This work of text is relevant for students in engineering, management, graduation to learn about telecom technology and management. It will also serve as a reference book for telecom industry corporates and training companies that need best in class study material. This book provides a holistic approach to contemporary strategic business management as far as telecom industry is concerned (with specific relevance to Indian telecom industry). An integrated approach has been included to support the theory derived by the authors. It covers collaborative evolving business formats over different growth stages and nature of markets. It also includes review of the strategic implications of socioeconomic and technological paradigm shift for both new entrants and incumbent firms in telecom industry in India and other significant markets.

Acknowledgements

Both the authors are grateful to Dr Vishwanath D Karad and Dr Sunil Karad of MIT Group of Institutions, Pune for the support and encouragement. The authors are also grateful to the following eminent academicians for their support and encouragement—Dr Suresh Borkar (Illinios Institute of Technology, Chicago); Dr G K Kharate (Dean-Engineering, Pune University); Dr D S Bormane (Chairman-BOS, Pune University); Dr R Kshirsagar (Dean-Engineering, Nagpur University); Dr Rajkamal (Former VC, DAVV, Indore); Dr S P Kothari (Former VC, VIT, Vellore).

We wish to thank Dr Amit, Dr Thanasis (Oxford University) and Mr Prabhu (IIT Kharagpur) for believing in our cause and writing with us on M-health.

Dr Milind expresses his sincere gratitude towards his parents and family for supporting the pursuance of this effort.

Mr Rishi would like to thank Mr P Balaji, now in a leadership role at Vodafone and Cmdr J Jena of TCOE for his industry connects and mentoring him for transition to academics. They also gave me the privilege to setup Telecom Sector Skill Council as an Industry specialist.

Mr Rishi wishes to express his sincere gratitude to his father Late Shri. Surinder Kumar and mother Smt Sudershan Kumari for ensuring he remains humble and a believer of God.

Mr Rishi's transition from corporate to academics is credited to his wife Jyoti. Thank you. Rishi's children—Sapna and Pranav—are the next generation who will leverage telecom to the fullest.

Mr Rishi is not a writer by profession and expresses his gratitude to his friend and colleague Rashmi Deodhar who converted words effectively to text.

A note of thanks does not seem enough; however, the authors, are sure that the beloved ones will appreciate and understand our feelings.

Contents

BASICS AND INTRODUCTION TO INDIAN TELECOM

CHAPTER 1

Learning Objectives

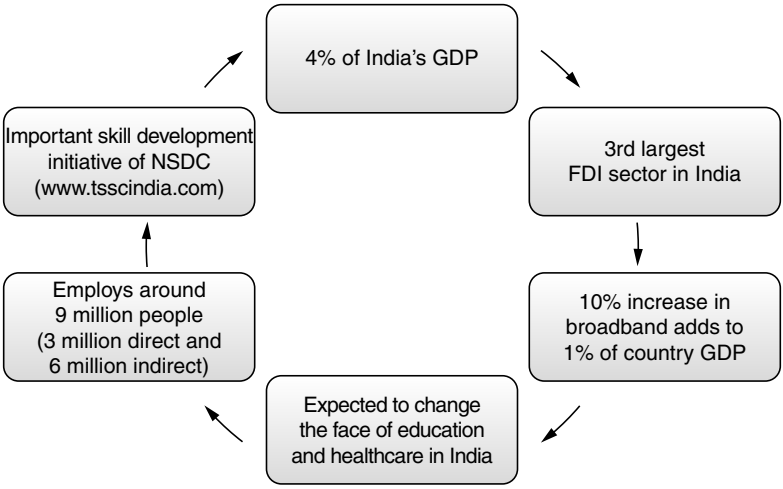
After completion of this chapter, the reader will have a good overview of the Indian telecom sector with regard to:

- Important telecom sub-sectors for business management
- India's comparative position in Asian Telecom
- Interpreting telecom trends at a glance
- Understanding of telecom technologies in India
- Indian telecom revolution, national telecom policies and reforms

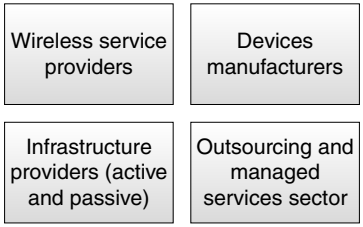
❒ 1.1 THE IMPORTANCE OF TELECOM SECTOR FOR INDIA

With the pride of connecting over 900 million people in India, telecom sector contributes to 4–5% of India's Gross Domestic Product (GDP) as mentioned by various sources. In terms of attracting foreign currency, telecom is the third largest Foreign Direct Investment (FDI) sector in India, attracting almost 7% of total FDI that comes to India, as quoted in various reports. We are a country where wireline broadband and wifi will not be the prime internet access technology. Hence the first-hand use of data for most Indian population will be through the handphone on a wireless telecom network.

India's make or break in growth will be on wireless broadband: 10% increase in broadband contributing to 1–1.5% increase in GDP, and India is not broadband penetrated, implying that the scope of opportunity is amongst the largest in the world. It is a matter of how far can the thoughts reach on the constructive impact will broadband commoditisation will have on India. The Indian telecom sector, with key technologies like High Speed Packet Access (HSPA+) and Long Term Evolution (LTE) being on the landscape, is expected to change the face of education and healthcare in India. Not many people know that Indian telecom sector employs close to 9 million people (3 million direct and 6 million indirect) and one of NSDCs most important skill-development initiative is in the telecom sector, namely, Telecom Sector Skills Council (www.tsscindia.com).



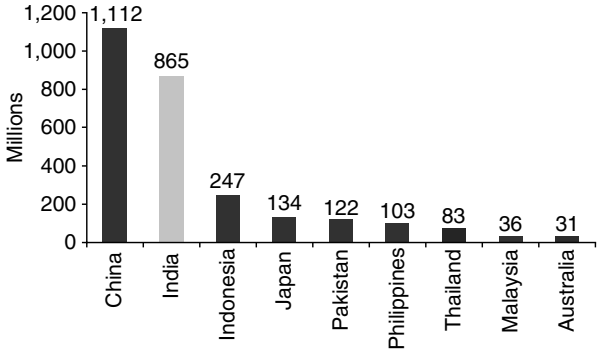
The four telecom sub-sectors important for business management that are slowly and steadily pacing up the telecom development in the country are:



❒ 1.2 INDIAN WIRELESS POSITION IN APAC

1.2.1 Subscriber Base

As per the Merril Lynch Report Dec 2012, India stands second to China in the total number of wireless subscribers declared by both the countries.



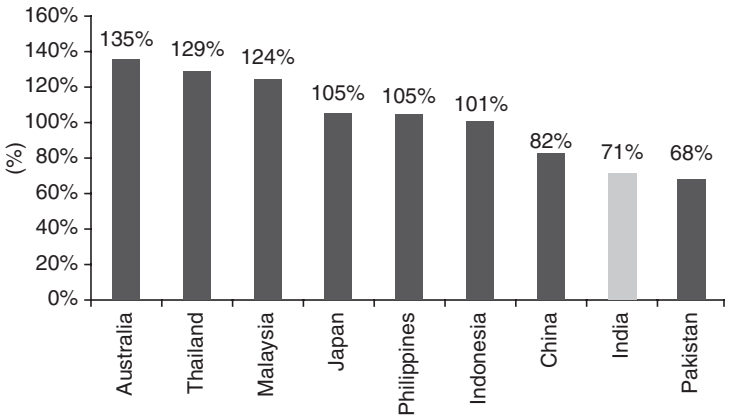
Source: Merrill Lynch Global Research Dec-2012

While India was at 865 million subscribers [HLR], China declared wireless subscribers [HLR) almost equal to India's population. Considering the order of country rating by number of wireless subscribers, the third largest country, Indonesia is almost 33% of India's wireless population and the gap is sizeable. This implies that India at best would always be the second largest wireless subscribers' base in the world, if not the first, as time progresses. The point of contention is that while India has this subscribers base split between 8 and 10 wireless operators per circle (ever more in a few), China gets its base being competed between 2 and 3 wireless operators. This factor will also be an influence to the other differences in the wireless position of Indian and China, being enumerated in due course.

There are multiple factors on which India and China's telecom industry performance can be compared. However, at a grass-root level, we would discuss differences and reasons thereof based on the following.

1.2.2 Wireless Penetration—Teledensity

In terms of wireless penetration, India and China are not too far apart. While China is sitting on an 82% teledensity, India is operating on more than 70%. This is a very healthy number, considering 70% of India's population resides in rural areas. However, this statistic gains more interest if one compares the ARPU between both the countries.

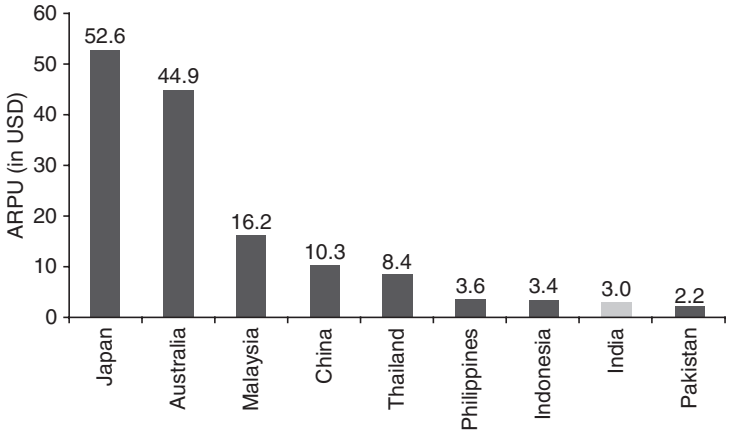


Source: Merrill Lynch Global Research Dec-2012

1.2.3 Average Revenue Per User (ARPU)

Average revenue per user (ARPU) of operators in China is almost three times that of India. The obvious question is why? Let us consider some telecom business dynamics in both countries. First of all, China doesn't have the crowd of 10–12 operators as is in India. This ensured that a price war and cut-throat competition were not waged and hence, the sustenance of ARPU.

Secondly, China has juiced the Evolution Data Only (EVDO) and CDMA ecosystem very strongly which has led to good data-led revenue growth. Their pre-requisite of promising a robust network for uninterrupted data speeds has been maintained with ubiquitous networks deployment. China went early into data technology and

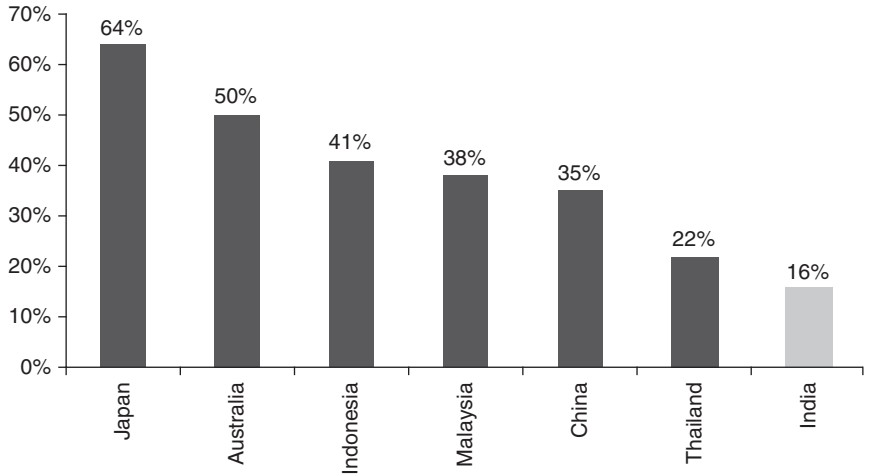


Source: Merrill Lynch Global Research Dec-2012

ensured user awareness at the shopfront level. Moreover, localisation of content became a strong shot in the arm for data. India, on the other side, is still struggling to put a good depth and width of data networks.

1.2.4 Data as Percentage of Revenue

Operators in China have 35% of revenue contribution from data services, whereas for Indian operators it's a meagre 16% (including SMS revenue). China does better in terms of data revenue, since they sell services and not data speed. Moreover, the subscribers experience a seamless network across China which makes their data experience enriching. China doesn't have to face competition of 10–12 operators per geographic circle. This ensures a healthy competition and tariffs that are profit generating for the operators. The telecom operators in China have also ensured that the desired and expected quality of service is delivered to the subscribers, along with content richness and vernacular services.



Source: Merrill Lynch Global Research Dec-2012

Data as a percentage of revenue has to increase in every country which considers telecom as a backbone of growth and prosperity. In subsequent chapters, we will envisage on what is lacking in the Indian telecom context with regard to lag in data revenue generation by operators.

❒ 1.3 INDIAN TELECOM LANDSCAPE SNAPSHOT

Let us concentrate on the Indian Telecom landscape and familiarise ourselves with the terms and performance factors (Telecom Regulatory Authority of India Performance Indicators Report).

(Data as on 30th June, 2014)

Telecom Subscribers (Wireless + Wireline)	
Total subscribers	942.95 million
% change over the previous quarter	1.07%
Urban subscribers	559.77 million
Rural subscribers	383.18 million
Market share of private operators	87.87%
Market share of PSU operators	12.13%
Teledensity	75.80
Urban teledensity	146.24
Rural teledensity	44.50
Wireless Subscribers	
Total wireless subscribers	914.92 million
% change over the prevous quarter	1.15%
Urban subscribers	537.56 million
Rural subscribers	377.36 million
GSM subscribers	859.36 million
Wireless Subscribers	
CDMA subscribers	55.56 million
Market share of private operators	89.85%
Market share of PSU operators	10.15%
Teledensity	73.55
Urban teledensity	140.44
Rural teledensity	43.82

Source: http://www.trai.gov.in/WriteReadData/PIRReport/Documents/Indicator%20Reports%20-%20Jun-14.pdf

The report comes with a disclaimer that the information and statistics contained are derived from a variety of sources, but are mainly reliant on data obtained from Service Providers. This report does not constitute commercial or other advice.

No warranty, representation or undertaking of any kind, expressed or implied, is given in relation to the information and statistics contained in this report. Since the data is derived from the service providers for triangulation sake, it is a safe bet to consider the data as an authentic source of information.

With more than 900 million wireless subscribers, India has the second largest subscriber base in the world, with urban teledensity hovering at 140% and rural teledensity at 42% (refer report statistics above). This is a huge achievement in terms of making a fully connected India, the growth coming primarily from rural India. The potential in semi-urban and rural India is still not fully tapped and government is working with operators to further make telecom penetrate into deeper Indian pockets.

The PSU operators like BSNL and MTNL have a lot of resources at disposal. However, they are failing to leverage their resources and strengths. BSNL was recognised earlier as a force to reckon with, but the same has lost sheen. In due course, the government will have to bring back focus on PSU operators and make them serve the nation in diverse domains.

1.3.1 Trends at a Glance

It is important to note that while wireline subscribers are declining rapidly as expected, the wireless subscribers' base also seems to be saturating slowly. Each product life cycle includes introduction: growth-maturity and decline. India's telecom phase of growth seems to be going slow and the market headed towards saturation as a measure of maturity (not to confuse with consumer maturity) (reference example is given below).

However, the ARPU has seen a steady rise in the past one year, with no compromise on minutes of usage. This may be due to revenue increase with stagnation in subscriber numbers. The ARPU has increased for GSM by 14%, while the minutes of use have risen by 5.3% (for GSM). This implies that people are still increasing their use of network and are paying better for the same. Also, the urban teledensity has reduced by 3.3%; however the rural teledensity has increased by 7%, implying that the next battlefield for telecom voice services shifts to rural, while the urban spaces become more competitive for data services.

India is also leaping forward in terms of internet subscribers (approx. 250 million), becoming the second largest country in the world in terms of internet subscribers.

Internet/Broadband Subscribers	Number of Subscribers
Total internet subscribers	259.14 million
Narrowband subscribers	190.31 million
Broadband subscribers	68.83 million
Wired internet subscribers	18.55 million
Wireless internet subscribers	240.60 million
Total internet subscribers per 100 population	20.83

Source: http://www.trai.gov.in/WriteReadData/PIRReport/Documents/Indicator%20Reports%20-%20Jun-14.pdf

	QE Dec 2012	QE Mar 2013	QE Jun 2013	QE Sep 2013	QE Dec 2013	% change over Dec-2012 (12 months)	% change over Mar-2013 (9 months)	% change over Jun-2013 (6 months)	% change over Sep-2013 (3 months)
1. Subscriber's Base (in millions)									
(i) Wireline	30.79	30.21	29.73	29.28	28.89	−6.15%	−4.37%	−2.80%	−1.33%
(ii) Wireless	864.72	867.80	873.36	870.58	886.30	2.50%	2.13%	1.48%	1.81%
Total	**895.51**	**898.02**	**903.09**	**899.86**	**915.19**	**2.20%**	**1.91%**	**1.34%**	**1.70%**
Rural	338.54	349.22	357.61	356.68	365.79	8.05%	4.75%	2.29%	2.55%
Urban	556.96	548.80	545.48	543.18	549.40	−1.36%	0.11%	0.72%	1.15%
2. Traffic (MOU) (minutes of use/sub/month)									
Wireless–full mobility									
(i) GSM	360	383	388	375	379	5.36%	−0.87%	−2.17%	1.10%
(ii) CDMA	230	275	278	262	272	18.06%	−1.21%	−2.41%	3.53%
3. ARPU (₹/sub/month)									
Wireless–full mobility									
(i) GSM	98.14	105.00	111.45	109.08	112	14.06%	6.61%	0.45%	2.62%
(ii) CDMA	79.95	95.25	98.35	98.22	104	29.58%	8.77%	5.34%	5.48%
4. Teledensity									
Population in million (Estimated)	1221	1225	1229	1233	1236				
(i) Wireline teledensity	2.52	2.47	2.42	2.38	2.34	−7.31%	−5.26%	−3.40%	−1.63%
(ii) Wireless teledensity	70.82	70.85	71.08	70.63	71.69	1.22%	1.18%	0.85%	1.49%
Total Teledensity	**73.34**	**73.32**	**73.50**	**73.01**	**74.02**	**0.93%**	**0.97%**	**0.71%**	**1.39%**
Rural teledensity	39.85	41.02	41.90	41.70	42.67	7.06%	4.03%	1.82%	2.32%
Urban teledensity	149.90	146.96	145.35	144.02	144.95	−3.30%	−1.37%	−0.27%	0.65%

Source: http://www.trai.gov.in/WriteReadData/PIRReport/Documents/Indicator%20Reports%20-%20Jun-14.pdf

However, the broadband subscribers are only 68 million. The leading indicator of explosive growth in internet is that out of the 250 million internet subscribers, 240 million are using wireless internet or net on mobile. This number will grow exponentially and will be responsible for fuelling M-commerce, M-education and M-health in India. The concern area is that broadband subscribers are hardly 68 million, which includes 3G and 4G subscribers as well. Such meagre broadband population is a threat to non-adoption of data services, however, most would see this as an opportunity to launch new consumer-friendly services.

India's fate in telecom hangs in balance based on how much broadband data penetration can happen, and to identify killer applications that will make a difference to lives of consumers.

1.3.2 Operator Trends

The essence of operator-wise trends as per the last Telecom Regulatory Authority of India (TRAI) report is as above. This is an example of how the TRAI report needs to be evaluated and analyzed (QE Dec 13 vs QE Dec 12).

1. Airtel is the largest gainer of subscribers in absolute terms.
2. Idea is the largest gainer of subscribers in percentage terms.
3. Airtel, Vodafone and Idea have cumulative market share of 54%, while the other 10 operators fight for the remaining 45% share of the market.
4. Telewings (Uninor) has lost the maximum subscribers, being a regional player. In comparison to national players, Tata seems to have lost maximum subscribers. This may be due to CDMA subscribers doing MNP and moving to GSM operators.

1.3.3 Operators Revenue Trends

1.3.3.1 Telecom Financial Data

	QE Dec 2012	QE Mar 2013	QE Jun 2013	QE Sep 2013	QE Dec 2013	% change over Dec-2012	% change over Mar-2013	% change over Jun-2013	% change over Sep-2013
Telecom Sector						**(12 months)**	**(9 months)**	**(6 months)**	**(3 months)**
(i) Gross Revenue (₹ in Crores)	52,858.39	54,283.78	57,260.98	57,452.56	58,385.39	10.46%	7.56%	1.96%	1.62%
(ii) Adjusted Gross Revenue (₹ in Crores)	34,527.50	35,279.50	38,640.30	38,810.56	39,574.99	14.62%	12.18%	2.42%	1.97%

Source: http://www.trai.gov.in/WriteReadData/PIRReport/Documents/Indicator%20Reports%20-%20Jun-14.pdf

Wireless Subscribers Base (in millions)

Service Provider	QE Dec 2012	QE Mar 2013	QE Jun 2013	QE Sep 2013	QE Dec 2013	% change over Dec-2012 (12 months)	% change over Mar-2013 (9 months)	% change over Jun-2013 (6 months)	% change over Sep-2013 (3 months)
Bharti	181.91	188.20	190.91	193.39	198.41	9.07%	5.43%	3.93%	2.60%
Vodofone	147.48	152.35	155.03	155.54	160.41	8.77%	5.29%	3.47%	3.13%
Idea	113.95	121.61	124.97	127.23	128.69	12.93%	5.82%	2.97%	1.15%
Reliance communications group	118.53	122.97	125.73	116.26	117.24	–1.08%	–4.66%	–6.75%	0.84%
BSNL	99.92	101.21	97.99	97.86	96.29	–3.63%	–4.86%	–1.73%	–1.60%
Aircel	63.35	60.07	60.97	63.25	66.91	5.63%	11.39%	9.75%	5.80%
Tata	69.56	66.42	64.63	63.55	63.27	–9.04%	–4.74%	–2.10%	–0.44%
Telewings	41.52	31.68	32.30	32.36	32.78	–21.05%	3.46%	1.50%	1.31%
Sistema	14.88	11.91	9.77	9.56	9.81	–34.09%	–17.67%	0.39%	2.62%
Videocon	3.64	2.01	2.42	3.24	3.97	9.04%	97.54%	64.17%	22.35%
MTNL	5.30	5.00	4.51	3.74	3.59	–32.26%	–28.16%	–20.38%	–4.00%
Loop	3.00	3.01	2.72	2.89	2.98	–0.53%	–0.96%	9.68%	3.21%
Quadrant	1.70	1.37	1.42	1.73	1.96	15.32%	43.15%	37.92%	13.33%
Total	**864.72**	**867.80**	**873.36**	**870.58**	**886.30**	**2.50%**	**2.13%**	**1.48%**	**1.81%**

Source: http://www.trai.gov.in/WriteReadData/PIRReport/Documents/Indicator%20Reports%20-%20Jun-14.pdf

1.3.3.2 Gross Revenue, Adjusted Gross Revenue, License Fee and Spectrum Charges

1. Gross Revenue (GR) and Adjusted Gross Revenue (AGR) of Telecom Service Sector for the Quarter Ending (QE) Dec-13 has been ₹ 58,385 crores and ₹ 39,575 crores, respectively. There has been an increase of 1.62% in GR and 1.97% in AGR as compared to previous quarter. The year-on-year (Y-O-Y) growth in GR and AGR over the same quarter in last year has been 10.46% and 14.62%, respectively.
2. Gross Revenue (GR) and Adjusted Gross Revenue (AGR) increased by 1.62% and 1.97%, respectively, in the Quarter Ending (QE) Dec-13.
3. Pass through increased by 0.90% in the Quarter Ending (QE) Dec-13, and on annual basis it has increased by 2.62%.
4. Pass-through charges as Percentage Gross Revenue: 32.22% in Quarter Ending (QE) Dec-13 as against 32.45% in the previous quarter.

Particulars	QE Dec-2012 (₹ in Crores)	QE Sep-2013 (₹ in Crores)	QE Dec-2013 (₹ in Crores)	Q-O-Q % Change Over Sep-2013	Y-O-Y % Change over Dec-2012
Gross Revenue (GR)	52,858	57,453	58,858	1.62	10.46
Adjusted Gross Revenue (AGR)	34,528	38,811	39,575	1.97	14.62
Pass Through (GR-AGR)	18,331	18,642	18,810	0.90	2.62
License Fee (LF)	2,814	3,105	3,168	2.03	12.57
Spectrum Charges	1,281	1,477	1,585	7.27	23.69

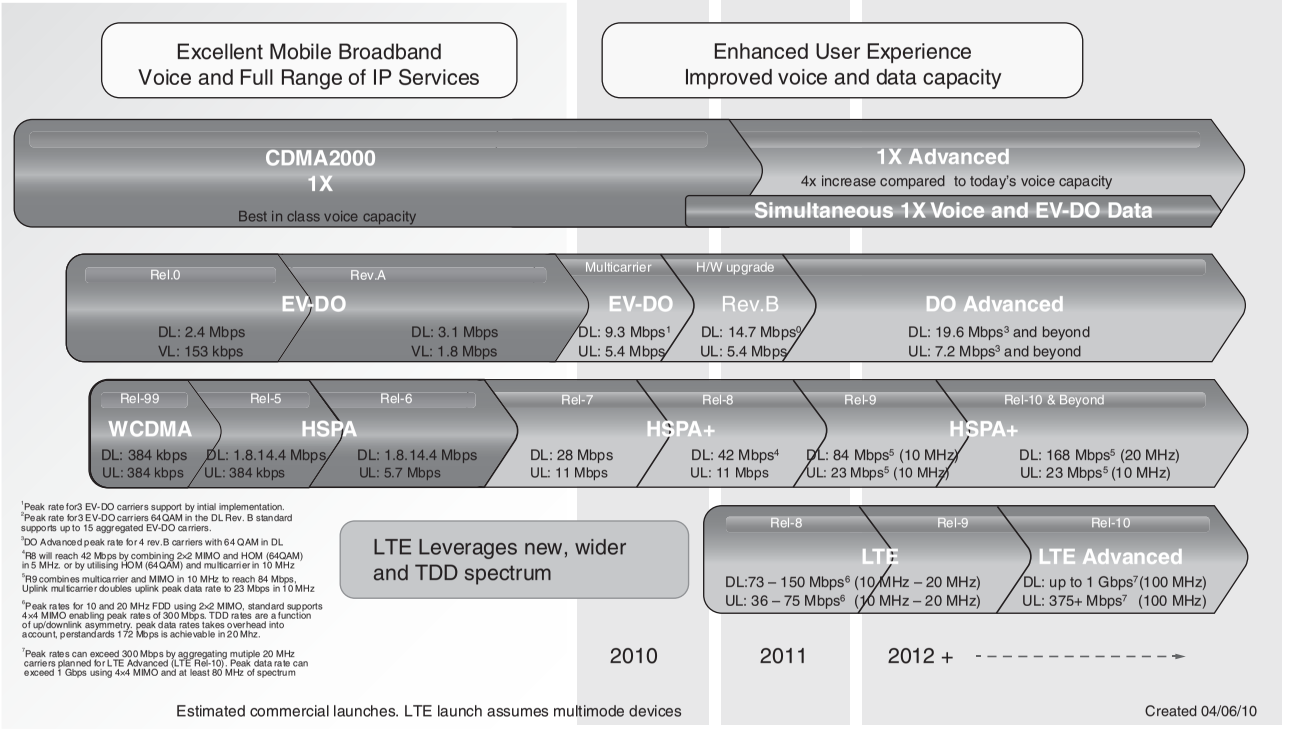
Source: http://www.trai.gov.in/WriteReadData/PIRReport/Documents/Indicator%20Reports%20-%20Jun-14.pdf

The telecom sector is seeing rise in gross revenue (up by 10% in year-to-year comparison ending Dec 2013). However, the ARPU and data as percentage of revenue is not significantly high. This implies that while operators are looking at the silver lining, getting it right in terms of data services is yet to happen.

❒ 1.4 DATA TECHNOLOGIES IN INDIA

India has a varied diversity in terms of voice and data services available to the customer as options.

There are four operators offering CDMA voice and data services (MTS, Tata Docomo, Reliance Communications and BSNL/MTNL). However, GSM as a voice bearer is more dominant and is offered by multiple operators (13 numbers to be precise).


Excellent Mobile Broadband
Voice and Full Range of IP Services
Enhanced User Experience
Improved voice and data capacity
CDMA2000
1X
Best in class voice capacity
1X Advanced
4x increase compared to today's voice capacity
Simultaneous 1X Voice and EV-DO Data
Rel.0
Rev.A
Multicarrier
H/W upgrade
EV-DO
EV-DO
Rev.B
DO Advanced
DL: 2.4 Mbps
VL: 153 kbps
DL: 3.1 Mbps
VL: 1.8 Mbps
DL: 9.3 Mbps[1]
UL: 5.4 Mbps
DL: 14.7 Mbps[2]
UL: 5.4 Mbps
DL: 19.6 Mbps[3] and beyond
UL: 7.2 Mbps[3] and beyond
Rel-99
Rel-5
Rel-6
Rel-7
Rel-8
Rel-9
Rel-10 & Beyond
WCDMA
HSPA
HSPA+
HSPA+
DL: 384 kbps
UL: 384 kbps
DL: 1.8.14.4 Mbps
UL: 384 kbps
DL: 1.8.14.4 Mbps
UL: 5.7 Mbps
DL: 28 Mbps
UL: 11 Mbps
DL: 42 Mbps[4]
UL: 11 Mbps
DL: 84 Mbps[5] (10 MHz)
UL: 23 Mbps[5] (10 MHz)
DL: 168 Mbps[5] (20 MHz)
UL: 23 Mbps[5] (10 MHz)
[1]Peak rate for3 EV-DO carriers support by intial implementation.
[2]Peak rate for3 EV-DO carriers 64 QAM in the DL Rev. B standard supports up to 15 aggregated EV-DO carriers.
[3]DO Advanced peak rate for 4 rev.B carriers with 64 QAM in DL
[4]R8 will reach 42 Mbps by combining 2x2 MIMO and HOM (64QAM) in 5 MHz. or by utilising HOM (64 QAM) and multicarrier in 10 MHz
[5]R9 combines multicarrier and MIMO in 10 MHz to reach 84 Mbps. Uplink multicarrier doubles uplink peak data rate to 23 Mbps in 10 MHz
[6]Peak rates for 10 and 20 MHz FDD using 2x2 MIMO, standard supports 4x4 MIMO enabling peak rates of 300 Mbps. TDD rates are a function of up/downlink asymmetry, peak data rates takes overhead into account, perstandards 172 Mbps is achievable in 20 Mhz.
[7]Peak rates can exceed 300 Mbps by aggregating mutiple 20 MHz carriers planned for LTE Advanced (LTE Rel-10). Peak data rate can exceed 1 Gbps using 4x4 MIMO and at least 80 MHz of spectrum
LTE Leverages new, wider and TDD spectrum
Rel-8
Rel-9
Rel-10
LTE
LTE Advanced
DL:73 – 150 Mbps[6] (10 MHz – 20 MHz)
UL: 36 – 75 Mbps[6] (10 MHz – 20 MHz)
DL: up to 1 Gbps[7](100 MHz)
UL: 375+ Mbps[7] (100 MHz)
2010
2011
2012 +
Estimated commercial launches. LTE launch assumes multimode devices
Created 04/06/10

While CDMA is available in 800 MHz frequency, GSM is available in 900 and 1800 MHz frequency bands. CDMA also has a very strong data network presence which initially was on EVDO Rev.A supporting downlink of 3.1 Mbps and uplink of 1.8 Mbps.

Looking at the popularity of EVDO data networks and its seamless coverage throughout India, a lot of subscribers started using this broadband service. Eventually the CDMA data operators upgraded their network to EVDO Rev.B which can support up to 9.3 Mbps downlink speed and 5.4 Mbps uplink speed. (However, this configuration needs multi-carrier configuration of channels.)

Due to the unprecedented acceptance of EVDO, the GSM operators were impatient to launch wireless broadband services. This initiative also found government support and in August 2010, the government auctioned 3G spectrum for blocks of 5 MHz in 2.1 GHz frequency range. All the GSM operators bid for the spectrum in order to have a first-mover advantage in launching wireless broadband services. With this auction, the operators collectively paid ₹ 60,000 crores (estimated) to the government and started preparing for an aggressive 3G launch.

However, they realised that none of the operators brought a PAN India License, due to which the Networks were going to be fragmented. The LTE and 3G circles won in the auction by various GSM operators, which are depicted as follows:

₹ (In Crores)	LTE License Value—Telecom Operator								
Service Area	**Aircel**	**Bharti**	**Infotel**	**Qualcomm**	**Tikona**	**Augere**	**BSNL**	**MTNL**	**Circle Total**
Delhi			2,241.02	2,241.02				2,241.02	**6,723.06**
Mumbai			2,292.95	2,292.95				2,292.95	**6,878.85**
Maharashtra		915.64	915.64				915.64		**2,746.92**
Gujarat			613.85		613.85		613.85		**1,841.55**
Andhara Pradesh	1,059.12		1,059.12				1,059.12		**3,177.36**
Karnataka		1,543.25	1,543.25				1,543.25		**4,629.75**
Tamil Nadu	2,069.45		2,069.45				2,069.45		**6,208.35**
Kolkata		523.20	523.20				523.20		**1,569.60**
Kerala			258.67	258.67			258.67		**776.01**
Punjab		332.27	332.27				332.27		**996.81**
Haryana			119.90	119.90			119.90		**359.70**
Uttar Pradesh (E)			142.50		142.50		142.50		**427.50**
Uttar Pradesh (W)			183.87		183.87		183.87		**551.61**
Rajasthan			97.32		97.32		97.32		**291.96**
Madhya Pradesh			124.66			124.66	124.66		**373.98**

(*Continued*)

(*Continued*)

Service Area	Aircel	Bhati	Infotel	Qualcomm	Tikona	Augere	BSNL	MTNL	Circle Total
West Bengal	70.97		70.97				70.97		**212.91**
Himachal Pradesh			20.66		20.66		20.66		**61.98**
Bihar	99.28		99.28				99.28		**297.84**
Orissa	63.63		63.63				63.63		**190.89**
Assam	33.02		33.02				33.02		**99.06**
North East	21.27		21.27				21.27		**63.81**
Jammu & Kashmir	21.27		21.27				21.27		**63.81**
Operator Payout	**3,438.01**	**3,314.36**	**12,847.77**	**4,912.54**	**1,058.20**	**124.66**	**8,313.80**	**4,533.97**	**38,543.31**
Circles won	**8**	**4**	**22**	**4**	**5**	**1**	**20**	**2**	

1.4.1 3G and LTE License Details of Operators

₹ (In Crores)	3G License Value Telecom Operators							
Service Area	**Airtel**	**Bharti**	**Idea**	**Reliance**	**STEL**	**Tata**	**Vodafone**	**Circle Total**
Delhi		3,316.93		3,316.93			3,316.93	**9,950.79**
Mumbai		3,247.07		3,247.07			3,247.07	**9,741.21**
Maharashtra			1,257.82			1,257.82	1,257.82	**3,773.46**
Gujarat			1,076.06			1,076.06	1,076.06	**3,228.18**
Andhra Pradesh	1,373.14	1,373.14	1,373.14					**4,119.42**
Karnataka	1,579.91	1,579.91				1,579.91		**4,739.73**
Tamil Nadu	1,464.94	1,464.94					1,464.94	**4,394.82**
Kolkata	544.26			544.26			544.26	**1,632.78**
Kerala	312.48		312.48			312.48		**937.44**
Punjab	322.01		322.01	322.01		322.01		**1,288.04**
Haryana			222.58			222.58	222.58	**667.74**
Uttar Pradesh (E)	364.57		364.57				364.57	**1,093.71**
Uttar Pradesh (W)		514.04	514.04			514.04		**1,542.12**
Rajasthan		321.03		321.03		321.03		**963.09**
Madhya Pradesh			258.36	258.36		258.36		**775.08**

(*Continued*)

(*Continued*)

Service Area	Airtel	Bharti	Idea	Reliance	STEL	Tata	Vodafone	Circle Total
West Bengal	123.63	123.63		123.63			123.63	**494.52**
Himachal Pradesh		37.23	37.23	37.23	37.23			**148.92**
Bihar	203.46	203.46		203.46	203.46			**813.84**
Orissa	96.98			96.98	96.98			**290.94**
Assam	41.48	41.48		41.48				**124.44**
North East	42.30	42.30		42.30				**126.90**
Jammu & Kashmir	30.30	30.30	30.30	30.30				**121.20**
Telco Total	**6,499.46**	**12,295.46**	**5,768.59**	**8,585.04**	**337.67**	**5,864.29**	**11,617.86**	**50,968.37**
No Spectrum	1959–1964 Mhz		1969–1974 Mhz		1974–1979 Mhz		1964–1969 Mhz	

This was further supplemented with an attempt to bring India at par with the data technologies landscape. The government auctioned BWA spectrum in 2300 MHz band.

BWA spectrum was eventually used for LTE TDD launched by Airtel, with Qualcomm selling its spectrum to Airtel. Aircel launched LTE TDD in due course and RIL is in the process of deploying the network. LTE TDD in India has 20 MHz spectrum available per operator; however, it faces challenges of devices ecosystem. This becomes more visible with lack of hand-held devices for LTE TDD.

It is important to note that India and China are the only two big countries adopting LTE TDD. Rest of the world has used LTE FDD to launch services and hence, the devices ecosystem economies of scale tilts in FDD favour. Moreover, Voice over LTE (VOLTE) or Circuit Switched Fallback (CSFB) to other technologies is yet to be tested for interoperability.

The overall bidding strategies adopted by operators eyeing the BWA spectrum in 2300 MHz are indicated in the table.

Of these operators, Airtel and Aircel have already launched networks, while RIL is in the process of launching it. Qualcomm has already exited the venture by selling network licence to Airtel. The fate hangs in balance for Tikona and Augere, where uncertainty may loom large.

In the next 12 months, we will see 4G LTE launches in major cities and within 3–4 years we will see 4G LTE launch in at least one city in every telecom circle of India.

It is estimated that India's mobile subscriber base will grow to 1,145 million subscribers by 2020. Simultaneously, smartphone growth will be from 10% in 2013 to 45% by 2015. Mobile broadband usage is on the rise with social media, web browsing and chat driving more than a third of the mobile broadband traffic currently. All these factors will contribute to 4G uptake. According to a recent study, India will have 105 million 4G subscribers by 2020.

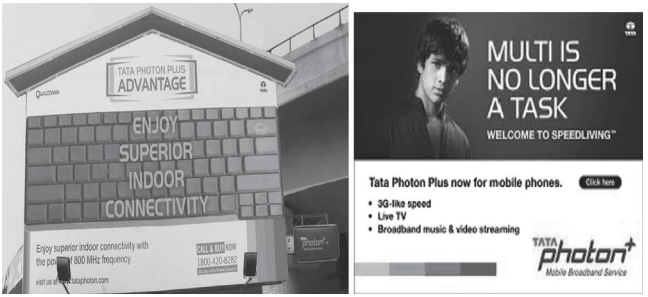
Reliance Jio	Airtel	Aircel	Qualcomm
Only player in India to get PAN India BWA License	Bagged license in 4 circles	Bagged license in 8 circles	Intended to lead the deployment of LTE in India
Expected to lead the BWA ecosystem in India — make LTE a front-runner in technology	Prefered circles where it didn't win 3G license but has a leading share of market – Kolkata, Maharashta and Punjab	Intended to have 3G and BWA spectrum in same circles so that they don't run out of broadband capacity in near term	Picked the two most prestigious circles – Mumbai and Delhi. Also picked two secondary circles of Kerala and Haryana
Will take the content and price war to next levels, expected to own the devices ecosystem	It also took Karnataka where it has 54% share of market and highest contributing circle to revenue	Picked circles that are top contributors to revenue. Also wanted to pick Delhi and Mumbai but backed out due to excessive price war	Planned to hand over the license to a service provider that expresses intention to launch LTE and proliferate through the key markets. Qualcomm doesn't have any service operations experience in India

1.4.1.1 Inherent Challenges for 4G in India: (LTE TDD)

1. Economies of scale: While the world is witnessing launched of multiple LTE FDD networks (GSA), there are hardly any networks expected on TDD. This subdues the case for infra and associated telecom ecosystem stakeholders to make their offerings more affordable.
2. Untested technology: The fate of technology and interoperability is yet to be ascertained. In such situations, operators adopting TDD need to put their neck out and take higher risks.
3. Devices selection: Device selection is applicable for technologies, for which a large selection of devices and equipment are available. TDD devices are still getting incubated, leading little for selection by consumers.
4. Competence availability: Telecom stakeholders have limited or no competency to manage and operate TDD networks, and developing/inculcating competency is extremely time-, money- and effort-intensive activity.
5. Lack of voice support: LTE is a broadband wireless access technology, implying there is no voice support on the LTE band. This is a constraining situation since voice support is essential for devices convergence.
6. CSFB interoperability and fallback are still in the lab stage, and without CSFB, multiple-technology fallback will not be possible. This will impact the consumer experience and quality of service.

1.4.2 Why EVDO Can Score Over HSPA in India?

India saw launch of 3G (EVDO) before the auctions and launch of 3G (HSPA). The EVDO operators had a significant benefit over 3G operators for a variety of reasons.



Source: http://network2media.org/index.php?option=com_content&view=article&id=4232:milestone-brandcom-drives-home-tata-photon-plus-advantage&catid=5:news&Itemid=3 and http://broadbandforu.blogspot.in/

1. **Superior coverage:** EVDO operates in 800 MHz as compared to 3G in 2100 MHz. This led to better in-building coverage experience by EVDO subscribers.
2. **Seamless network:** EVDO operators had a uniform PAN India presence which gave seamless data experience to consumers as compared to 3G services, which were being offered in limited circles by each operator.
3. **CAPEX benefit:** EVDO networks were launched with lower CAPEX as compared to 3G network, and hence, the services could be offered at a more affordable price.

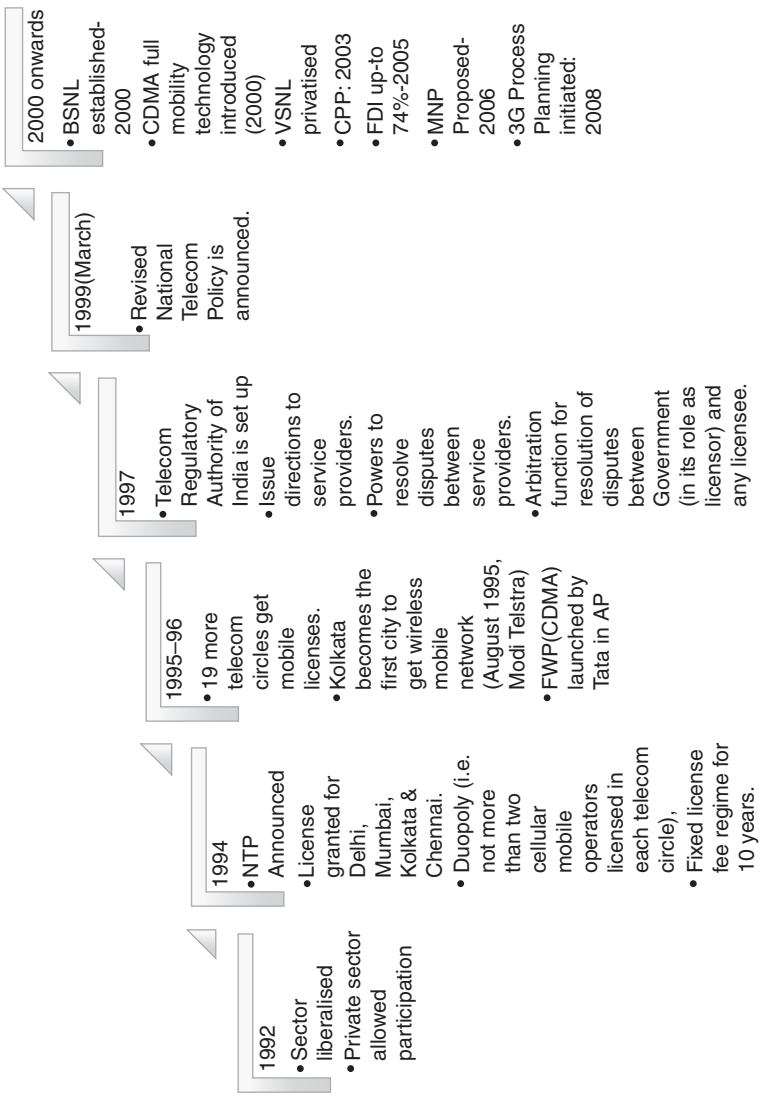
A brief comparative table indicating various data technologies used in India and perspective of utility by the consumer are shown as follows:

Wireless Data Technology	Spectrum Band	Protocol	Customer Propositions	Advantages and Issues with Offers
2G	800/900/1800 M	CDMA and GSM	Voice, SMS, Caller ID	Only voice offers, cannot support much dta, 1800 M is more capex intensive with compromise on consumer experience
2.5G	800 Mhz/900/1800M	CDMA2K, GPRS, EDGE	2G, MMS, Web browsing, location based apps, short audio and video clips	Slower speeds, need for better network optimisation, MMS and LBS not a big adopter by consumer
3G	800/2100 Mhz	EVDO, UMTS/WCDMA	2.5G, Full motion, Video, streaming services, gaming	Insufficient spectrum, inefficient spectrum band, in building experience issues, lack of mature content
4G (BWA)	2300 Mhz	LTE (TDD) and Wimax	3G, HD content, video conferencing, 3D gaming	TDD lacks developmental economy of sale, devices in availability, VOLTE issues

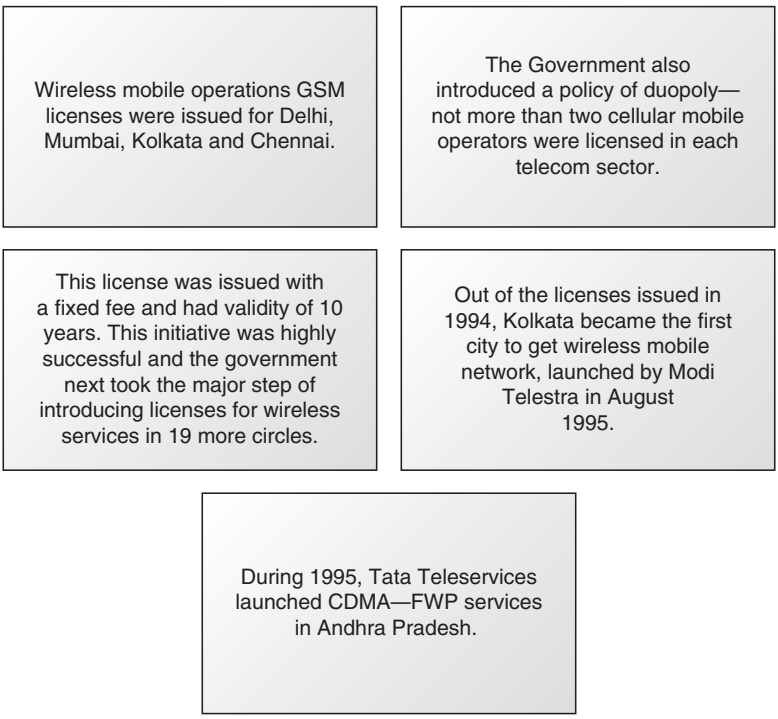
❒ 1.5 TELECOM REVOLUTION

Indian telecom revolution owes its birth to the opening up of economy during early 1990s. In the year 1992, the telecom sector was libraries and private sector participation was allowed. This was a major breakthrough for the government to put India on the path of unleashing its potential in telecom.

A broad roadmap of telecom policies evolution is shown as follows:



In the year 1994, the first National Telecom Policy (NTP) was announced by the government. Under this policy:



The government started realising that a strong regulator is now required to handle all the telecom-related matters on behalf of the government and hence, TRAI was set up in 1997. This regulatory body had the following primary functions:

1. Issue directions to service providers
2. Power to resolve disputes between service providers
3. Arbitration functions for resolution of disputes between government (in its role as licensors) and any licensee.

The NTP 1994 needed a much-desired revision and the government proactively introduced NTP 1999. From the year 2000 onwards, a lot of telecom-friendly initiatives were taken by the government, of which some important ones are listed as follows:

Initiatives	BSNL (Bharat Sanchar Nigam Limited) got established in the year 2000
	CDMA full mobility technology was introduced in the year 2000
	VSNL (Videsh Sanchar Nigam Limited) was privatised and TATA invested in the same.
	Calling Party Phase (CPP) was a big initiative launched in the year 2003.

(*Continued*)

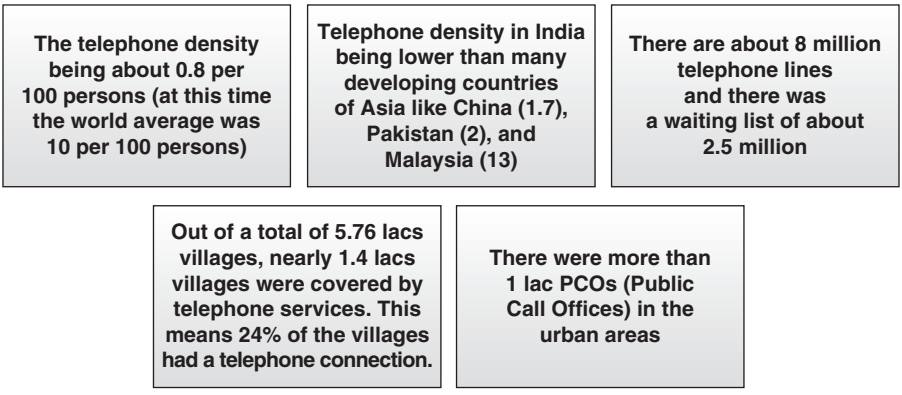
(*Continued*)

Initiatives	Foreign Direct Investment (FDI) in telecom was permitted upto 74% in the year 2005.
	Mobile Number Portability (MNP) was proposed by the government in the year 2006.
	3G process planning to make India a wireless broadband country was initiated in the year 2008.

1.5.1 National Telecom Policy 1994

This was a landmark document defining the status of India and assigning objectives for the future. The NTP 1994 enumerated the following status on Indian telecom.

1.5.1.1 Background



1.5.1.2 Objectives of National Telecom Policy 1994

Considering the above status of telecom services in India, the government set out the following objectives in the NTP 1994:

1. The policy's focus will be to provide telecom services for all and ensure telecom services are within everyone's reach. The government had a vision that availability of telephone connection should be made on demand as early as possible.
2. To achieve universal telecom services covering all the villages as early as possible. The objective was provision of access to all people for certain basic telecom services at affordable and reasonable prices.
3. The quality of telecom services should be of world standard. The objective was to address consumer complaints, dispute resolution and interface with public will receive special attention.
4. India to emerge as a major manufacturing base and a major exporter of telecom equipment. Local manufacturing to be encouraged and given required supports and incentives.

5. The defence and security interest of the country will be protected. No action will be taken under NTP that will pose any threat to national security.

1.5.1.3 Revised Targets of National Telecom Policy 1994

Following revised targets were set out by the government under NTP:

1. Telephone should be made available on demand by 1997.
2. All villages should be covered by telecom services by 1997.
3. In the urban areas, a PCO should be provided for every 500 persons by 1997.
4. All the value-added services that are available internationally should be introduced in India at the earliest. This will raise the telecom services available in India to international standards.

1.5.1.4 Value-Added Services

In order to achieve telecom standard comparable to international facilities, the subsector of value-added services was opened up to private investment in July 1992 for the following services:

1. Electronic mail
2. Voice mail
3. ISDN data services
4. Audio text services
5. Video text services
6. Video conferencing
7. Radio paging cellular mobile telephony

1.5.2 National Telecom Policy 1999

The NTP 1999 attempted to build upon NTP 1994 and to add further direction and speed to the development of Indian telecom infrastructure.

1.5.2.1 Objectives

The important steps undertaken in NTP 1999 were as follows:

NTP 1999	Encourage development of telecommunication facilities in remote, hilly and tribal areas of the country.
	Create a modern and efficient telecommunication infrastructure. This is to be done taking into account the conversions of IT, media, telecom and consumer electronics. The vision thereby was to propel India into becoming an IT super-power.
	To convert PCOs, wherever justified, into public tele-info centres. These centres to have multimedia capability like ISDN services, remote database access, government and community information systems, etc.

(*Continued*)

(*Continued*)

	In a time-bound manner transform the sector to a greater competitive environment in both urban and rural areas. This is to be done by providing equal opportunities and a level-playing field for all players.
NTP 1999	Strengthen R&D efforts in the country. To provide an impetus and build world class manufacturing capabilities.
	Important to achieve efficiency and transparency in spectrum management and allocation.

1.5.2.2 Targets

1. Make available telephone on demand by 2002. To sustain it thereafter so as to achieve a teledensity of 7 by the year 2005 and 15 by the year 2010.
2. Encourage development of telecom in rural areas making it more affordable by suitable tariff structure. This is to be done by making provision of rural communication mandatory for all service providers.
3. Increase rural teledensity from the current level of 0.4 to 4.0 by the year 2010 and provide reliable transmission media in all rural areas.
4. Achieve telecom coverage of all villages by providing reliable telecom infrastructure by the year 2002.
5. Provide internet access to all District Head Quarters (DHQ) by the year 2002.
6. Provide high speed data and multimedia capability to all towns with a population greater than 2 lacs by the year 2000. This is to be done by using latest technologies including ISDN.

1.5.2.3 Status of NTP 1999

Objectives Achieved

1. Teledensity of 7 by 2005 and 15 by 2010—achieved 70.89 by March 2011
2. Making tariff structure more affordable—lowest tariffs in the world
3. Increase rural teledensity from 0.4 to 4.0 by 2010—achieved rural teledensity of 33.79 by March 2011.
4. Achieved telecom coverage of all villages—achieved coverage of 98.5% by March 2011
5. Provide high-speed data to all towns with a population greater than 2 lacs by the year 2002.

Objectives Underachieved

1. Strengthen R&D efforts and provide impetus to build world class manufacturing capabilities in India.
2. Achieved efficiency and transparency in spectrum management.
3. Provide multimedia capability to all towns with a population greater than 2 lacs by the year 2002.
4. Provide reliable media to all exchanges by 2002.
5. Provide internet access to all DHQ by 2000.

1.5.3 National Telecom Policy 2011

1.5.3.1 Objectives

NTP 2011	Achieve rural teledensity from the current level of around 35–60 by the year 2017 and 100 by the year 2020.
	Achieve 175 million broadband connections by 2017 and 600 million by the year 2020. This will provide minimum 2 Mbps downlink speed and making available higher speeds of at least 100 Mbps on demand.
	Provide high-speed and high-quality broadband access to all village panchayat through optic fiber by 2014.
	Meet 80% Indian telecom sector demand through domestic manufacturing with the value addition of 65% by the year 2020.
	Recognise telecom as infrastructure sector to realise true potential of ICT for development.
	Strive to create one nation–one license across services and service areas.
	Achieve one nation–full mobile number portability and work towards one nation–free roaming.

1.5.4 Telecom Reforms 2012 Onwards

India is one of the fastest growing telecom markets in the world, now at par with the technological landscape of 3G and 4G as well. For a long time, the telecom tariffs exhibited elasticity to growth in minutes of usage. This led to a sharp increase in teledensity, making telecom sector to contribute significantly to the country's economic growth.

Against this backdrop, the NTP 2012 was conceived, with the vision to transform the country into an empowered and inclusive knowledge-based society.

1. Department of Telecommunication in India has planned to increase rural teledensity from 40 to 60 by year 2017 and 100 by year 2020.
2. The National Broadband Plan envisages 160 million broadband connections including 60 million wireless broadband connections by the year 2014.
3. There are plenty of opportunities for the communication service providers in India to address this growth path.
4. Government of India has approved building of National Optical Fiber Network (NOFN) to provide connectivity to 2,50,000 Gram Panchayats of the country. The project envisages providing high-speed and high-quality broadband access to all village panchayats through optic fibre by year 2014 and progressively to all villages and habitations.
5. Target of 175 million connections by 2017 and 600 million connections by 2020 at minimum 2 Mbps speed and higher speed up to 100 Mbps on demand. This will help the government to ensure equitable and inclusive growth if achieved.
6. To provide high-speed and high-quality broadband access to all village panchayats through a combination of technologies by the year 2014 and progressively to all villages and habitations by 2020. This will enable citizens to participate in and contribute to e-governance in key sectors like health, education, skill development, employment, governance, banking, etc. to ensure equitable and inclusive growth.

7. The multiplier effect and transformational impact of telecom and broadband services on the overall economy. It recognises the role of such services in furthering the national development agenda while enhancing equity and inclusiveness. It provides the enabling framework for enhancing India's competitiveness in all spheres of the economy.
8. It envisages support to platform-neutral services in e-governance and m-governance in key social sectors such as health, education and agriculture, which are currently limited to a few organisations in isolated pockets. This will expand the footprint of these services and thus foster an atmosphere of participative democracy delivery model, which is truly citizen-centric, ensuring equitable and inclusive development across the nation.

To every problem, there is a solution. Thus, challenges faced by the social sectors can be tackled through telecom technologies by mirroring the advantages of physical infrastructure/branches. This book further aims to discuss the role of telecom in enabling growth of various sectors such as healthcare, banking, education and energy for a paradigm shift in our country's telecom-led growth.

End Notes

Indian telecom revolution owes its birth to the opening up of economy during early 1990s. In the year 1992, the telecom sector was libraries and private sector participation was allowed. This was a major breakthrough for the government to put India on the path of unleashing its potential in telecom industry.

With the pride of connecting over 900 million people in India, telecom sector contributes to 4–5% of India's Gross Domestic Product (GDP) as mentioned by various sources. In terms of attracting foreign currency, telecom is the third largest Foreign Direct Investment (FDI) sector in India, attracting almost 7% of total FDI that comes to India, as quoted in various reports.

India is one of the fastest growing telecom markets in the world, now at par with the technological landscape of 3G and 4G as well. For a long time, the telecom tariffs exhibited elasticity to growth in minutes of usage.

In the next 12 months, we will see 4G LTE launches in major cities and within 3–4 years we will see 4G LTE launch in at least one city in every telecom circle of India.

Descriptive Questions

1. Why is the telecom sector important for Indian economy?
2. Explain the various wireless technologies launched in India.
3. What are the key differentiators between HSPA and EVDO?
4. Explain the various telecom policies between 1994 and 2012.
5. What are the opportunities and challenges of 4G in India?

CHAPTER 2

STRATEGIC ELEMENTS OF TELECOM MANAGEMENT

Learning Objectives

After completion of this chapter, the students will have a good overview of the Indian telecom sector with regard to:

- Key performance indicators measured by telecom operators
- Service providers' success factors
- Telecom consumer life cycle and measurement
- Understanding acquisition, retention and churn
- Various regulatory bodies affecting Indian telecom ecosystem
- Business models and risks in brief

❒ 2.1 INTRODUCTION

Indian telecom key performance indicators are essential for understanding and evaluating. This chapter will enumerate the strategic parameters and fundamentals of telecom management in India.

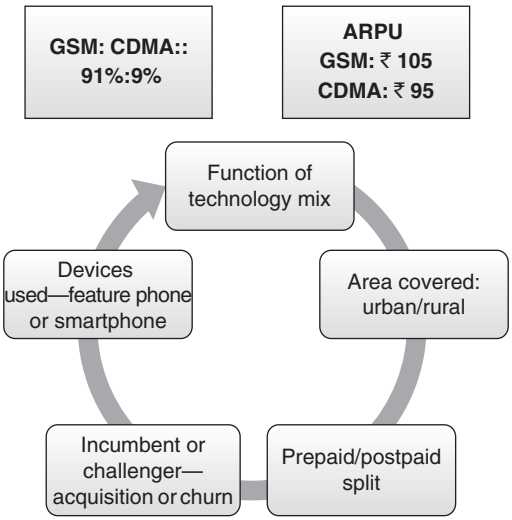
❒ 2.2 AVERAGE REVENUE PER USER (ARPU)

ARPU is a very important parameters for telecom operators to manage and monitor. Since it's dynamic and variable, many factors lead to impacting the same.

Average revenue per user is affected by various factors in India. The key elements are as following:

1. **Function of technology mix:** The revenue from consumers utilising various technologies has a rub off on ARPU. A second generation (2G) customer would give lesser ARPU than a third generation (3G) one. It is the same in the case of Global System for Mobile (GSM) subscriber giving higher ARPU than CDMA.
2. **Areas of coverage:** The area of operations for an operator impacts ARPU. An operator with a rural or semi-urban dominating network will have lesser ARPU than the operators in leading metros.
3. **Prepaid/postpaid split:** India has become a dominant Prepaid market (excess of 95% customers are on Prepaid). However, the 5% Postpaid will be contributing to almost 20% of the telecom revenue. The service providers with a healthy base of Postpaid customers stand to experience better ARPU as compared to challenger operators with negligible Postpaid base.

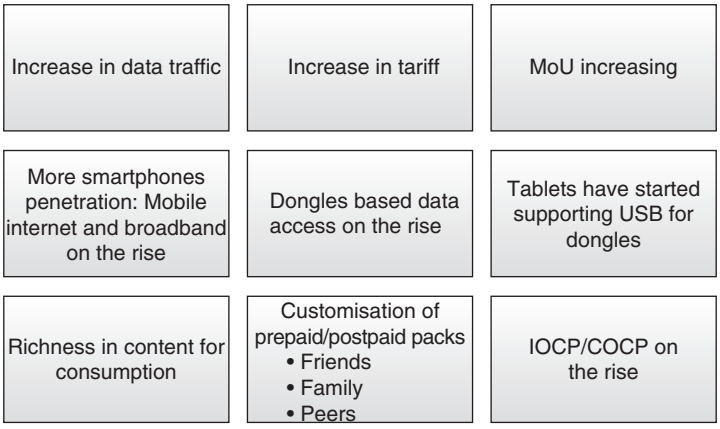
4. **Acquiring or churn:** The incumbent operators on 900 MHz had a first-mover advantage and also first-time acquisitions were done by them. In turn, these acquired customers have better ARPU delivered to the service provider as compared to the long tail churn customers.



Factors affecting ARPU

5. **Device being used:** Service providers have woken to the fact that devices play a significant role in defining consumer usage behaviour for various services. It is now well established that customers using smartphones give higher ARPU to operator as compared to the ones using feature phones. This is encouraging the operators to push from a feature phone to smartphone migration amongst customers.

In the last 2–3 quarters, Indian telecom business has seen a steady rise in ARPU. This can be assigned to various important factors, some of them are mentioned as follows:



ARPU rising—prepaid/postpaid

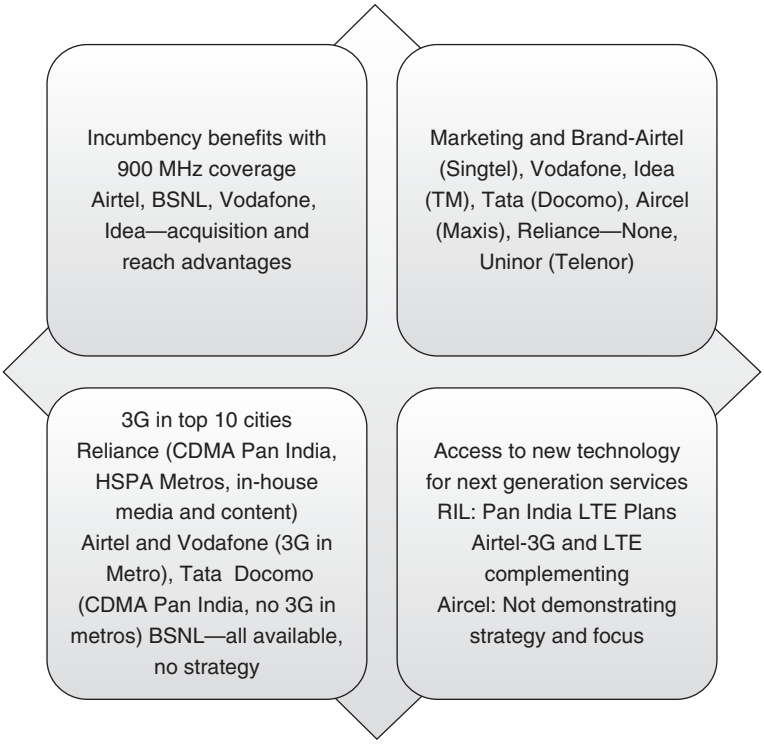
1. **Increase in data traffic:** Operators have seen increase in data traffic and, in fact, most of the service providers are now spending a lot of money to encourage data usage. This is because voice as a service is flattening with no price elasticity of demand.
2. **Increase in tariff:** The tariffs in India bottomed out 12–18 months ago. This means that tariffs were so low that the service provider operators became unsustainable. Steadily, operators started to increase tariff and that gave a positive push to ARPU.
3. **Increase in MoU:** Minutes of usage are increasing as operators expand their networks to new semi-urban areas. The rise in MoU effectively increases revenue and hence, ARPU.
4. **Smartphones penetration:** With smartphone sales being now close to 25% of overall volume of handsets sold in India, the user interface prompts consumers to use more telecom services and provide higher revenue.
5. **Dongle-based data access:** The success of photon followed by other 3G and 2G data dongles adds strongly to operator revenue. These enterprise warriors that use dongles on the move are high ARPU generators. In fact, now tablets have also started supporting dongles for data access.
6. **Richness in content consumption:** Consumer has moved on from ringtones to gaming, social networking and instant messaging solutions. Availability of rich content is finding consumers who are also ready to use the same.
7. **IOCP/COCP on the rise:** Individual owned by company paid devices and mobile bills being afforded by corporates is adding to increase in ARPU.

❒ 2.3 SERVICE PROVIDERS' SUCCESS FACTORS

The following are the four critical elements on which the success factors of service providers can be ascertained:

1. **Incumbency benefits:** Operators like Airtel, BTACL (now Idea Cellular), Sterling Cellular (now Vodafone) and BSNL had incumbency benefits of 900 MHz coverage and first-mover advantage for gaining best quality customers. With the incumbency benefits, BTACL grew to become a PAN India network by acquiring RPG Cellular, Spice, and Escotel's 900 MHz spectrum and space.
2. **Marketing and brand:** Operators who gained due to FDI also gained from learning about best-in-class marketing practices from their international partners.

   Airtel has a strategic alliance with Singtel, Vodafone itself is a global multinational, Idea Cellular has an alliance with Axatia (erstwhile Telekom Malaysia), Tata has NTT Docomo as the global partner, Aircel is a Maxis (Malaysia Company), Uninor being a venture of Telecom (Nordic) and Unitech. This leaves companies like Rcom, RIL and Videocon deprived of branding and marketing practice know-how from their FDI partners.
3. **Broadband in top 10 cities:** Reliance has a strategic advantage over others in this case, since Rcom has metro 3G circles, PAN India EVDO network and a robust content house in BIG Cinemas, BIG entertainment, BIG FM, and BIG



SWOT of Operators

FLIX. Airtel and Vodafone also have 3G in metros but lack content creation capability. Tata Docomo has a PAN India EVDO network but lacks 3G in metros. BSNL has all what it takes but lacks strategy.

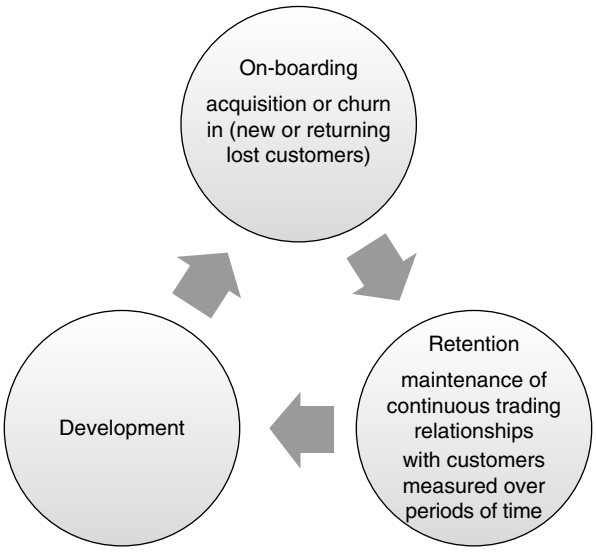
4. **Access to next generation services and technologies:** RIL has a pan India LTE license and is capable of rolling out networks in 1800 MHz band as well. Airtel has both 3G and LTE network in areas of broadband potential but lacks devices ecosystem. Same is the case with Aircel that has launched 3G and LTE networks in India but may lack further expansion initiatives.

❒ 2.4 TELECOM CONSUMER LIFE CYCLE

2.4.1 Quality of Consumers

Indian operators firmly believe that MoU and ARPU increase is a fundamental reason proportional to the quality of consumers. Both the incumbents and challengers are focused on customer quality, while the former wants to protect the base and latter wants to make it churn.

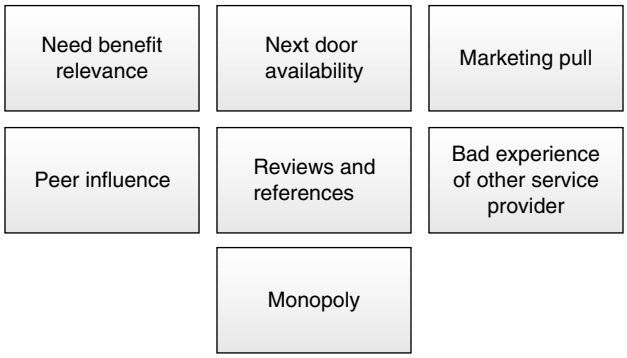
In the above context it is important to trace the life cycle of customers in telecom. The consumer engagement process goes through the following three steps in this regard:



Customer life cycle

2.4.1.1 Acquisition

Acquisition is the process of the consumer attracted to use your services for the first time or returning back to your service. When the customer is using any service for the first time, it is mentioned as customer acquisition. If the customer has come to your network from some other network, it is referred to as churn in. If you have lost the customer to another network, for you its churn out. The various on-boarding essentials considered by a customer are as follows:



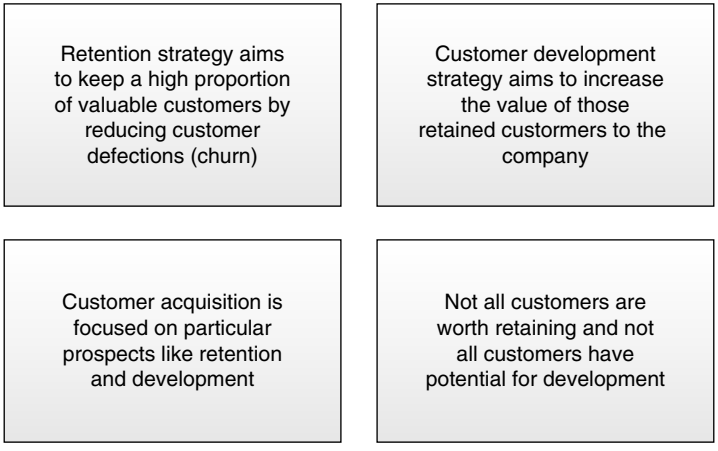
1. **Need benefit relevance:** The customers' service provider of choice may be different that the one he subscribes to, due to relevance of service offered. If 4G is available with one operator who may not be of choice, and the technology is relevant to the consumer, then he will on-board the same service provider.
2. **Next-door availability:** Consumer chooses to reduce cost of service engagement. A shop next door may prompt a faster decision-making to buy a device as

compared to a shop at a distance. Greater the proximity to the customer, higher the chances of on-boarding.

3. **Marketing pull:** Brand personality makes perceived risks lesser for the consumer. Brand pull is created over a period of time and is critical for service acceptance and assurance.
4. **Peer influence:** Network of friends, family and peers prompts consumer for on-boarding, churn in or churn out. A positive reference always works in favour of the company.
5. **Reviews and references:** In the devices industry, expert reviews and online references play a major role in consumer decision-making for on-boarding.
6. **Bad experience of other service provider:** A consumer may choose to on-board a service provider by leaving the earlier one due to poor service or not meeting the promises made.
7. **Monopoly:** If a telecom service is available without competition (e.g., BSNL in rural India), the consumer has no choice but to on-board the same. However, if the services are not satisfactory, then the consumer will change the network as soon as an alternative is available.

2.4.1.2 Retention

This is a stage to reduce churn to ensure high-value customers are always associated with the company. However, all customers are not worth retaining. The telecom stakeholders need to evaluate the consumer data effectively to identify the customers who must be retained, which also is a costly measure.

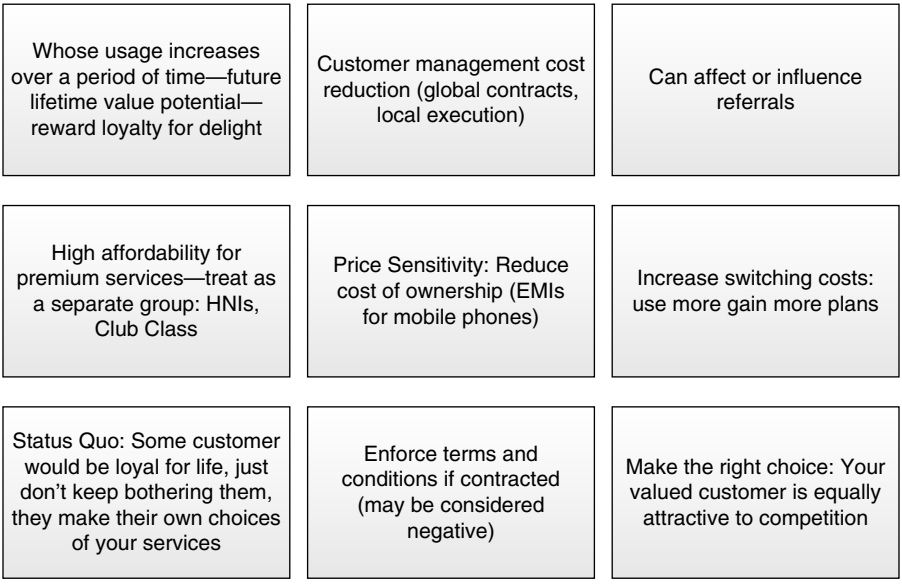


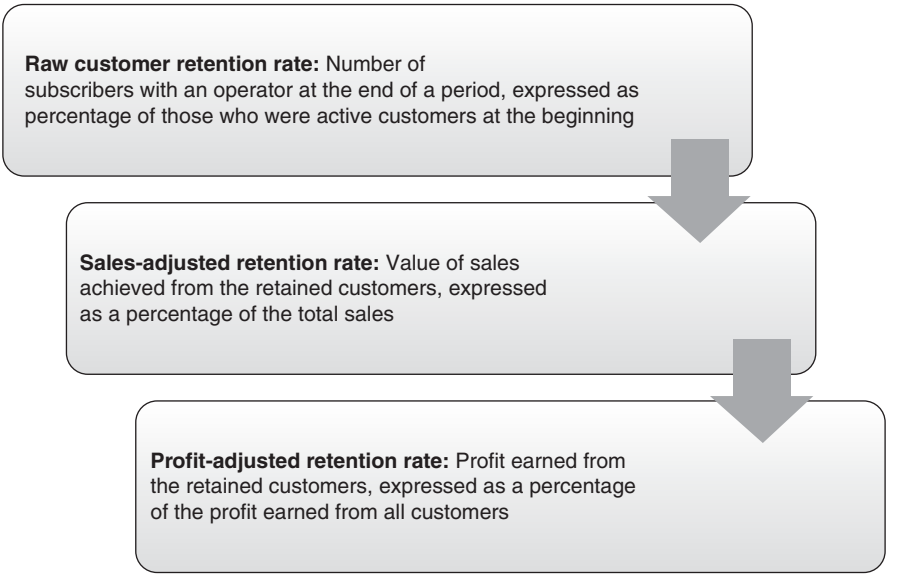
Retention and development

At a strategic level, the following customers are worth retaining:

1. **Whose usage can increase over a period of time:** Customers who show a pattern of incremental usage over time must be retained. These customers have a future lifetime value potential and if delighted, they give good return of loyalty.

2. **Customers whose management cost reduces over a period of time:** These are either global contracts with local execution or the customers who settle down to the nuances of telecom stakeholders. With sustained or enhanced ARPU, reduction in the cost of customer maintenance is essential as a retention parameter.
3. **Can effect referrals or influence other decision makers:** Such customers may or may not generate high ARPU, but must be retained since they may have a decision-making impact on other consumers. Various heads of purchase who decide about bulk connections (voice or data) need to be retained with the service providers.
4. **High Network Individuals (HNIs):** these are the ones that have high affordability of premium services. Such customers need club class treatment.
5. **Status quo:** Loyalists may exhibit stickiness due to ongoing brand association and/or positive experiences. Such customers don't want to be bothered/called for any feedback, upselling or cross-selling. If left undisturbed, these customers assure retention for life.
6. **Price sensitive:** They are the most common category of consumers. Their entry load can be reduced with EMIs and taking assurance of fixed ARPU over a long term.
7. **Increase switching costs:** Offers to be created whereby share of wallet reduces with increase in consumption (3GB pack with first 1GB for ₹600, 2nd 2GB for ₹300 and 3rd 1GB for ₹200). So the consumer will stick for the entire duration of plan and not switch in between.
8. **Enforce terms:** A defecting consumer breaching the contract must be reminded of the terms and conditions agreed and that partial fulfilment of contract cannot be entertained.





Measuring retention

Any parameter is as good as the measurement accuracy that can be exercised to the same. The retention element is measured on different performance indicators as given here:

1. Raw customer retention
2. Sales adjusted retention
3. Profit adjusted retention

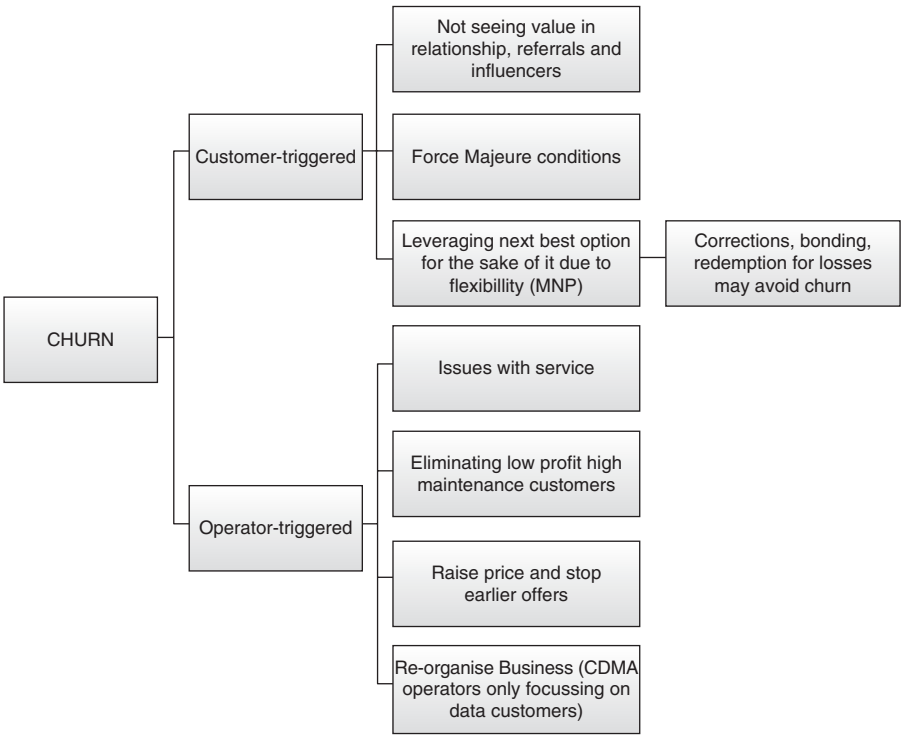
Retention strategies are adopted to manage churn. The number of consumers leaving or predicted to leave a telecom service is referred to as churn.

Churn

Churn is not always involuntary; it can be triggered by the service provider as well. The various essentials of churn are enumerated as follows:

Customer-triggered churn: This churn happens due to a customer's initiative and reasons can be assigned as follows:

1. Not seeing any immediate or near term value in continuing the relationship, sometimes even influenced by referrals and peers.
2. Force Majeure conditions: Customer relocates to a different country/place where current provider's services are not available, customer unfortunately dies or doesn't have the need for services any more.
3. Flexibility: Since switch over options are available, customer moves on to try the next best option. If that option becomes viable, then the customer sticks to the same.



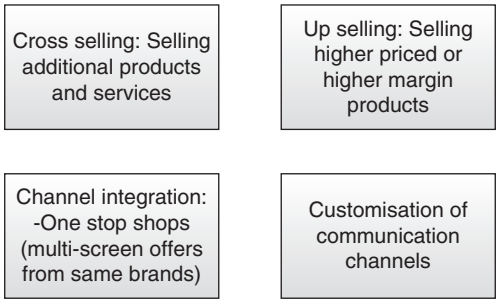
Operator-triggered churn: This is a function of misgivings and wrongdoings at the service provider end, which prompts the customer to switch. Few of the reasons are as follows:

1. Issues with service: The services provider deteriorates and starts to lack customer expectations. In such a case, if care is not taken by the service provider, then the customer churns out.
2. Eliminating low profit and high maintenance customers: Based on CRM data analysis, operators sometimes take judicious calls to remove customers who don't use enough services to enable service provider earn revenue. For example, a leading operator in India has publicly announced that they remove customers who use less than 1MB of data per month. Customers giving high service cost with low ARPU are also potential targets for elimination from the network.
3. Increase in service price and removing earlier offers: Churn happens when operators withdraw freebees. This also ensures that only the serious consumers remain on network.
4. Re-organising business: Sometimes decisions to change business focus impacts churn out. Operators in India decided to reduce focus on CDMA voice customers and enhance focus on CDMA data subscribers. A lot of CDMA voice subscribers churned out to GSM.

2.4.1.3 Customer Development

A retained customer is as good as the value enhancement that can be derived from it. Once the right quality of customers is retained, then few strategies are adopted for value enhancement:

1. **Upselling:** consumers are enticed to upgrade to higher level of usage or tariffs with better offers. Such customers may be given extended validity or price reduction of higher tariff packages.
2. **Cross-selling:** Offering different services to the same customers (Airtel can offer voice, data, devices, DTH as a single organisation and take leverage from a customer who may have started using Airtel only for voice).
3. **Channel integration:** One-stop shop helps the consumer to be long-term loyalist. It is important to offer all potential products and services of a company under one roof so that the consumer can make choices easily.



Globally the telecom industry is in the midst of a transformational shift, driven by a huge surge in data traffic on telecom networks. However, Indian telecom landscape is still trying to crack the maze of data adoption. This needs not just strategic thinking but also strategic and tactical thinkers. The new age of telecom professionals need to penetrate the industry fast so as to change the ways we have positioned the next level of telecom services for consumers.

A number of mobile operators are rolling out 4G networks in India; some may even know the shortcomings and pitfalls. Users will be able to upgrade to fastest, most reliable and best-priced wireless networks, provided they are ubiquitously available. Indian operators are offering very competitive tariffs to encourage more of their subscriber base to use mobile data services, while voice tariff in India has tanked to be the lowest in the world. The telecom revolution India needs has to happen now, before it's too late.

❒ 2.5 NATIONAL AND INTERNATIONAL REGULATORY BODIES

2.5.1 ITU

The ITU is a treaty-based organisation in which governments are the primary members, although other organisations (such as non-governmental organisations and individual companies) can also hold a form of direct membership status in the ITU as well.

1. **ITU-T:** Standardisation of telecommunication, ICTs, regulation of numbering, international tariffs
2. **ITU-D:** Assisting implementation and operation of telecommunications in developing countries
3. **ITU-R:** Radio communication standardisation and global radio spectrum management

2.5.2 3G Partnership Project (3GPP)

1. 3GPP was created in December 1998 by the signing of 'The 3rd Generation Partnership Project Agreement'.
2. The original scope of 3GPP (1998) was to produce technical specifications and technical reports for a 3G mobile system based on evolved GSM core networks and the radio access technologies that they support.
3. The scope was subsequently amended to include the maintenance and development of GSM technical specifications and technical reports including evolved radio access technologies (e.g., General Packet Radio Service (GPRS) and Enhanced Data rates for GSM Evolution (EDGE)).
4. The discussions that led to the signing of the 3GPP Agreement were recorded in a series of slides called the *Partnership Project Description* that describes the basic principles and ideas on which the project is based.

2.5.3 3G Partnership Project 2 (3GPP2)

1. A collaborative 3G telecommunications specifications-setting project comprising North American and Asian interests developing global specifications for ANSI Cellular Radio telecommunication Intersystem Operations network evolution to 3G and global specifications for the radio transmission technologies (RTTs) supported by ANSI
2. Although discussions did take place between ETSI and the ANSI-41 community with a view to consolidating collaboration efforts for all ITU 'family members', in the end it was deemed appropriate that a parallel Partnership Project be established–'3GPP2', which, like its sister project 3GPP, embodies the benefits of a collaborative effort with:

   - ARIB—Association of Radio Industries and Businesses (Japan)
   - CCSA—China Communications Standards Association (China)
   - TIA—Telecommunications Industry Association (North America)
   - TTA—Telecommunications Technology Association (Korea)
   - TTC—Telecommunications Technology Committee (Japan)

3. CDG (CDMA Development Group) forms a part of 3GPP2 since CDMA is a popular technology in America and Asia.

2.5.4 Telecom Regulatory Authority of India (TRAI)

1. The entry of private service providers brought with it the inevitable need for independent regulation.

2. TRAI was, thus, established with effect from 20th February 1997 by an Act of Parliament, called the Telecom Regulatory Authority of India Act, 1997, to regulate telecom services.
3. Consumer interests
   (i) Quality of service
   (ii) Retail tariffs
   (iii) Transparent service provision
   (iv) Mobile number portability
   (v) Preventing spam
   (vi) Consumer complaint redressal
4. Interconnection
5. Digitisation of cable tv services
6. Recommendations on spectrum, licensing and policy

2.5.5 Cellular Operators Association of India (COAI) and AUSPI

1. COAI was constituted in 1995 as a registered, non-governmental society.
2. COAIs core membership includes private cellular operators, namely Aircel Ltd., Bharti Airtel Ltd., Idea Cellular Ltd., Uninor, Videocon Telecommunications Ltd., and Vodafone India Ltd. operating across the whole country.
3. Associate Members include Alcatel Lucent India Ltd., Ascend Telecom Infrastructure Pvt. Ltd., Cisco Systems India Pvt. Ltd., Ericsson India Pvt. Ltd., GTL Infrastructure Ltd., Huawei Technologies Co. Ltd., IBM India Pvt. Ltd, Indus Tower Ltd., Intel Corporation, Nokia Siemens Networks India Pvt. Ltd., Qualcomm India Pvt. Ltd., Sony India Mobile and ZTE India Pvt. Ltd.
4. COAI interacts with various international organisations such as ITU, GSMA, UMTS, Forum and 3GPP/3GPP2 to name a few.

2.5.6 TDSAT

1. The Telecom Regulatory Authority of India Act, 1997 was amended by the Telecom Regulatory Authority of India (Amendment) Act, 2000.
2. The desired objectives of bringing about functional clarity, strengthening the regulatory framework and the disputes settlement mechanism were attained by setting up of a separate dispute settlement mechanism, etc.
3. An Appellate Tribunal known as the 'Telecom Disputes Settlement & Appellate Tribunal' was set up under Section 14 of the Telecom Regulatory Authority of India Act, 1997 by TRAI (Amendment) Act, 2000 (hereinafter called the 'Act')
4. Function is to adjudicate disputes and dispose of appeals with a view to protect the interests of service providers and consumers.
5. Adjudicate any dispute between a licensor and licensee, between two or more service providers, between a service provider and a group of consumers, and to hear and dispose of appeals against any decision or order of TRAI.
6. The Appellate Tribunal came into existence on 29th May, 2000 and started hearing cases from January 2001.

2.5.7 Indian Cellular Association (ICA)

1. Indian Cellular Association (ICA) is the apex body of the mobile industry comprising of Brand Owners; Technology Providers; Manufacturers; National Distributors; Application, Solution and VAS Providers; and Ethical Retailers.
2. The association has been constituted to provide value and service to the mobile cellular handset industry in India by fuelling its growth, improving competitiveness, helping create a legal and ethical market and regulatory environment, thereby providing long-term benefits of mobile connectivity to the Indian masses.
3. The Association is headed by its National President, Mr. Pankaj Mohindroo, who presides over the association's objectives of ensuring the development of the mobile cellular handset industry in India.

❒ 2.6 BUSINESS MODELS AND RISKS

1. Outsourcing
    (i) Managed services
    (ii) Managed capacity
2. Passive infra sharing
    (i) Indus towers
    (ii) American towers
    (iii) VIOM
3. Quasi and direct MVNO
    (i) Virgin mobile
    (ii) T24 offers
4. Devices ecosystem
    (i) Contract-bundled phones with services
    (ii) Operators embracing devices ecosystem
    (iii) OEMS and operators launching white-labelled tablets
    (iv) Pushing dongles sales
5. Business integration
    (i) Exclusive stores for complete company offers
        (a) Airtel sells telecoms and DTH from same store
        (b) Reliance stores sell multiple ADA group solutions
        (c) Reliance Digital retails RIL and multi-brand products
6. MNP implicating the need for better QoS to avoid the threat of high ARPU customers churn
7. M2M
    (i) AMR
    (ii) M-health
    (iii) Education initiatives
8. Rural reach
    (i) Low cost solutions being deployed for rural coverage; incremental subs will come only from rural markets

9. CDMA for data and GSM for voice
10. Active infra and spectrum sharing on wish list
11. Spectrum-availability-led strategy (700 MHz? Refarming? When and how much?)

End Notes

Indian operators firmly believe that MoU and ARPU increase is a fundamental reason proportional to the quality of consumers. Both the incumbents and challengers are focused on customer quality, while the former wants to protect the base and latter wants to make it churn.

Customer life cycle management – acquisition, retention and development – are key to sustaining and enhancing ARPU and hence, revenue for telecom operators. Minimising churn is essential to retain higher paying customers. Upselling, cross selling and channel integration will lead the way forward in strategic telecom business management.

With smartphone sales being now close to 25% of overall volume of handsets sold in India, the user interface prompts consumers to use more telecom services and provide higher revenue.

Globally the telecom industry is in the midst of a transformational shift, driven by a huge surge in data traffic on telecom networks. However, Indian telecom landscape is still trying to crack the maze of data adoption. This needs not just strategic thinking but also strategic and tactical thinkers. The new age of telecom professionals need to penetrate the industry fast so as to change the ways we have positioned the next level of telecom services for consumers.

Various global and Indian regulatory bodies are working on synergies and standardisation of technologies. However, India's say on the global forum is very limited.

Descriptive Questions

1. What factors are affecting rise of ARPU in India?
2. Explain the reasons of ARPU rising for Indian Telecom Operators.
3. Do a SWOT of key telecom operators in India.
4. Explain customer life cycle process with regard to acquisition, retention and development.
5. Differentiate between customer-triggered and operator-triggered churn.
6. Write a note on international and Indian regulatory bodies influencing telecom sector.
7. Explain the business models and risks involved in Indian telecom.

CHAPTER 3

DATA'S PARTICIPATION IN INDIA'S FUTURE

Learning Objectives

After completion of this chapter, the students will have a good overview of the Indian telecom sector with regard to:

- Significant importance of data services for India's future
- Mediums of application distribution
- Impact of value-added services (VAS) on rural India
- Use cases of selling data services
- VAS ecosystems and business models
- VAS implementation at operator end and developer end
- Challenges to overcome

❒ 3.1 INTRODUCTION

Data services, more popularly known as mobile value-added services (MVAS), have assumed significant importance in recent times due to the rapid growth in wireless subscriber base. They have enhanced the utility of mobile phone as a powerful medium to deliver information viz. News, Entertainment, Advertisement, Music, Games, Commerce, Education and Health. Simultaneously, they help the service providers in generating new revenue streams as also the consumers in receiving the benefits of personalised applications.

The biggest challenge confronting our corporate and country perhaps is maintaining sustainability—economic, social and environmental—in ways that contribute to developmental growth. At the same time, this is a unique opportunity to realign with forces that are shaping our future, especially digital technology that has the ability to empower people, even in remote corners of our country.

Digital inclusion has the ability to take the trajectory of high growth to one and all and sculpt the future for equitable development. The objective is to identify key elements and parameters that could facilitate an optimum ecosystem to support entrepreneurship. Mobiles today have begun to replace roads in our country. While we build the basic amenities and physical infrastructure in our country, we have a huge opportunity to strengthen and leverage the digital infrastructure being built in our country. There is immense scope to develop utility MVAS services in the country that will bring M-education, M-health, M-banking, M-governance, M-agriculture and other mobile services through digital highway to all sections of our population. We hope that in the coming months, all stakeholders—MVAS providers, operators and

the government—will be able to work towards creating a sustainable and buoyant MVAS industry.

❒ 3.2 VAS GOING MAINSTREAM

Value-added services is no longer a niche matter, but it has gone mainstream in all walks of life. Almost 70% of internet users in the world access the same through their mobile devices. In a comparatively short span of time, the number of smartphone users is almost 75% of the number of OC users in the world. It is also a revealing fact that 82 minutes per day is the global average of non-voice use of mobile phones. Facebook, as we know, is the third largest population on the planet and last year 41% of Facebook's revenue was through mobile phone users.

Over 2.4 billion Internet users in the world, of which also 1.5 billion access the Internet through their mobile devices	In less than 7 years, the number of smartphone users has already crossed 1 billion as against 1.5 billion PC users
Average time spent on mobile (non-voice) globally has already grown to 82 minutes per day	Facebook has crossed a billion monthly active users, of which over 819 million access it through a mobile device *41% of Facebook's revenues came from mobile in Q2 2013*

As the telecom industry sees a rapid decline in voice tariffs, it is looking at services beyond standard voice calls, or MVAS, to propel it to the next level of growth. With mobile penetration expected to go up to nearly 100% by 2015, and the advent of 3G, MVAS revenues are expected to grow to approximately ₹48,000 crores. The industry is looking at various means to use MVAS as a growth driver and simultaneously as a key differentiator. While today non-voice revenues in India only account for about 10% of an operator's revenues, the global average for leading MVAS countries is far higher, pegged at approximately 23%.

M-Commerce	• Retail banking and transactions on telecom devices • Payment gateways over the mobile for online shopping
M-Health	• Use of mobile in personal health: apps for first aid, quick treatment, vital signs monitoring • Data services to create updates and alerts

M-Education	• Training and learning related content for multiple entities • Beneficiaries can be educational institutes, organisations, or self learners
M-Infotainment	• Current entertainment trends like Bollywood material delivered on the go • Information like news created with high definition experience

With the above mentioned primary themes of data services in India, the mobile applications ecosystem revolves around the content creators, distributors and finally consumers. In this whole chain, the most pertinent issue to discuss is the impact of mobile applications on rural India and the paradigm shift in distribution of VAS.

There are three pertinent mediums of applications distribution depicted as follows:

In subsequent pages, we discuss the implications of how data service providers need to break the traditional shackles and how rural Indian can benefit from a data-based revolution.

❒ 3.3 APPLICATION STORES: THE NEXT DATA DISTRIBUTION MEDIUM

It is an applications world. Almost 3,00,000 applications have been downloaded 10.6 billion times.

There are enough games and entertainment applications which will only be used till the time one gets tired. Now consider the diverse situation that there are only 50 physicians per 1,00,000 Indians. This gap in providing medical services is what applications have to address.

Applications through stores like Google play, iOS will become the next level distribution medium where there will be applications helping someone in need to locate a doctor and medicines available in the local market. There will also be awareness amongst users to utilise applications which will help in giving first aid.

1. **VAS companies will either be development, content, or technology providers or a mix:**
   Mobility companies will have to move on from dependence on telecom operators to direct to customers. VAS companies should treat telecom operators, original equipment manufacturers and enterprise as just another medium of content delivery connecting to people.

   The only precaution to be taken is the choice of a wise business model.

2. **VAS companies have to break the telecom operators' barrier and transform:** More than A (astrology), B (Bollywood), C (cricket), D (devotional), VAS is now emerging and evolving with D (doctor), E (education), F (fun), G (governance), S (social) and P (people). The ABCD of VAS has taken a future turn. Interestingly, a VAS company was earlier defined as one which acts as back-end service provider to a telecom operator or uses telecom companies for distribution of its software and services.

   It is now high time that the vision and definition of VAS companies is redefined. These companies should break the barrier of operating through telecom service providers and choose independent distribution model.

3. **Devices OEM now being a distribution channel for VAS:** The present evolution eventually highlights ecosystem evolution of devices OEM now being a distribution channel for VAS.

   The trend is changing thereby VAS companies are integrating their services with leading devise sellers for applications in the field of health care, banking, insurance and emergency services.

The industry statistics suggest that 89% of smartphone owners use the device all day long and 84% of them use the smartphone for internet browsing. The opportunity lies in the fact that smartphone penetration in India is less than 20% of the total devises zone. It is up to one's imagination on how the rural landscape can change when most of India's population has a smartphone available. This imperatively suggests that the application provider should target the right solutions and people along with the distribution medium. The organisations will still be able to generate huge demand, revenue and health profits by thinking people and not revenue.

The VAS companies should design services and propositions for people and not for telecom operators, device manufacturers or organisations. All the above are distribution mechanism and not the target audience for consumption of services. As of now the trend is about conceptualising services, assuming how much revenue it will make via telecom operator and other channels.

The products are not being created and marketed based upon how much value they add to people. The VAS organisations have to think about addition tangible (including social) value to people.

The VAS companies will have to become a Brand and connect with relevant people directly. Internationally the gaming fraternity is aware of VAS companies like Rovio, Jump Start, EA who have created one of the best gaming experiences on mobile applications.

However, in India there is very little awareness on the names and brands of VAS companies. In this new consumer world order, VAS companies will have to become a brand and reach consumer directly.

❒ 3.4 DO WE REALLY UNDERSTAND RURAL INDIA? HOW CAN VAS IMPACT HERE?

It is well known that 70% of India lives in rural geography. There is so much data captured by satellite which is relevant for rural users. The solutions are unlimited and very relevant for the community. Do the VAS applications give rain forecasts, flash

updates on water tables going up and down to inform the farmer about which crop to sow and invest in?

The new evolution of VAS provider can solve a lot of real-life problems. However, the question they ask is whether VAS can provide mobility solutions and be an important medium for progress and development of rural India.

While urban India has multiple resources to choose VAS services from, however, rural India is awaiting the evolution of data services which will have an immense impact on the life, time, money and efforts of the population residing there.

3.4.1 A Medium to Connect at Large

Almost 21% of India's population uses smokeless tobacco (gutka, tobacco-based paan masala) and VAS companies can choose to address this social issue. Will VAS mobility become a better medium to connect with people and drive relevant messages? This is one major area where VAS can make an impact.

3.4.2 Pure Drinking Water

Around 38 million Indians are affected annually by diseases that are water borne. In fact it is estimated that 1.5 million children in India die of diarrhea alone annually.

In terms of working population, around 75 million working days are lost because of people falling ill due to contaminated water.

This results in an annual economic burden estimated to be around $ 600–700 million every year. Will VAS mobility help in avoiding such diseases affecting people? Can there be such an application that can send messages and alerts on safe drinking water?

3.4.3 A Solution for Local Business

Other than agriculture, rural India is also the place where the best handcrafts are made. These cottage industries have artisans to create beautiful products. However, they get very little return for their investment. There can be an application which can help the cottage industry by-pass intermediaries and connect them directly to consumers. VAS mobility can help cottage industries to promote the products, showcase the products and maybe conduct e-commerce through a website. Such mobility applications can help peasants reach the local market or maybe the nearest town. They can also be connected to the logistics chains of big companies.

3.4.4 Back to School

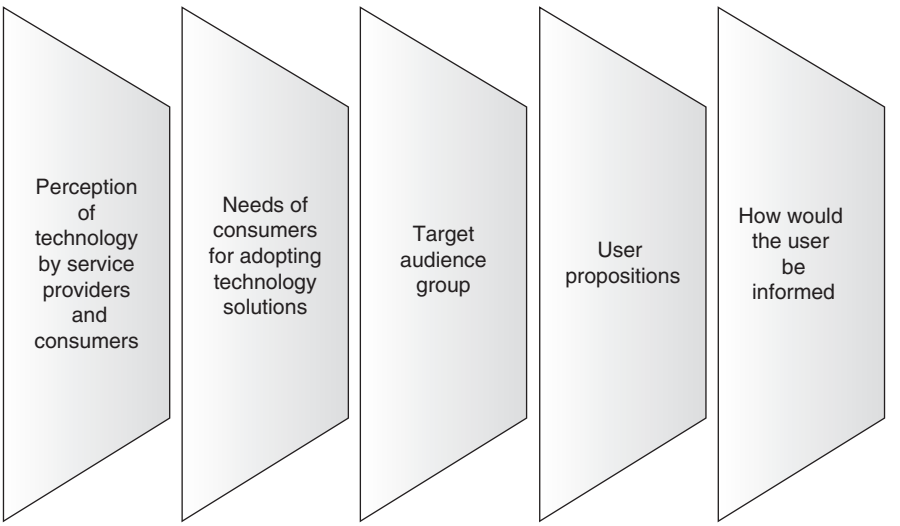
General statistics show that only 15% of Indian students reach high school and only 7% of the 15% complete it. As stated earlier, there are only 50 physicians per 1,00,000 Indians. Will mobile applications and services help someone become a doctor?

Can VAS mobility help educate hungry people solve problems in mathematics and will these solutions also help them read books online which they cannot afford?

There are huge possibilities for getting the right telecom services in front of people and yet remain profitable. All that is required by VAS and telecom is to move on from the regular crowded market and think people, think value creation for them through VAS.

❒ 3.5 TECHNOLOGY AND SERVICES IN INDIA—THE NEXT STEP

In the successive sections we will discuss and highlight the following elements:



Service providers have spent almost ₹1,00,000 crores to gain 3G and BWA spectrum. The business case was based on the fact that the broadband mobile services will be the next killer product for the Indian telecom space. However, the consumer considered it to be just another service launch by many mobile operators. It was imperative for the service providers to understand the consumer perception and then position the product and services according to the need of the market.

The operators also thought that the Indian consumer will be fascinated by the speed of data transfer that the services may offer and that data is the buzz word of future. The operators must think of services more than speed and data.

Almost 85% of Indian population doesn't worry about speed, since they don't have even basic internet access. Broadband users still constitute a negligible proportion of the Indian population. Unless the masses experience internet, speed is an immaterial parameter. To create the right hook, telecom business management needs to address how the rest of the population will know what internet is all about. Imperatively services are more important than the delivery mechanism. From a business management perspective, the telecom ecosystem needs to shut services and not 3G.

People will always bother about telephone connections and not about how it is wired. Anything other than services that meet the primary needs of consumer, are secondary. The 3G adoption will have an uptake if one understands what the primary needs of consumers are for data services.

One shoe will not fit all, implying that one data plan for all will take the services nowhere. Hence, wireless broadband needs customisation in the services they offered to the market.

Corporate customers who use data services are important but they remain stationary. However, they will still remain the best users of data services. In order to

penetrate data services to the masses, wireless service providers will have to capture non-traditional service hubs for providing data on the move.

Some of the non-traditional data services hubs can be:

1. Enabling food courts on 3G Wifi
2. Enabling malls with 3G experience
3. Capturing resident welfare associations with data services
4. Capturing city users by giving them experience of a lifetime

❒ 3.6 USE CASES OF SELLING DATA SERVICES

3.6.1 Products + Services

Sell the use case of books/primary education application as a product to be bundled with 3G services. Get more such products bundled with 3G. People will buy such combination rather than only connectivity services.

3.6.2 Marry Data and Phone

Don't oversell the data plan/activation. Let customer choose the right opportunity to start data usage. The customer should not be knocking on the service providers' door to know when to activate.

Data penetration will only increase if it is pre-activated with phone in spite of people using it or not using it. Sell services like internet banking along with the banks.

3.6.3 Educate on Internet and Email

According to Indian statistics millions of postcards and letters are managed every year which could be little less today. Operators must help people know the significance of email and other internet-led services unless the consumer understands that they will not appreciate data services, and for that matter 3G. Telecom ecosystem needs to educate people, organise sessions, if needed they need to tie up with schools, colleges, and NGOs for driving the messages about the importance of internet and email.

3.6.4 Special Price Plan for Students

There are millions of students enrolling for higher education each year. This number will multiply exponentially if open schools and distance learning is also included. Service companies need to enable and optimise data services and 3G connections for the student community.

3.6.5 Special Plan for Family

India has one of the largest households base in the world and they call for a special data plan which fixes their budget and income level. Operators providing wireless data services need to make services plans for households.

3.6.6 Address Data Connection Needs of Women

India has women population of 600 million (almost 50% of total population). Yet, how many data connection are sold to them? Wireless service providers need to have a separate set of product propositions for women and their needs. If required, the operators must launch a special phones/tablets bundled with women-centric data application.

❒ 3.7 ECOSYSTEM MATTER

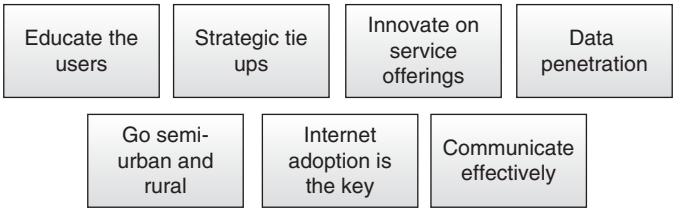
Service providers will have to tie up with other telecom ecosystem partners like device manufacturers, government bodies and other associations which can drive the connectivity to the last mile.

Strategic tie ups and associations especially with device manufactures will be extremely important because the capability of devices and data speeds of networks will be interdependent.

The game of data penetration will be played in small towns. The operators need to believe that it is an attempt for adoption of new service and it will take time. Operators should attempt to make local users like celebrities and let them connect to people to talk about new data services.

Since people buy services and not speed the operators need to use one of the following strategies to ensure people consider broadband as an indispensable part of their life.

A few critical elements based on which the consumers can be made to adopt data services include the following:

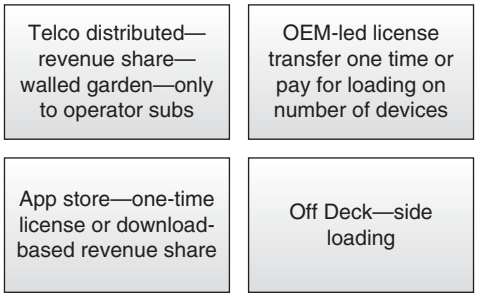


It is evident that the mobile phone, including applications supported by the mobile phone, can be a game changing way of improving access to many services. The power of the mobile phone as illustrated through multiple global case studies, and some successful examples in India, coupled with the high need for certain essential services in India make a compelling case for high involvement and investment by the government and private players to rapidly scale up VAS utility in India.

3.7.1 Business Models—On Deck and Off Deck

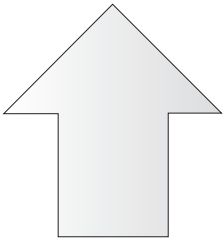
There are two types of telecom VAS business models that are popularly seen in the market place. The on deck business models include VAS distribution through telecom operators, with revenue share and a walled garden approach. This in turn leads to a case where the VAS developer can only access the subscribers to a particular operator

only. The second on deck example is OEM license based application transfer. In this, the device manufacturer and the VAS developer decide on a value of license and digital rights management fee. The third model is making applications popular through the app stores and this needs competence to create apps for multiple application stores.



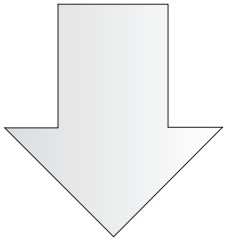
❒ 3.8 LOCATION-BASED APPLICATIONS

Location-based application (LBA) refers to applications that use knowledge of the geographical position of a mobile device, enable with internet, to provide services based on that information. The location-based utilities include multiple applications ranging from search, point of interest (PoI) services to sophisticated target marketing including Customer Relationship Management (CRM) software leverages. However, the LBA benefits come with associated dependencies as well.



Utilities

- Security
- Search
- Fleet management
- Advertising
- Social media
- Points of interest
- Rural applications
- CRM: most data services used at home, office, airports, etc.

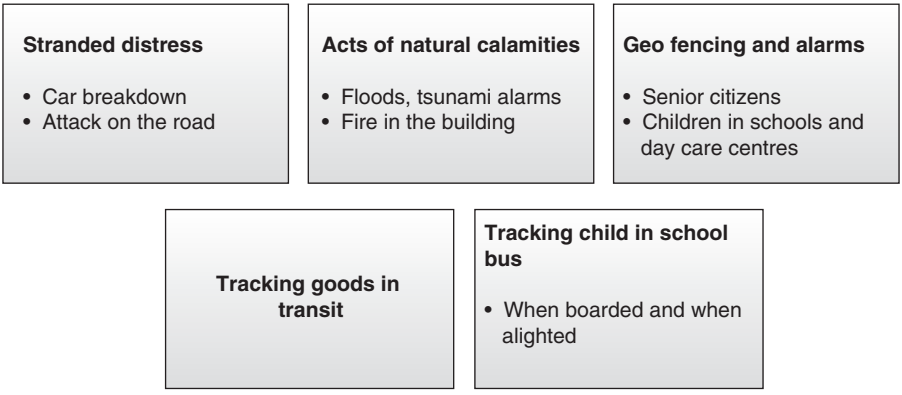


Dependencies

- Application simplicity
- User maturity
- Devices
- Network
- Accuracy
- Operating system
- User interface

First and foremost, the application has to be simple to use so that an average person can be benefited. This implies that some level of user maturity is required to make LBA popular. Next, the devices have to support Global Positioning System (GPS) as a technology without which location tagging is not possible. Then comes the most

important issue of accuracy since the success of any location-based service depends on the level of accuracy the technology can offer. Moreover, the use of services on various operating systems and a viable user interface is the other dependency.



Few use cases:

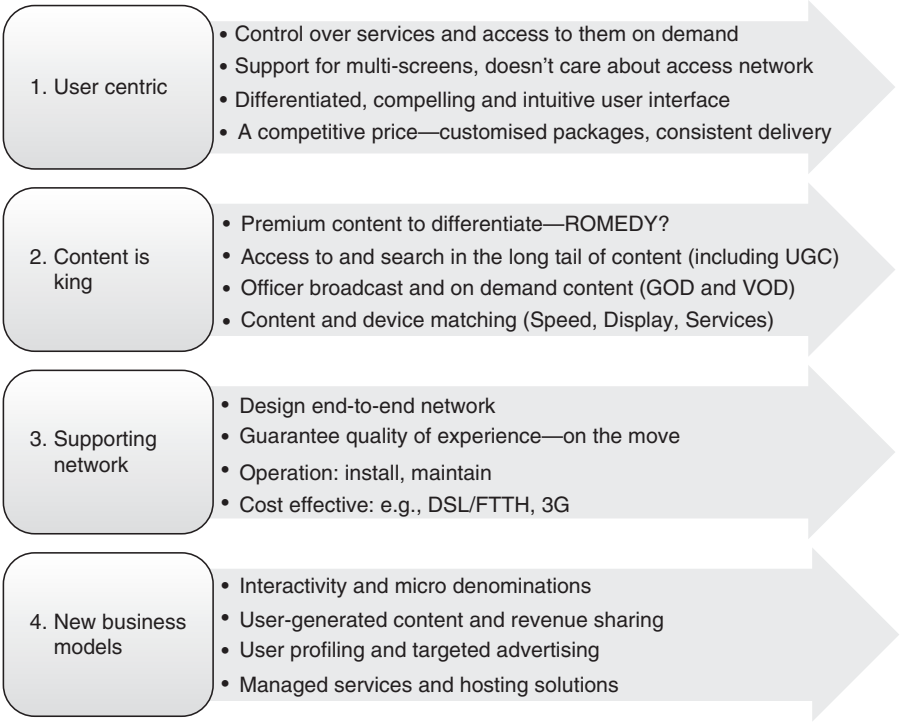
1. Navigation—users get route maps to a particular destination, real-time traffic routing that takes into account actual congestion patterns, etc.
2. Location-based advertising—advertisements of discounts or offers from a store as the user comes within the vicinity.
3. Location-based reminders—users can enter in to-do lists, whose location information is activated when the user passes by, for instance, pick up shopping or laundry, etc.
4. Family and friend finder—allows users to keep track of the location of their children, relatives or friends, with the informed consent of these subscribers.
5. Location-based search—allows users to access local services, or find even more detailed information such as listings and ratings of movies playing in theatres nearby, etc.
6. Tourist information on places of interest in vicinity
7. Field force tracking—productivity enhancement
8. Fleet management of cabs

❒ 3.9 BUSINESS MODEL INFLUENCERS

1. **Device manufacturers:** The devices need to support GPS services with accuracy in order to the service providers' ability to offer the same.
2. **Equipment vendors:** The active infrastructure vendors need to have location-based hardware and software on the go so that the time to market can be minimised.
3. **Content providers:** A service is as good as the usability and hence, the content providers need to proactively offer location-based services.

4. **Application vendors:** Content availability needs to translate into effective user interface and user experience. For the same, appropriate and adequate applications are required to be developed and ported OTT or on the devices.
5. **Payment gateways:** The location-based services need to be amortised and hence a revenue-share-based or one-time-transfer-of-application-based payment mechanisms need to be supported.
6. **Mobile network operators:** The need to believe that location-based services can be a new stream of revenue and consumer retention tool. The proposition needs to be marketed for prepaid as well as postpaid customers. The launch of location-based services needs significant investments in capex and opex, which has to be backed by return on investments.
7. **Regulatory authorities:** Location-based services come with their own regulatory issues. If one's location can be hacked, then it can become an imminent threat to the users. Location-based services need to be regulated for safety and security measures.
8. **Users:** The success or failure of a service finally depends on the adoption by users. End users awareness, viability and access to the services become important cornerstones of service delivery and use.

3.9.1 Challenges for Service Providers



3.9.2 VAS Because Revenue Per Minute Is Falling

M-Commerce (M-PESA)	Services consisting of payments, banking, and retail transactions over the mobile phone such as person to person payments, bill payments etc. Internationally, M-PESA in Kenya is a great success story where remittance services offered by Vodafone and Safaricom are being utilised by approximately 27% of the population.
M-Education (for deaf)	Services consisting of training and learning related content, both in the sphere of format education and non-formal and vocational training through mobile applications. While most companies in India are largely focused on corporate learning or providing examination alerts for major public examinations, there is tremendous scope for services such as language training (text, audio, and interactive), mobile reading, broader adult literacy and vocational training on specific subjects.
M-Governance (video and pension)	Services which involve the strategy and utilisation of all kinds of wireless and mobile technology services, applications, and devices for improving the delivery of effective government services for all citizens. In India, Bihar and Kerala are pioneers in the field of M-Governance. The Bihar Government is using an SMS based system to monitor performance of various schemes across districts. Kerala is planning to use mobile technology as an enhancement to its existing e-Governance platforms. Other governments such as Goa are also planning to deploy M-Governance services.
M-health (world vision)	Very nascent stage in India today but some of the healthcare service providers and telcos such as AIIMS, Maestros Mediline Systems, Apollo Hospitals, Aircel see a tremendous opportunity in the use of mobile applications for service delivery as powerful applications can help to increase productivity and efficiency of their staff members, and also increase their ability to reach patients. For example, an initiative being undertaken on a small scale currently is teleradiology which enables physicians to view high resolution X-Ray reports on their smart phone screems and instantly send back reports.

❒ 3.10 BRINGING VAS TO LIFE

3.10.1 Operator End

1. **Market analysis:** This deals with customer profiling (prepaid and post-paid) and the segment of operations viz. consumer, enterprise or SME. The analysis deals with available marketing, potentially addressable market and target market. It will also ascertain elements related to target segment benefits and attractiveness—customers buy benefits over others, how large is the segment and how fast it is growing—combination of primary and secondary data, who you would like to be your FIRST customer, clearly differentiated solution with value delivery unambiguously stated, does an entry in a segment facilitate lateral entry in other segments, to name a few.

2. **Business case and requirement:** This needs to evolve based on the problems and unforeseen challenges and assessment of how critical these can be. If they're related to the target market, to what extent can they be influenced? This also deals with launch coverage, investment, expected usage/subscriber base, share of net ads, share of gross ads, cumulative subscribers on VAS and revenue expectancy based on consumer life cycle.
3. **Pricing:** This can be subscription-based, utilisation-based or bundled with other services. All the models can be explored in parallel so that the initial adoption starts faster. The pricing also depends on the category in which the service is launched: infotainment-, entertainment- or utility/productivity-based applications.
4. **Service description:**
   (a) **Vendor identification:** This deals with the credentials and capability of the company and/or the team that creates the service proposition.
   (b) **Bearer analysis:** This is a very important aspect of the service delivery. It must be known as to what kind of bearer (GPRS/EDGE/3G/4G) will be the most suited to deliver the service with best-in-class consumer experience. The choice of a wrong bearer can lead to a total service failure.
5. **Sales and marketing competence development:** Once the service is ready to launch, the sales and marketing teams need to promote them to the market—existing and new consumers. Proper training for segmenting, targeting and positioning the services by sales and marketing teams is an essential element at the operator end. The launch plan will include PR, advertising, direct selling, personal selling and sales promotions.
6. **Customer service support competence development:** With the launch of service, there will always be post-sale support queries on usability, activation and tariffs. It is important to ensure that the post-sales network is adequately equipped with the right information to support customers.
7. **Reports management:** Last but not the least is the sales promotion element. If there is a revenue share agreement with application vendor, then it's important that the data matches on both sides. Data call records have to be proper in order to ensure there is no revenue leakage and financial settlements are executed effectively.

3.10.2 VAS Provider Implementation

As with the operator end, there are hectic and technology-intensive activities required at the VAS provider's end. The VAS provider needs to execute the following activities:

1. **Planning:** It depends on the market being approached by the go-to-market partner or service provider. VAS planning is a complicated multi-dimensional program that goes beyond the evolution of service platforms and service offerings. The planning must facilitate this process in terms of platforms, service innovations, operational excellence and business models.
2. **Building:** With the increase in mobile applications and VAS, the Independent Software Vendors (ISVs) are under pressure from carriers to build differentiated and cost-effective applications with lower time to market. Operators

need the applications not only to increase their ARPU but also to enhance end customer satisfaction. The VAS developers have begun to build applications with standards-based reusable software frameworks.

3. **Testing:** This is a very important component of application development life cycle. Application development is a complex process and hence the possibility of errors cannot be ruled out. Testing is aimed at evaluating an attribute or capability of application and determining that it meets its required results. It involves testing of applications across different devices, operators, network equipment, languages and locations. Due to the complexities involved in the testing process, testing companies require the support of core professionals.
4. **Acceptance:** Once the application beta is ready, the same has to be demonstrated to the distribution partner and acceptance of workability needs to be agreed
5. **Go-live:** During an off peak hour, the first office application or commercial launch is to be done. This is with the context of finding out whether the app is working well with the network or is adding undue load. Limited period go-live activity is conducted when the ongoing network traffic is minimum.
6. **Fall back:** The application is pulled back and network restored to original state for eliminating any bugs or for commercial launch across the network.
7. **Handover:** The application is made commercially available and handed over officially to the partner for go-to-market.
8. **Closure and review:** The performance of application services, adoption and user experience is monitored for an agreed period of days. Thereafter the project is closed and regular reviews for updating are undertaken.

The marketing plan at VAS developer end needs to consider the following elements:

1. **Market opportunity:** To align with the operator business case or device manufacturer business case (this is required if the VAS provider is not directly marketing the proposition to end consumers)—the urban/rural positioning, relevance of the application and demography becomes important for these business management decisions.
2. **Mobile OS to support:** This is relevant due to the investments required for creating applications to meet user requirements of android, iOS, windows OS, to name a few. The key features, benefits of use and limitations of application on each of the operating system must be known.
3. **Key result areas and roles:** There are multiple entities that will have to work together for a content go-to-market strategy. These include the application programmers (creators), the aggregator and the entire service delivery mechanism from source to destination.
4. **Real estate:** The equipment that hosts the application and links to the delivery mechanism needs space and a location that is maintenance-friendly from the perspective of accessibility.
5. **Bearer technology:** The VAS developer will make user interfaces and content based on the technology being deployed like 2G/3G/LTE—whether to use Augmented Reality or 3D interface?
6. **App language and end of life:** Each application will need a programming language and that too faces obsolescence. With the launch of application, end

of life for the software support has to be considered. This will define the upgrade path for the application.

7. **Formats of components:** This is the way the application will be viewed on multiple devices, the layout and widgets for ease of application access. The formats can be video, text or voice.
8. **Application discovery:** It is a critical aspect for ease of user access. It needs to be decided whether the application will be transferred over the air, embedded on devices or on dialer interfaces of dongles.
9. **Creation of background services:** This includes user statistics, session status and linking of billing of services.
10. **Sensor support:** The application may require sensor support like RFID and/or QR codes.
11. **DRM:** Applications must have digital rights management licenses so that there are no legal or regulatory issues once the content is launched commercially.
12. **Pre-testing:** This is required so that the application launch doesn't affect any voice services, network loading or phone compatibility. It must ensure smooth and seamless upload and download sessions.
13. **Testing fundamentals:** To include functional/usability testing, user interface testing, performance testing, device impact on battery life and application security testing.
14. **Cutover, fallback and launch:** In a low peak-hour phase, the application is launched, network cutover happens and the app is tested. Subsequently a fall back is to execute to test the network load and then finally the application is commercially launched.

❒ 3.11 CHALLENGES TO OVERCOME

1. VAS players don't promote themselves as a brand—lack of recognition and promotion:

    1. Lack of consumer awareness about the manufacturer of content (MoC)
    2. Lack of a platform for MVAS companies to raise marketing awareness
    3. Inadequate regulatory framework or guidelines
    4. Lack of industry cohesion and consortium for larger interest, which needs to be based on market research

2. Inadequate infrastructure in semi-urban and rural areas:

    1. Lack of sufficient network infrastructure/connectivity
    2. Lack of sufficient cell phone/smartphone penetration

3. Lack of micropayments infrastructure:

VAS for rural can be a blessing. However, the payments system is not evolved to the last mile. Limited micro-payment infrastructure discourages an operator disintermediated model, which can support rapid scaling of operations for independent VAS providers.

4. Revenue share issues between content manufacturer and distributor:

The operators take inequitable revenue share due to their costs incurred for promoting the service, deploying ownership of relationship with the subscriber, billing and collections, and associated risks of loss/lack of service acceptance. In most cases, operators retain 70–80% of revenues generated by data applications. This makes it difficult for the content provider to grow or invest in marketing, new services development and innovation.

5. Lack of transparency between Telcos and content providers:
The usage and billing data of operators and content manufacturers sees quite a variation. On top of it, since the data services sometimes lack operator priority, there is a delay of operators to share usage and billing data with content providers. Such issues lead to lack of reconciliation and hence trust gets questioned between the partners.

3.11.1 Operational Challenges

While deploying data services that can be of utility, multiple operational challenges are faced such as the following:

1. Lack of market research on part of content provider and content distributors to ensure relevance of service based on consumer needs
2. Product pricing and recovery issues
3. Lack of visibility of right partners to build a strong ecosystem
4. Lack of consumer awareness—there are no marketing initiatives done by content manufacturers
5. Funding: need to make significant investments with long gestation period
6. Incremental setup costs: Interoperability of applications is required across operating systems and handsets.

The government, including the various relevant government departments, can give further direction to the industry by examining competing development needs and prioritising critical areas for potential Utility MVAS, setting aside funds for the various services and potentially playing an active role in the dissemination/facilitation of such services. The right cues from the government and regulators is expected to facilitate the gradual maturity of the ecosystem to a sustainable, high-equilibrium state resulting in a win-win situation for the consumers, private players and the government.

End Notes

Digital inclusion has the ability to take the trajectory of high growth to one and all, and sculpt the future for equitable development. The objective is to identify key elements and parameters that could facilitate an optimum ecosystem to support entrepreneurship. Mobiles today have begun to replace roads in our country. While we build the basic amenities and physical infrastructure in our country, we

have a huge opportunity to strengthen and leverage the digital infrastructure being built in our country.

As the telecom industry sees a rapid decline in voice tariffs, it is looking at services beyond standard voice calls, or MVAS, to propel it to the next level of growth. Value-added services are no longer a niche matter, but have gone mainstream in all walks of life. Almost 70% of Internet users in the world access the same through their mobile devices.

Applications through stores like Google play and iOS will become the next level of distribution medium, where there will be applications helping someone in need to locate a doctor and medicines available in the local market. Mobility companies will have to move on from dependence on telecom operators to direct to customers. VAS companies should treat telecom operators, original equipment manufacturers and enterprise as just another medium of content delivery connecting to people.

The operators also thought that the Indian consumer will be fascinated by the speed of data transfer that the services may offer and that data is the buzz word of future. The operators must think of services more than speed and data.

Service providers will have to tie-up with other telecom ecosystem partners like device manufacturers, government bodies and other associations which can drive the connectivity to the last mile.

Strategic tie-ups and associations especially with device manufactures will be extremely important because the capability of devices and data speeds of networks will be interdependent.

Descriptive Questions

1. Explain the three pertinent mediums of applications distribution with their benefits and challenges.
2. Write a note on M-health, M-education, M-commerce and M-infotainment.
3. How can VAS/data services have an impact on rural India?
4. Describe the various uses of selling data services in India.
5. Explain the activities at operator end to launch VAS services. Compare the same with activities at VAS provider's end.
6. What are the challenges and opportunities to provide data services in India?

INDIAN MOBILE PHONE SECTOR

CHAPTER 4

Learning Objectives

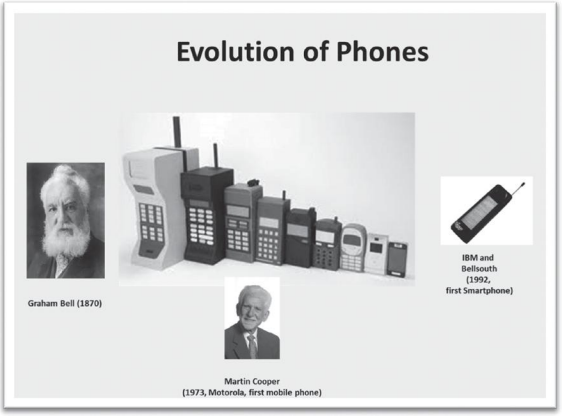
After completion of this chapter, the students will have a good overview of the Indian telecom sector with regard to:

- Revolution of mobile phones and unconventional uses
- Multi-screen convergence and operating systems
- Various categories of mobile phones and consumer segmentation
- Consumer purchase categories
- Purchase drivers
- Various distribution models and sales outlets
- Modes of promotions

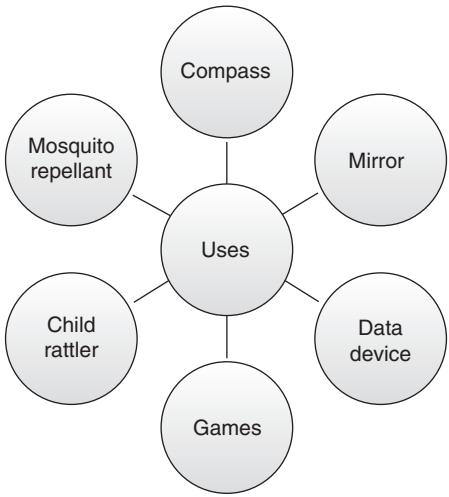
❒ 4.1 INTRODUCTION

If one would go back 20 years, someone's last will read '……..... and my position in the waiting list for the fixed telephone connection goes to my grandson'. This was the desperation and the long waiting years that people had to undergo two decades ago. However, this was set to change.

Alexander Graham Bell invented the phone in 1870 and the next revolution was in 1973, when Martin Cooper of Motorola created the first mobile phone. This was followed by IBM and Bellsouth announcing the first smartphone in 1992.



As an evolution, mobile phone is being used for unconventional applications. Few of them are depicted as follows:



In India, almost 250 million phones are sold every year. Of which around 30–40 million are smartphones and rest being feature phones. However, the average year-over-year growth in smartphones is around 40–50%, whereas in feature phones its 15–20%. In terms of volume, Samsung is the market leader in India followed by Micromax.

The overall average selling price of mobile phones is close to ₹4,000, feature phones average selling price is ₹2,500 approximately and average selling price of smartphones is around ₹11,000 to ₹12,000.

❒ 4.2 MULTI-SCREEN CONVERGENCE

It is no longer about just the phones. Devices ecosystem in telecom is converging across multiple screens. This convergence is setting one vendor apart from another.

	PC	**Smartphone**	**Tablet**	**Smart TV**
Apple	MAC	iPhone	iPad	Apple TV
Google	Chrome	Android Phone	Android Tab	Google TV
Microsoft	Windows Office	Windows Phone	Windows 8	XBOX

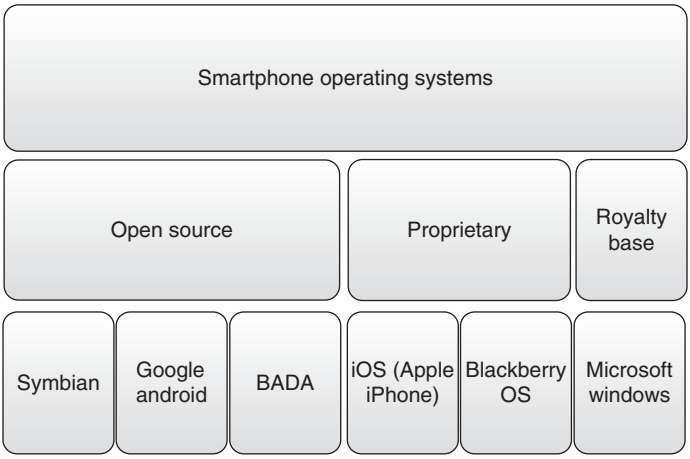
Samsung, LG and Sony have a competitive edge since they are able to provide a ubiquitous experience across multiple screens.

❒ 4.3 OPERATING SYSTEMS

Operating systems are more relevant from smartphone's perspective. This is due to multi-tasking requirements and convenience (User Interface) to be provided to end users.

An operating system is the basic underlying software which facilitates the use of features and applications. Smartphones are said to have High Level Operating System (HLOS), in which advanced data services can be used on the mobile phones.

As per industry considerations, operating systems are considered in the following categories:



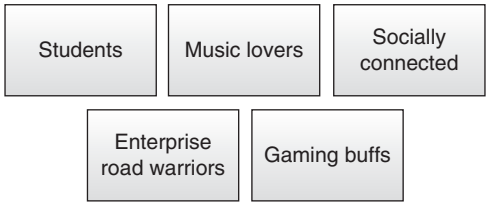
Mobile phones are categorised based upon the price range and the features base support. The various categories of mobile phones are as follows:

Ultra Low Cost Mobile Handsets (ULCMH)	Price range less than ₹1,500 Key features include B&W/colour screen, messaging and Phone Book
Low to Medium Cost Mobile Handsets (LCMH)	Price range ₹1,500 to ₹2,500 Key features includes colour screen, FM radio and VGA camera
High Cost Mobile Handsets (HCMH)	Price range ₹2,500 to ₹4,000 Key features inlcudes GPRS/EDGE, expandable memory, MP3 player and digital camera (Megapixel camera)
Smartphones	Price range greater than ₹4,000 Key features include HLOS, QWERTY keypad/touchscreen, applications installation, WiFi and 3G

Based on the consumer needs and profile, the choice of channel and products is made by companies. Consumer behaviour is undergoing an abrupt change with wireless broadband. The new consumer target group is between 12 years and 35 years. The generation is changing from television generation to mobile and internet generation as depicted here:

The TV Generation	The Mobile Net Generation
Switch off	Switch on
One-way communication	Two-way communication
Mono-culture	Multi-culture
Integrated	Fragmented

There are different kinds of users of mobile phones, especially those who are in need of data connections. A couple of them are as follows:



Students: Majority prepaid consumers but willing to spend money on the latest devices. They operate in circles of comparison and influence, thereby wanting to carry the latest gadget with them. Most students have started opting for part-time jobs while studying. This money comes handy for their telecom devices and services purchase.

Music Lovers: Look for products with higher storage and memory expansion capabilities. Their mobile is their music station. Such people are well aware of the audio capability of devices. For example, the Walkman-branded phones survived for long due to their perceived better output for music and also the features like track ID and graphic equalisers.

Socially Connected: This category moves across all ages and genres. Here, the urge is to find phones that have good data speeds and can upload/download user-generated content. The people who like to be professionally socially connected look for large screen phones to use services like Linkedin, others may look for Facebook et al.

Enterprise Road Warriors: These are the corporate people who need devices on the move. The enterprise road warriors need to be in touch with work irrespective of their location. Such people look for rugged devices, best in class, in order to have the best fit of aesthetics and performance. Bring Your Own Devices (BYOD) and Company Owned and Company Paid (COCP) devices are both popular in this category. However, if the corporate has included proprietary software in the phone, then BYOD doesn't work. Enterprise road warriors have a higher device replacement rate and are an attractive category to devices manufacturers.

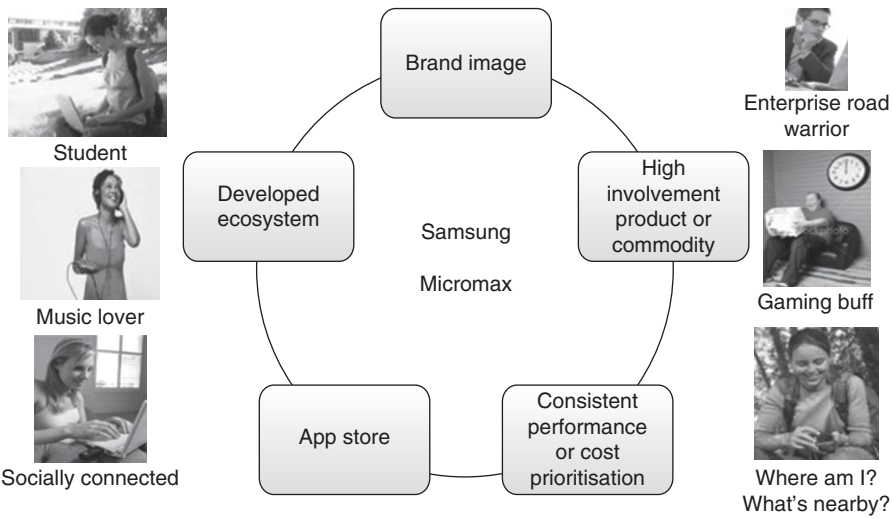
Gaming Buffs: It is evident that the age of use of mobile and internet has shrunk to almost 8 years now. This implies that an 8–9-year-old child is able to handle gadgets effectively and efficiently. A child of age 10–12 normally has a mobile phone. This age

is very enthused by gaming and mobile phones are replacing the traditional handheld gaming equipment. The dual core/octa core phones most probably will be done justice to when high profile and 3D gaming gets supported on devices by networks and play stores.

Apart from the categories mentioned above, there are 'Voice Only' customers who buy high-profile phones for the love of the brand or to just be socially accepted in a particular peoples' network.

❒ 4.4 DRIVERS OF MOBILE PHONE PURCHASE

For the variety of users as mentioned earlier, one or more of the following drivers motivate them for purchase of a particular product:



Drivers to buy a phone

1. **Brand image:** There are users who are influenced by particular brand/brands and are willing to look at product pricing based upon the choice of brand. These people are early adopters and may not specifically be utilitarian. They take pride in a particular brand of phone which they own. These people follow the trends and will shift brands based on the immediate popularity of one over the other.
2. **High-involvement product:** This is a driver for consumers who take time for making comparisons and will choose the one best suited to their needs. They may or may not be highly brand conscious. Mobile phones become high-involvement product for consumers who have higher productivity of other dependencies on the product. This implies that their work or life is critically dependent on the mobile devices e.g. doctors, enterprise people and so on.
3. **Trade-off:** This is a purchase driver for consumers with a 'Budget First' approach. These users would evaluate trade-off between consistent performance or cost prioritisation and then make a purchase decision. These

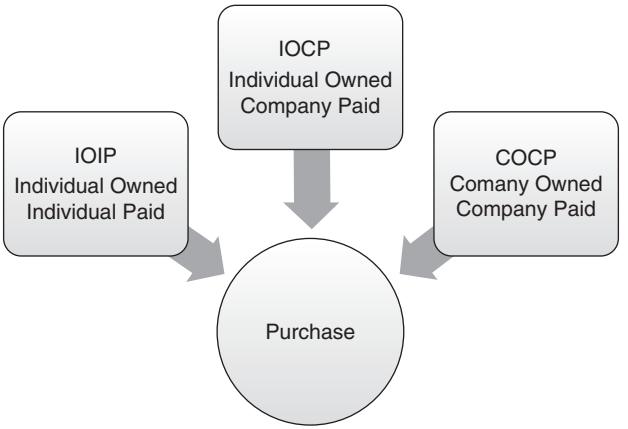
consumers are consciously asking questions on self about how much premium to pay for brand if one product of a multinational brand and other of a lesser known brand have a price difference of more than 20–30%. They may trade-off certain features in the phone at the expense of getting a better deal for price.

4. **Applications store:** In today's world, the application stores (Google Pay, Apple Store and likes of these) are strong influencers as driver to buy a mobile. People may choose the handset (based on the operating system), depending on how many applications are available on the app store. Although all app stores will support the applications required by the consumers, however while searching for alternatives and making a purchase decision, people would consider operating systems with largest number of applications, even though they may never use them. It is estimated that only 30,000 applications are used/downloaded by billions of mobile users; however, we still aspire for lakhs of applications to be made available on application stores.
5. **Develop ecosystem:** The traditional consumer purchase cycle use to start with problem re-organisation and reaches a logical conclusion with procurement. After the same, post-purchase behaviour kicks in, which can influence repeat purchase. Hence, the new consumer purchase cycle ends with post-purchase behaviour. This implies that the consumer considers a holistic and developed ecosystem, including after-sales support while choosing a mobile phone for purchase. This ecosystem evaluation happens by means of reviews, opinions and blogs written by consumers and some Subject Matter Experts (SMEs) who would be considered an authority when it comes to evaluating a mobile phone and its ecosystem, for a purchase consideration.

❒ 4.5 CONSUMER PURCHASE CATEGORIES

The companies (OEMs) want to make devices that fit the utility and pocket or all kinds of consumers. However, it is important to understand the consumer purchase categories. This helps in understanding choices of point of purchase (POP) and average selling price (ASP) commanded by the product and hence, the right marketing mix can be applied for the target consumer purchase category. During the feature phones era, the device choices were limited and so were the content/applications; however, the advent of smartphones has made the phone to be an integral part of one's personal as well as professional life. This has started to dictate a dissection of consumer purchase categories as mentioned subsequently.

1. **Individual Owned Individual Paid (IOIP):** This category implies that the consumer decides upon the product himself, pays for the product from own pocket and is the final owner.
2. **Individual Owned Company Paid (IOCP):** In this category, the employer funds the mobile phone of the employee. The product is owned by the individual.
3. **Company Owned Company Paid (COCP):** This is a purchase category where company purchases mobile phones and, based on discretion, gives to employees. In the event of employee leaving the company, he/she has to return

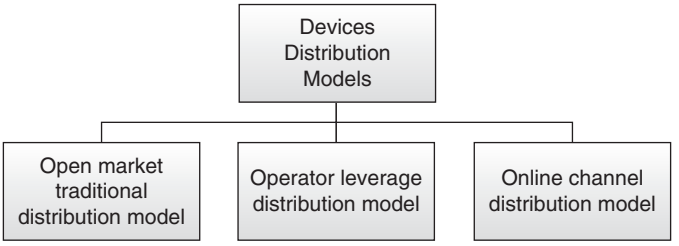


COCP lost sheen but gaining ground again due to customisations required for enterprises

the phone back. This category is gaining ground again due to customisation required for enterprise (some companies may want proprietary software to be loaded on the phones).

❒ 4.6 DISTRIBUTION MODELS OF TELECOM DEVICES

Distribution models are undergoing an evolution due to the variety of products available and changing consumer behaviour. The following are the popular and prevalent distribution models:



4.6.1 Open Market Traditional Distribution Model

Handset manufactures sell devices through distributors and then retailers in this distribution model. The handsets OEMs leverage this model by having strategic partnerships and alliances with large distributors. This distribution model is highly depending upon the width and depth of market reach. Here the battle is for reaching to the maximum number of sales counters.

4.6.2 Operator Leverage Distribution Model

In this model, mobile phones are sold to service providers' shops and 'Locked' for services of these providers. There are two methods to lock consumers to service providers.

Source: http://techwhack.co/52gb-memory-sony-india-deceptive-advertising-xperia-tipo-smartphone-india/

1. Hard locking: Devices are programmed to work only for selected operators (traditional CDMA devices)
2. Soft locking: The tariff package helps operators to retain customers for a long period of time, for instance, 1 GB download free per month for 3 months.

4.6.3 Online Channel Distribution Model

Products are advertised, sold online and door-delivered to households. In this model, exclusive launches are possible with special offers and cross subsidy. Here there can be various ways to influence consumer through M-commerce. M-commerce is not only a website; there is an entire ecosystem that needs to be created to sell products (mobile phones) on the internet.

Source: http://couponzclub.com/moto-g-mobile-phone-with-100-cashback-flipkart-e-gift-vouchers/

The online sellers of phones tend to influence users with social media, blogs and reviews. They go a step ahead to provide cross subsidy and bundling (Bluetooth free with phone). These websites can be accessed on laptops, tablets and mobile phones,

thus making the accessibility agnostic to the type of screen being used. The exclusives have become a new trend whereby Xiaomi and Moto products sell exclusively on one company website as compared to the other. The customer care and payment mechanisms are already set in place, with best-in-class sales execution and delivery/reverse logistics ecosystem.

Online selling is agnostic to place and directly reaches the consumer. In time to come, this channel is set for unprecedented growth.

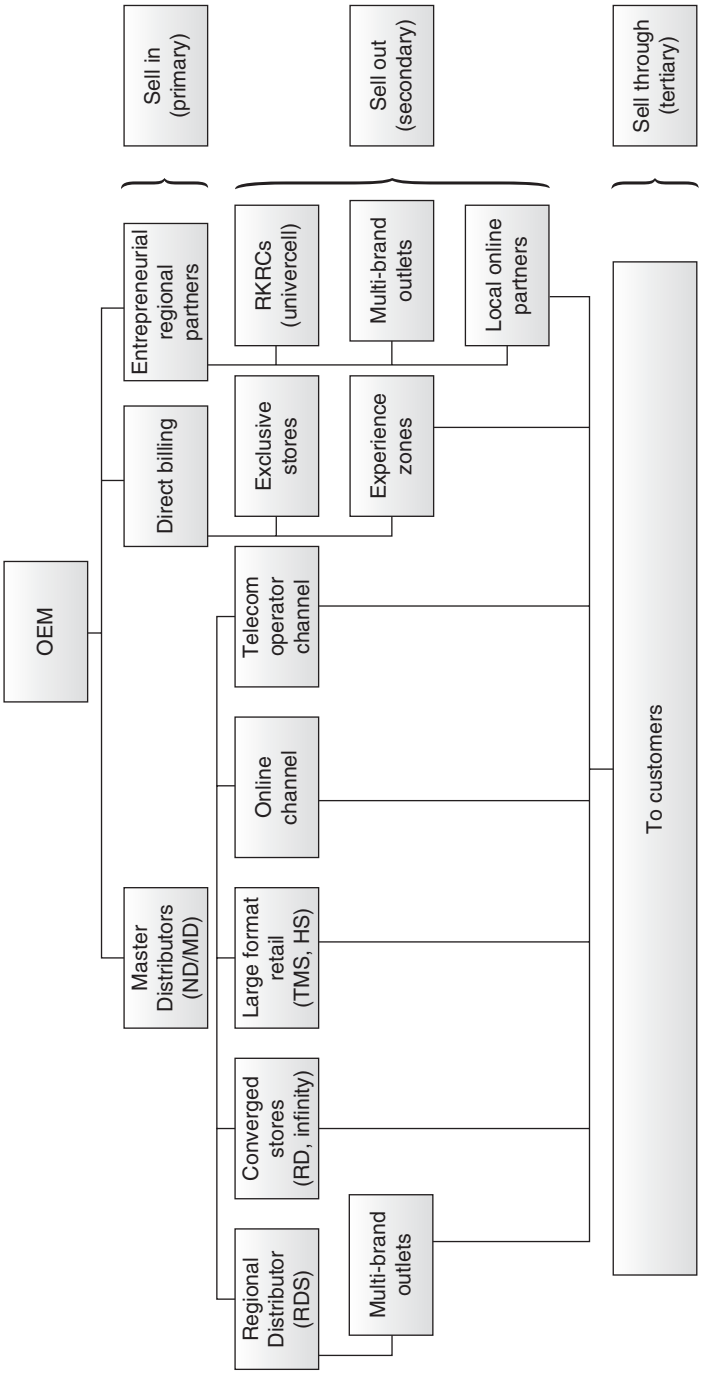
❒ 4.7 ROUTE TO MARKET

Route to market is the supply chain process of making device available in the hands of the consumer. There are three different ways adopted by the OEM to distribute products for sell.

The following are the first points of modes of distribution:

1. Master/National distributor/s
2. Direct distribution and billing
3. Entrepreneurial regional partners

Let us examine the route to market (RTM) structure of the above three methods.


OEM
Master Distributors (ND/MD)
Regional Distributor (RDS)
Multi-brand outlets
Converged stores (RD, infinity)
Large format retail (TMS, HS)
Online channel
Telecom operator channel
Direct billing
Exclusive stores
Experience zones
Entrepreneurial regional partners
RKRCs (univercell)
Multi-brand outlets
Local online partners
To customers
Sell in (primary)
Sell out (secondary)
Sell through (tertiary)

4.7.1 Master/National Distributor/s (MD/ND)

The MD/ND are billed the material, they clear it from customs, warehouse it, shrink wrap and keep the boxes ready for shipment. From the MD/ND, the material is distributed to the following five entities:

1. Regional Distributors (RD)—From the RD, the material moves to multi-brand outlets (MBO's), also called as Mom & Pop stores
2. Converged stores (Reliance Digital, Cromaetc)
3. Large Format Retail (LFR) (the mobile store, hotspot)
4. Online channel (Flipcart, Amazon, etc.)
5. Telecom operator channel (Vodafone store, Airtel store, etc.)

4.7.2 Direct Distribution and Billing

OEM's who have their exclusive stores and experience zones prefer to bill them directly and place the material for sale. Direct distribution and billing is also practiced in some cases for large format retail and converge stores, where the volume is substantial and terms of business are conducing.

4.7.3 Entrepreneurial Regional Partner

These are large distributors especially active in South India. They are responsible for distribution to the following concerns:

1. Regional Key Retail Chains (RKRCs) (Univercell, Sangeetha)
2. Multi-brand outlets
3. Local online partners

At high level, the route to markets dynamics is mentioned above. There are three parameters based on which business outcome is measured. They are as follows:

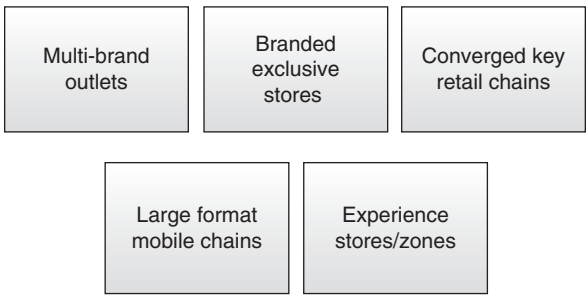
Sell in (primary sales): This is the billing done from the OEM to MD/ND, direct distribution, and billing partners and entrepreneurial regional partners.

Sell out (secondary sales): This is the billing form the first distribution layer to the second distribution layer.

Sell through (tertiary): Sell through is the billing done to the end consumer or customer. This is a very critical parameter which will define channel stop. This also has a direct impact on Sell in and Sell out.

❒ 4.8 TYPES OF MOBILE DEVICE OUTLETS

Predominantly there are five types of outlets through which telecom devices are sold.



Each of these stores are depicted as follows:

Multi-brand outlets

Branded exclusive store

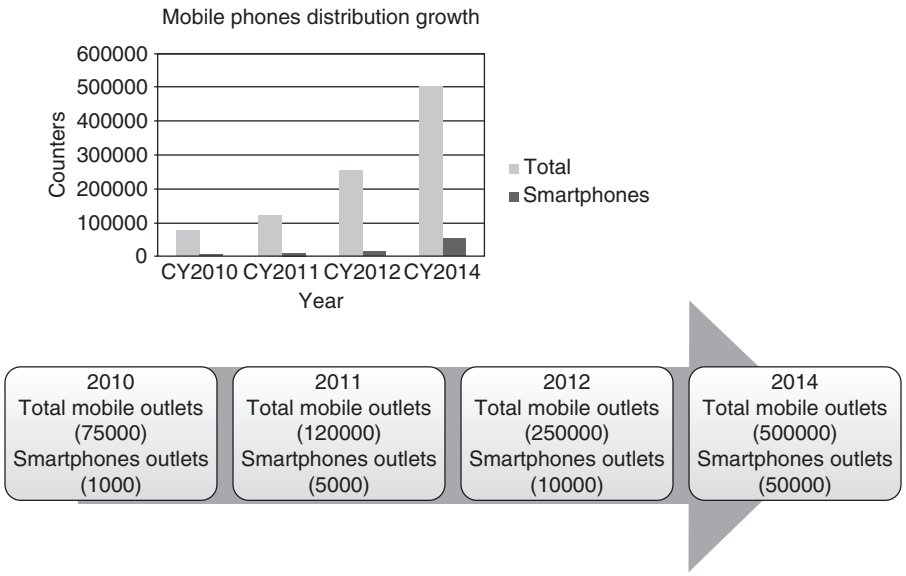
Key retail chain

Mobile chain

Experience store

Types of mobile outlets

Source: http://www.express.be/sectors/nl/retail/grootste-sony-centre-van-europa-opent-in-antwerpen/99873.htm
http://www.rcity.co.in/rcity/products-details.aspx?s_id=103
http://www.themobilestore.in/about_us/
http://www.reuters.com/article/2012/08/29/us-sony-tablet-idUSBRE87S0SS20120829



Mobile phones distribution progression

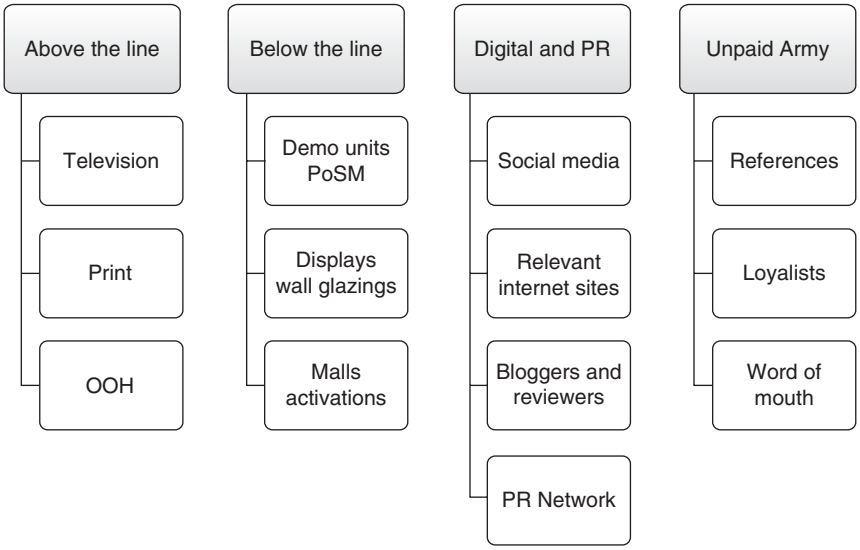
❒ 4.9 MARGINS

As per market opinion, there is substantial difference between the channel margins given by Indian manufacturers and global brands. The primary reason for lesser channel margin by large global brands is that they depend more on high volume sale with low margin per unit. The stakeholders in the mobile market perceive the distributors can significantly impact the sales of a brand. This is the perception that is leverage by Indian manufacturers. They attract distributors by paying higher margins. This in turn encourages the channel to upsell products for Indian brands. With increase in competition, margin of certain manufacturers has reduced significantly which may lead to consolidation in the industry.

Channel	Indian Brands (%)	Global Brands (%)
Super/national distributors	4–5	2–4
Regional distributors	4–6	3–5
Retailers	5–7	2–4

❒ 4.10 MODE OF PROMOTION

The Indian device market relies upon the following modes of integrated marketing communications.



1. Advertising
   (a) Above the line
      (i) Television
      (ii) Print
      (iii) Out of home (OOH)
         - Billboards
         - Transit
         - Cinema
   (b) Below the line
      (i) Demo units
      (ii) Dummies
      (iii) Point of sell material (POSM)
      (iv) Wall glazings and mall activations
2. Personal selling
   (a) In-store promoters and route trainer network
3. Sales promotion
   (a) Trade promotion
   (b) Consumer promotion
4. PR and publicity
   (a) EPR: Electronic PR
   (b) TPR: Traditional PR
5. Direct Marketing
   (a) Digital marketing
   (b) Telecalling
   (c) SMS-based promotions

4.10.1 Marketing of Devices

4.10.1.1 Products in the Marketing Mix

1. Tablets
2. Mobile phones—Smartphones, feature phones
3. Wifi and data products

The product must be trustworthy and company should be known for its service. A strong product portfolio is always a key success factor for devices companies.

Price in the marketing mix: Because of presence in different product categories, companies can use various pricing strategies. We can divide the pricing strategies and match it with the products that it is used for.

Skimming price: Companies like Apple and Samsung, whose smartphones are considered one of the best in the market, are the leader in terms of the features and USPs that they provide. Such companies use skimming price for these products, wherein it tries to get a high value in the start before competitors catch up. Once the model is old or any competitor has launched a similar product, immediately product prices are dropped.

Competitive pricing: This happens more in feature phone segment. Thus, in various categories, competitive pricing is maintained since the differentiating features are minimum.

Place in the marketing mix: The product must be present through various channels in the market. This is based on the distribution channels mentioned in the chapter earlier on.

The distribution network is the most interesting in the case of devices. In several cities, there can be single distributor through whom they distribute throughout a territory. For example, in Mumbai, Samsung has SSK distributors who are distributors for all Samsung products. This distributor has a huge investment in brand and both, the distributor and the company, go hand in hand for the sale of products. Online is another channel which has started competing with traditional devices sales channels.

Promotions in the marketing mix: Devices companies use multiple forms of promotions. This is based on the brand strength—to adopt a pull strategy or push strategy. Advertising helps to push the product however strong tactical sales promotion is used to push the product to the customer.

❒ 4.11 KEY NOTE

As per GSMA, the global business impact of connected devices could be $4.5 trillion by 2020. The price of mobile devices is coming down and these devices are capable of supporting powerful applications, which empower the user in a variety of ways, from exchanging information via SMS, accessing entertainment-based services to checking bank account details, crop prices, receiving personalised health alerts and obtaining vocational training. Smart homes will have several devices such as smart meters, smart appliances, personal energy management systems and home automation systems. All these utilities can be managed by smartphones-based applications.

Factors like development in technology, proliferation of mobile devices and the necessity of the consumers to stay connected round the clock have led to unprecedented

hike in scale, speed and scope of services by telecom companies across the globe. This phenomenon has to be replicated in India now.

Faster technological growth in wireless connectivity and mobile devices marked the foundation of the mobility revolution for the telecom sector. As convergence is boosting, there will be new demand for all kinds of connected devices. Our telecom ecosystem needs to brace for new evolution of devices and their utilisation.

End Notes

In India, almost 250 million phones are sold every year. Out of this, around 30–40 million are smartphones and rest being feature phones. However, the average year-over-year growth in smartphones is around 40–50%, whereas in feature phones it's 15–20%. In terms of volume, Samsung is the market leader in India followed by Micromax.

It is no longer about just the phones. Devices ecosystem in telecom is converging across multiple screens. This convergence is setting one vendor apart from another. Samsung, LG and Sony have a competitive edge since they are able to provide a ubiquitous experience across multiple screens.

Based on the consumer needs and profile, the choice of channel and products is made by companies. Consumer behaviour is undergoing an abrupt change with wireless broadband. The new consumer target group is between 12 years and 35 years. The generation is changing from television generation to mobile and internet generation. There are different kinds of users of mobile phones, especially those who are in need of data connections.

Retailing through shops, online sales and operator channel sales are the popular go-to-market strategies for devices. Each of these has its own benefits and challenges.

Descriptive Questions

1. Write a note on unconventional uses of mobile phones and multi-screen convergence.
2. Explain various types of mobile phones based on features and price points.
3. Describe the route to market for mobile phones and types of sales outlets.
4. Provide a use case to describe primary, secondary and tertiary sales of devices.
5. What are the modes of marketing promotion for devices?

TELECOM BUSINESS TO BUSINESS MARKETING

CHAPTER 5

Learning Objectives

After completion of this chapter, the students will have a good overview of the Indian telecom sector with regard to:

- Business marketing practices for telecom infrastructure
- The agents of change for B2B telecom marketing
- Basics of active and passive infrastructure
- Critical considerations and goals of B2B business
- B2B demand and buying categories
- Telecom infrastructure purchase process
- Responsibility matrix and understanding customer profitability

❒ 5.1 INTRODUCTION

'Business Marketing is the practice of individuals, or organisations, including commercial businesses, governments and institutions, facilitating the sale of their products or services to other companies or organisations that in turn resell them, use them as components in products or services they offer, or use them to support their operations'. The telecom infra business management is a core B2B marketing engagement between sellers and buyers.

B2B marketing has never been easy: multiple decision makers slow sales cycles, and often complicated technical specifications. In today's always-on environment, attention spans are short, schedules packed and budgets invariably tight.

B2B customers in telecom are harder to reach by conventional sales methods, since the requirements are extremely technically sensitive. Telecom service providers operate 24 × 7 and hence, the equipment needs to live up not just to the service provider's expectation but also to the end consumers' requirements. According to recent surveys, traditional B2B approaches are becoming less effective. The influence and media consumption patterns of B2B prospects are also changing in ways that present both dangers to existing sales channels and opportunities for the bold.

B2B marketing has changed profoundly in telecom. While B2B decisions are often made by larger groups of people with complex interrelations, the ability to reach individual influencers and decision makers in personalised, service providers' requirements becoming more diverse and compelling ways in real time has become an important success factor. Automation and M2M will likely drive the next wave of innovation

in telecom, and the companies that succeed will do so by building on a solid base of testimonials, social and searchable information before reaching out to sellers.

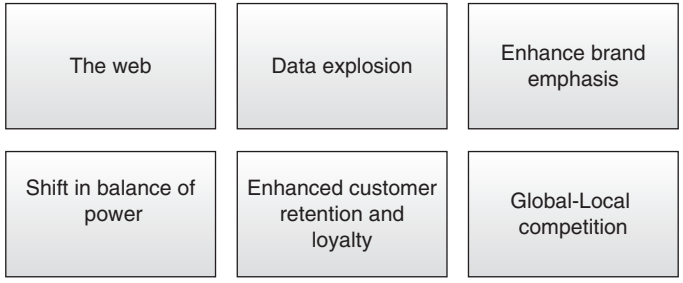
In this previously slow-and-steady area of marketing, it's no longer B2B as usual. The new breed of B2B customer demands more in less time. Telecom infrastructure marketers who respond by breaking new ground with their strategies (roadmaps, investment protection, backward integration of equipment, etc.) will ultimately have a much greater chance of winning their multi-million dollar business and loyalty.

The convergence of IT and telecom has opened significant doors for B2B marketing activity. Understanding the trends that are re-shaping the B2B marketing will help the telecom operators and infra companies to take full advantage of marketing and revenue management.

Emerging marketing have recently been the growth engines for B2B. The boundary between voice and data, video and telecom, mobile and fixed are blurring; hence, each B2B buyer and seller needs to be on top of the changing trends. The new world is opening up path-breaking solutions and multiple B2B opportunities. The new-age telecom manager must be abreast with these latest changes. This may lead to new players entering the emerging markets and fragment the telecom and ICT infrastructure supply business.

❒ 5.2 AGENTS OF CHANGE

B2B infra marketing has changed with new advents of customer behaviour and technology. The most dominant agents of change are mentioned as follows:



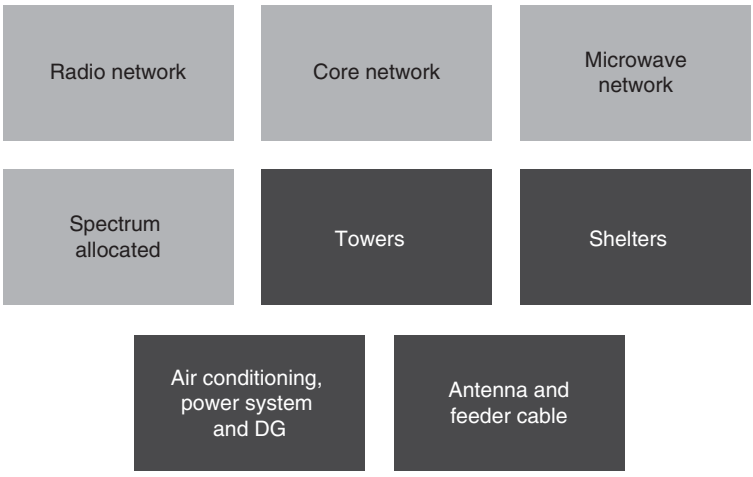
1. **The web:** The web has led to new channel of information, communication and reach. It has also facilitated reviews and comparisons impacting consumer decision-making. Long-arm sourcing possibilities with companies like alibaba.com have removed geographic barriers. The web has also increased in age of information sourcing and retention.
2. **Data explosion**: Information management sophistication has increased with data explosion. The earlier and expected performance indicators and information is more readily available leading to new ways of B2B management decisions. In addition, this also brings with it the danger of too much data and authenticity of sources. A wrong source can lead to inappropriate decision-making as well.

3. **Enhanced brand emphasis:** Affiliate marketing is bringing new business models to consider. The brands that exhibit high quality are positioning themselves as affordable in bulk deals. B2B companies need to worry about apples being compared to oranges so that the decision makers do the right techno-commercial comparisons.
4. **Shift in balance of power:** Balance of decision maker is shifting from manufacturer to customer. Both sides have equal access to sales and marketing data, which implies that no company can hide their actual performance and product details in the near term.
5. **Enhanced customer retention and loyalty:** Customer Lifetime Value (CLV) is a strong concept. Breakeven and profits can only happen with repeat purchases. Customer loyalty has overtaken churn (brand shifters)
6. **Global-Local competition:** Now the challenge is of worldwide competition. Local companies coming up as dark horses. Trade blocs being formed in group of countries preferring B2B partners.

5.2.1 Telecom Infra Business (B2B)

Intense industry competition and the high cost of setting up and operating the infrastructure provide a strong business case for infrastructure sharing. Moreover, several benefits are associated with infrastructure sharing. For example, it helps in reducing capital and operating expenditure, and in achieving speed-to-market. It also allows operators to offer mobile services when their own network signal is not available as well as ensures optimum usage of scarce national resources and access to areas where it is difficult to acquire sites.

The telecom infrastructure business can be broadly categorised into two parts.



Active (light grey) and passive (dark grey) telecom infra

1. **Active infrastructure:** The active infrastructure constitutes the core element of cellular telephony. It consists of the essential elements of network deployment and contiguous radio cells. This combination is responsible for providing coverage while operating on a dedicated set of radio channel frequencies. The common elements of active infrastructure includes mobile switching centre (MSC), base station controller (BSC), base trans-receiver station (BTS) and GSM antenna to name a few. These equipments are responsible for providing uninterrupted services to subscribers.
2. **Passive infrastructure:** The passive infrastructure comprises of elements which enable the active infra to operate un-interrupted. This includes the telecom towers, poles for mounting antenna's, shelters and associated equipments like generators and air conditioners forming an essential part of the telecom business management. Certain important elements of infrastructure business management are given below.

   In spite of being a relatively nascent industry, the infrastructure industry has witnessed strong growth. It is a consolidated industry with few players controlling more than 95% of the total infra business in India.

Several trends are expected to emerge in infrastructure sharing in the future. Until now, infrastructure companies have been focusing on attaining scale and rapidly setting up equipment to meet the operators' fast-paced growth requirements. Such companies have differentiated themselves on parameters such as adherence to project schedule and tower portfolio size but are now looking at various other ways to differentiate and pass on the benefits to operators.

Few objectives of an effective and efficient infra businesses are as follows:

1. Centrally monitor and manage distributed telecom infrastructure
2. Use IT as an enabler in pioneering the monitoring and automation of operations in telecom infrastructure
3. Re-engineer and integrate operational processes with ERP
4. Innovate and create a key product differentiator
5. Proactively monitor and manage SLAs committed to customers and stakeholders
6. Drive improvements through improved operational visibility, energy analytics, usage and fault patterns, process metrics, vendor performance, etc.

5.2.2 Critical Considerations of B2B Business

The right partnerships with the right businesses aren't one-time events, but living relationships that grow and develop over time. And time is an important consideration. Building B2B partnerships requires a lot of it, along with clear objectives, foresight and an honest approach. But, when done right, B2B partnerships are worth the effort and can be a win-win for everyone involved.

Before starting the process of creating a partnership, one should carefully consider which partnerships and alliances truly support your business objectives. For example,

think twice about any partnership that forces the company to stray from brand image, confuses the clients or hurts reputation.

In B2B marketing, focused approach is as effective as the focus itself. Whether it's a matter of focusing on specific verticals or prioritising target geographies, segmentation and considerations allows marketers to build more targeted activities, provides greater clarity to budget and resource allocation and enables us to better track marketing effectiveness.

A company is far better off by selecting a few verticals to focus on rather than to try and target many. This is especially true for small- and medium-sized businesses that don't have large budgets or resources.

1. **Vision setting is interdependent:** The operator does not have full visibility to all the aspects of evolution in telecom infra technology and the infra service provider never know enough about the end consumer needs. Hence, for viable partnerships, both the operator and infra equipment provider needs to work hand and hand to set a vision for the future.
2. **Fewer purchasers:** There are 13 service providers to which five or six infrastructure suppliers provide equipment. This implies that it's a small community fighting for viability.
3. **Multiple decision-making interfaces:** Unlike retail where the consumer makes choice for direct purchase, the infra business decision have to go through multiple levels of decision-making interfaces.
4. **Individual technocommercially competent:** The individual involved in infrastructure business need to be technocommercially competent without which decision-making becomes extremely uncertain.
5. **Evaluators may or may not represent personal need:** The individual interfacing from customer end may be responsible for evaluation for procurement. However, they may not represent the purchase for personal needs.
6. **Long-term engagement and gestation:** Infra business needs to be established on partnership and collaborating approach.

In comparison to the above B2B infrastructure business, the devices business (B2C) works on the following elements.

1. **Marketing push:** Brand building and consumer perception are two very important elements for devices business.
2. **Individual customers and stakeholders:** The business dynamics represents sale to individual consumers or customers.
3. **Peer consulting and influence:** Devices business depends upon references, testimonials, reviews and opinions of other users.
4. **Long-arm distribution:** The devices business is highly dependent upon micromanagement route to market, since a large geography needs to be covered for retail sales.
5. **Customer to point to sales:** In B2C, consumer approaches the distribution point of sales unlike B2B where the vendor goes to the potential customer for making sales pitch.

❒ 5.3 CRITICAL CONSIDERATIONS: B2B AND B2C

Areas of Difference	Infra Market	Devices Market
Market characteristics	Geographically concentrated	Geographically disbursed
	Relatively fewer buyer	Mass market
	Lesser but larger deals	Multiple but smaller purchases
Product characteristics	Technical complex	Standardised
	Customised	
Service characteristics	Service, timely availability extremely important—24 × 7 industry	Somewhat important—depends on individual sensitivity
Buying behaviour	Involvement of various functional area from both the ends	Involvement of family members
	Purchase decisions are performance based and rational	Purchase decisions are mostly based on perceptions and needs
	Technical expertise	Relatively less technical expertise is required
	Stable interpersonal relationships	Non-personal relationships

❒ 5.4 GOALS OF B2B PURCHASING

B2B purchasing happens with very serious considerations. This is because it is done for creating sustainable relationship which has to be long term in nature. In the B2B domain, there are fewer but high value deals so the stakes are very high on each business transactions and relationships. Companies like Intel, Ericsson, SAP, IBM, etc. have regular B2B interaction with their customers. The goals of B2B purchasing are critical for both entities. B2B marketing is therefore about meeting the needs of other businesses, though ultimately the demand for the products made by these businesses is likely to be driven by consumers of these customers. This complexity and dynamism has implications for B2B markets. The target audiences for B2B communications are amorphous, made up of groups of constantly changing individuals with different interests and motivations. Buyers seek a good financial deal. Production managers want high throughput. Health and safety executives want low risk. And those are just their simple, functional needs.

Faced with a multi-faceted and knowledgeable buyer, it is critical that the B2B marketer demonstrates a high level of expertise in all of its interactions with the target audience. This refers not only to product knowledge, but also to the technical and other back-up that the buyer will receive throughout the life of the purchase. As an example, Ericsson as a supplier to telecom service providers will make efforts to maximise contracts. The service provider will deal with the telecom infrastructure vendors like Ericsson with the following strategic considerations.

1. **Uninterrupted availability:** Telecom business comes with associated unpredictability in terms of capacity requirements and network deployment. The service provider needs a reliable partner who can provide required transactional as well as last minute support for capacity or coverage enhancement. At any given hour, the operator will look for uninterrupted supply of network elements which can facilitate their business. Vendors which demonstrate flexibility to provide such support to customers are always preferred from a relationship and business management perspective.
2. **Managing inventory:** The telecom service providers give contracts for long-term purchase. However, they are not specialist in were housing and inventory management. Their goal of B2B purchasing is to work with vendor/s that can support them stocking of material for immediate requirement, spares inventory and reasonable amount of forecasted material. This helps the service provider to focus more on its core areas which leaving the material management to the infrastructure vendor. For the vendor, it is an inventory management is an important element since it is linked to business assurance and predictability.
3. **Developing and managing supplier relationship:** B2B business organisations create the sustainable ecosystems for long-term assurance of quality and quantity of products and services. Developing and managing business relationships are the essential foundation of B2B purchase. B2B relationships have long maturity times and hence maintaining a congenial business environment is essential. Customers and suppliers use all tools, technology and procedures to manage improved or facilitate sales and other related interaction with business partners throughout the enterprise. Once the stakeholders have an idea of a relationship that will add value to business certain key processes are followed for long-term B2B partnership. Such partnerships take time to develop and flourish. It is important to start slow with simple goals and milestones that give both businesses a chance to focus on their strengths. This ensures they put necessary efforts to learn more about each other in the early stages of a partnership.
4. **Achieve lowest total cost of ownership (TCO):** The B2B purchasing considers how a product of service can achieve lowest TCO. During the transaction of B2B purchase of product and service the person responsible for procurement always considers multiple costs which are beyond the actual purchase price. The overall cost over the life cycle of a product or a service purchase is considered to be TCO. A company may purchase a product at an initial higher cost however, if the product lasts longer than others with lesser manufacturing defects and lower manufacturing cost, then the TCO over the life of the product is actually lesser. Traditionally there are three types of costs that are considered as TCO, which are mentioned as follows:
    1. **Cost of acquiring:** This includes the purchase price, transportation cost along with the administration, cost of evaluating suppliers, cost of expediting delivery and cost of removing any errors and/or delivery.
    2. **Cost of material possession:** Cost of possession includes incremental cost of arranging financing, storage and warehousing, material inspection, statutory taxes, insurances requirement and all other internal and external material handling cost.

3. **Cost of usage (operations):** These are the costs associated with ongoing use of the equipment. This may include cost of installation, ongoing employee competence development, use of labour on field repair as well as cost of product replacement and finally disposal.

B2B marketers should perceive value-based strategies that provide potential customers with comparatively lower TCO solutions. Such B2B strategies move sales propositions that are centred on prises to a long-term relationship built on TCO.

5. **Enhance firm competitive position:** Sustainable competitive advantage and superior position can be attributed to B2B marketing. B2B relationships change due to competitive and economic pressures. Companies with long-term vision on B2B relationships always benefit in terms of advance competitive position. This can be made evident by reducing time to market and time to revenue. Time to market is the length of time. It takes for the product to be available and ready to be use. Time to revenue is when a particular product starts to generate revenue for the company. A vendor supply relationship may be able to enhance the customer's competitive position since a long-term vendor may be able to deliver material faster thereby reducing time to market and time to revenue for the company.

❒ 5.5 MARKETING CHARACTERISTICS

There is a difference between marketing to a business and marketing to a consumer. Although the company is still selling a product to a person or entity, experience shows that the difference between these two types of markets runs deep.

When you market to a B2B, these businesses work hard to streamline the buying process in order to save time and money. This often explains why a B2B purchase is based more on logic and why a consumer's purchase is based more on emotion.

It is also true that the cost of a sale for the B2B market is more expensive and typically higher than the business to consumer market. The easiest way to explain this is that a B2B transaction often takes more time, money, effort and consideration.

The marketing to a B2B is focused on the logic of the product. This is done by focusing on the features of the product in limited audience marketing and not mass media. There is little to no personal emotion involved in the purchasing decision and hence media influences will be negligible. Sellers have to focus on understanding the buyers and how they operate within the confines of their organisation's procedures the process will execute itself. The B2B marketers have a thirst for knowledge, being information seekers. One needs to be more in-depth with marketing materials, presentations, trade shows, etc. The most effective marketing message will focus on how product or service saves them time, money and resources for the buyer.

The marketing to a consumer focuses on the benefits of the product. Their decision is more emotional and led by peer influence and reviews. Here a variety of distribution channels for convenience need to be present which is not the case for B2B market. The B2C consumers are not likely to be interested in a lengthy marketing messages based on logic. They will want crisp messages which appeal to them. Consumers may not want to utilise energy to understand benefits, instead they will want

advertising to clearly point out the benefits to them. The most effective marketing strategies focus on the results and the benefits that product or service will bring to consumers. Since this is a high-volume category, various integrated marketing techniques need to be used for proper message penetration to the potential audience.

Marketing Elements	B2B	B2C
Mass advertising	Normally focused on technical media—not normally TV	Often suitable and used including TV, radio and mass circulation print advertising
Direct mail	Often very suitable due to small numbers	Sometimes not viable due to high numbers & low value
Face to face selling by specialists	Often very suitable for company specialists	Rarely suitable for individual items to end users
Discounting	Often to reward volume customers	Discount sales are often used for sales promotion
Specialist exhibitions and or trade shows	Often used for high value items (Build Con)	Mainly suitable for items selling to retail buyers (Times Utsav)
Point of sale displays and communications	Not often used	Extensive use
Direct sales force	Used for extensive account management	Used to manage distributors and retailers
Distributors	Never used for infra	Highly dependent
E-commerce via internet	Becoming more prevalent to cut out intermediaries (freemarkets.com, spectrum auctions) and disseminate information	Becoming more prevalent at retailers, less so for manufacturers because of their narrow ranges
Multi-level marketing	No direct evidence	Used often by specific organisations

The key goal of any marketing campaign is to reach new customers and retain existing ones. In order to reach your customers, it's important to keep in mind where they spend most of their time. Before the mass emergence of the Internet as a form of media TV, radio and print was the forum of choice for advertising. Marketing to businesses would take place at trade shows and industry specific events in tandem with print advertising. With the mass adoption of the Internet as the 'place' of choice to gather information for work and play the audience for TV and radio has steadily declined. Print subscriptions for business and commercial magazines and newspapers as well have shown a steady downturn. Early advertisers tried to use the Internet in the same way they had used traditional media with interruption marketing to little effect. With so many options for media and ways to filter out the content they don't want, the real job of marketing in this space is to draw people to your site by providing relevant and compelling content.

If you're a technology company dealing with network solutions, be sure to highlight not just your products and features but show how you can implement entire solutions. Provide free trials of your products online where possible to let your potential customers feel comfortable with the product before they buy. Have a blog to discuss common and some not so common network problems people and businesses may face as well as how to solve those thereby showcasing your knowledge and expertise on the subject matter. Create a micro-site around specific product releases to showcase the product and start people talking about it. Drawing the consumer into a dialogue is also a good way to keep them engaged. Listen to their feedback and implement what is feasible as product/service offering upgrades.

❒ 5.6 B2B MARKET DEMAND CATEGORIES

Even though they don't sell their products to consumers, B2B sellers carefully watch general economic conditions to anticipate consumer demand patterns. The firms do so because the demand for business products is based on derived demand. Derived demand is demand that springs from, or is derived from, a source other than the primary buyer of a product. When it comes to B2B sales, that source is consumers. If consumers aren't demanding the products produced by businesses, the firms that supply products to these businesses are in big trouble. A small change in demand by consumers can have a big effect throughout the chain of businesses that supply all the goods and services that produce it.

Essentially, consumers are the handle and businesses along the chain compose the whip—hence the need to keep tabs on end consumers. They are a powerful purchasing force.

Because consumers are such a powerful force, some companies go so far as to try to influence their B2B sales by directly influencing consumers even though they don't sell their products to them. Intel is a classic case. Do you really care what sort of micro-processing chip gets built into your computer? Intel would like you to, which is why it runs TV commercials. The commercial isn't likely to persuade a computer manufacturer to buy Intel's chips. But the manufacturer might be persuaded to buy them if it's important to consumer.

The B2B market demand categories vary from customer to customer and from market to market. There are five types of business demand categories as listed:

(a) Derived demand: Derived demand is linked to the company's product outsource based upon how the companies production/business is performing. The purchase of resources like machinery, raw materials, consumable and other associated elements is decided as a derived demand of company's output.
(b) Volatile demand: This is based upon the derived demand created from volatility from another product. For example, the number of CNG pumps will reduce if the requirement of CNG goes down (number of CNG vehicles reduced) (demand of LTE-based station reduced since the roll-out obligations were relaxed)
(c) Joint demand: This is a demand of two products used in combination with one another.

(d) Inelastic demand: Demand which does not get changed significantly with change in price (more infrastructure will not be sold if prices dropped since it is linked to market attractiveness and expansion of subscribers)
(e) Inventory adjustment: Inventory adjustment policies like just in time (JIT) boost efficiency by reducing cost of inventory warehousing and requiring suppliers to deliver material JIT when they are needed.

❒ 5.7 INFRA BUYING SITUATION

Companies seek long-term relationships as any experiment with a different brand will have an impact on the entire business. Buyers go through three stages of the buying process, which include the following:

1. Education
2. Solution
3. Vendor selection

Buyers move in and out of each stage. Firms need to be prepared to engage buyers throughout the cycle. Organisations have to become better at determining what need and what questions buyers have when they decide to engage in the sales process. Understanding the buying cycle and the key needs buyers have at each point can help marketers and sales reps to create a knowledge base with relevant content that a sales team can leverage during the sales cycle.

There are three types of B2B buying situations mentioned as follows:

1. **Straight re-buying:** In this mode of infrastructure purchase the buyer routinely orders the same product or service without any modifications. For example, expansions of networks. This is a recurring purchase decision in which a customer reorders the product that has satisfied his needs in the past. The purchaser generally sees little or no reason to assess competing options. In this mode of purchase, level of operational dependency is very high. The marketers who maintain good relationships with customers can go a long way towards ensuring straight revise. This can be achieved by B2B marketers delivering:
   1. High quality products
   2. Superior Service
   3. Prompt delivery
2. **Modified re-buying:** The buyer wants to modify product specifications, price, service or in rare cases may change the supplier. Modified re-buying happens when the purchaser is willing to re-evaluate existing vendors and available options. This situation may occur if a B2B supplier has let a re-buy business

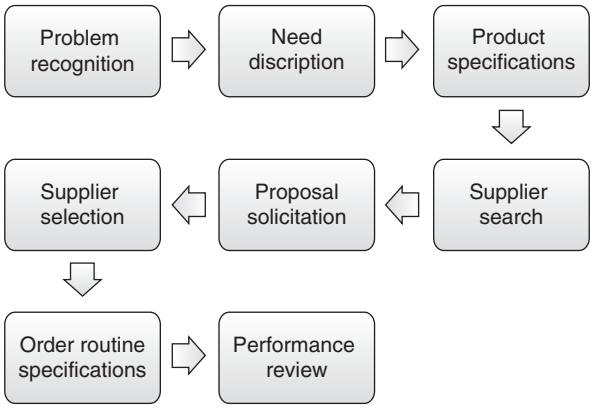
circumstance deteriorate because of poor service or delivery performance. Modified repurchases are sometimes mandated from top level of organisation to revaluate all vendors or it is due to strong marketing efforts by competitors. In such circumstances, the incumbent supplier faces the same challenges they may have face when initially convincing buyer to sign the contract. Once modified repurchase is initiated, the doors are open to competition and existing vendors must work hard to protect their business in the new scheme of things.

3. **New task buying:** New task buying is when the buyer purchases a product or service for the first time (Greenfield networks). New task buying is defined as the first time or unique purchase situation that requires considerable efforts by the decision makers on both sides. This is the most complex category of B2B purchase. It often requires purchasers to consider alternate offerings or vendors. A new task purchases can also be described as either minor or major depending on the total cost or overall importance of the purchase. For example, if a telecom service provider wants to consider a new vendor for network swap, it may involve complex items and decisions. The purchase cycle for this need may be from months to years.

5.7.1 Stages of B2B Buying Process

The stages of business buying includes recognising the problem, developing product specs to solve the problem, searching for possible products, selecting a supplier and ordering the product, and finally evaluating the product and supplier performance.

Buying B2B products is risky. Usually, the investment sums are high and purchasing the wrong product or service, the wrong quantity, the wrong quality or agreeing to unfavourable payment terms may put an entire business at risk.



Making a riskier investment can yield high returns. However, there is also a greater chance that they could lose their investment as well. Those involved in the decision buying process need to weigh the risks against the expected returns.

In order to entice and persuade the B2B buyer to buy a product, marketers try to determine the behavioural process of how a given product is purchased. Understanding the nature of customers' buying behaviour is important to a marketing firm if it is to market its product properly.

Stage 1: Problem recognition
In problem recognition the business team at the customer end identifies a problem defined by staff and certified by the line members of the company management. There are many problems which may be recognised or defined by the top management directly. The problem recognition is the first stage which initiates the B2B buying process.

Stage 2: Need description and product specifications
In need description the affected line manager will appoint a responsible department in-charge in supervisory capacity to define the problem and provide a complete information report to the line manager. The person in-charge then looks in to the matter and reports back the problem statement and the actual solution that may satisfy the need.

Stage 3: Product specifications
The line manager prepares the comprehensive report and formally approaches his immediate supervisor or senior management to help budget the requirement and authorised procurement. The concerned person also provides detailed (to the extent possible) specifications of the product and may recommend companies who can be considered for purchase.

Stage 4: Supplier search
The line manager prepares the detailed proposal along with the requirements and formally send it to procurement department with all due approvals. The purchase department now searches for various suppliers. After finalising the suppliers, the shortlisted suppliers are invited to submit proposals to meet the specifications of the product under consideration. Most of the times Request For Information (RFI) is sought from the suppliers.

Stage 5: Proposal solicitation
Based upon the initial details submitted by the suppliers and after evaluating RFI, a formal request for proposal (RFP)/request for quotation (RFQ) is sought. After the proposals are received formally, the same are carefully evaluated and matter is consulted with concerned people and departments.

Stage 6: Supplier selection
The final shortlisted one or two suppliers are invited for presentation followed by negotiations. Based upon the credibility and commercials offered the company shortlists one supplier to place the order and the same is confirmed to him.

Stage 7: Order routine specification
Once the order is placed, the routine of supply, installation, commissioning, testing and final acceptance is done. Based on this process, the payment is released.

Stage 8: Performance review
After few days of product installation, the equipment is tested for its performance and work quality. If any problem is there, the supplier is asked to rectify the same. The same is already discussed and agreed according to the contract. The performance review also indicates the probability of long-term contract and repeat orders.

5.7.1.1 Example of Buying Process: Telecom Infra Purchase

Stage 1: Problem recognition
Congestion in Network: Operator needs network expansion in a particular geography.

Stage 2: Need description and specifications
Leading to churn and higher load on customer care centre.

Stage 3: Specifications
Firm needs a simple expansion but is willing to consider replacement with equipment having lower operational expenditure and can be upgraded for next generation services. Such products may be priced at a slight premium initially but will be more beneficial in the long run for cost saving. However, a new set of spares will need to be purchased an additional training for the maintenance staff.

Stage 4: Search for and qualify potential sources
Go to existing vendor for proposal but take swap quote from other vendors for benchmarking and evaluating alternate options.

Stage 5: Acquiring and analysing proposals
This may involve competitive bidding (BSNL) or technical/deployment/project management presentations from existing infra vendors.

Stage 6: Evaluate proposals and select suppliers
Buyers choose proposals best suited to their needs. The decision-making involves testimonials and visit to existing customer sites (important for new technology for Greenfield projects). Final choice may involve trade-off between features such as price, quality and credibility.

Stage 7: Select an order routine
The operator and infrastructure vendor agrees on the terms of contract and workout the best way to process the order by defining circles of expansion and payment mechanism.

Stage 8: Obtain feedback and evaluate performance
The buyer measures vendor performance evaluated at a circle level. Large operators are likely to use formal evaluation procedures to evaluate performance.

B2B buyers focus more than ever on what solutions are available to help them 'do more with less'. Anyone involved in selling to corporate decision makers knows that it can be a frustrating and long process–one that many wish they could accelerate. However, with continued economic uncertainty on the horizon, it's important to gain a clear understanding of your customers' buying process and what you need to do to

facilitate them to buy from you. In these uncertain economic times, many decision makers are adverse to change, requiring more and more economic justification for each proposal, thus making it hard for even high ROI projects to get approved. Companies now need to facilitate their customers' buying process in order to differentiate themselves as the economically sound choice.

❒ 5.8 THE BUYING CENTRE

In the consumer market a very large percentage of purchase decisions are made by a single person. There are situations in which multiple people may be involved in a consumer purchase decision, such as a child influencing a parent to choose a certain brand of cereal or a husband and wife deciding together to buy a house, but most of the time purchases are individual decisions. The business market is significantly different. While single person purchasing is not unusual, especially within a small company, a significant percentage of business buying, especially within larger organisations, requires the input of many. In the marketing literature, those associated with the purchase decision are known to be part of a Buying Centre, which consists of individuals within an organisation that perform one or more of the roles discussed in due course.

The infrastructure buying centre at the customer end has six different roles either played by six different individuals or few individual playing multiple roles. A buying centre is a group of individual within an organisation that makes decision about a substantial purchase. The vendors can enhance their marketing efforts by knowing how a targeted buying centre might react to a new product offer. The buying centre is also called a decision-making unit. The different roles of people forming a buying centre are mentioned as follows:

1. **Initiator:** The initiator is an individual or group of individuals that acknowledge and recognise a problem and the need for making a purchase.
2. **User:** The user is actual consumer of product/services. (He could also be the initiator.)
3. **Influencer:** Influencers are evaluators who could influence the purchasing decision. These can be small groups or a formal evaluation committee. Influencers include technical, design engineers or external consultants. The evaluation committee forms a critical part of the buying centre.
4. **Buyer:** The buyer is a company representative interfacing with the potential vendors. The buyer is responsible for receiving and evaluating quotations and being a part of the decision-making committee. Once the supplier selection and finalisation happens, the buyer is responsible for processing and releasing purchase order. Subsequently the job involves expediting deliveries and implementing the purchasing policies of the organisations.
5. **Gate keeper:** The gate keeper are individual who control the flow of information amongst the member of buying centre.

6. **Deciders:** The decider is the ultimate authority who makes the actual purchase decision and authorises the buyer to finalise the vendor and associated commercials. These deciders have the authority to overrule any decisions in the interest of the organisations.

For marketers confronting a Buying Centre it is important to first identify who plays what role. Once identified the marketer must address the needs of each member, which may differ significantly. For instance, the Decider, who may be the company President wants to make sure the purchase will not negatively affect the company's bottom line while the Buyer wants to be assured the product will be delivered on time. Thus, the way each Buying Centre member is approached and marketed to requires careful planning in order to address the unique needs of each member.

5.8.1 Infra Responsibility Matrix

In telecom business management, it is very important for all the stakeholders to understand the responsibilities and accountabilities of each person. While smaller teams can have more informal rules to keep track of responsibilities, in bigger teams with cross-department and inter-organisational collaboration, it is very important to create a more formal process to track responsibilities. This helps reduce confusion and leads bid management and quotations generated with faster speeds.

Infrastructure sales organisations need a strong inter-functional, decision-making matrix. There are various decision-making areas and associated stakeholders which collectively decides the nature of proposal to be submitted to the customer. The decision areas include:

1. **Product:** This includes design specifications performance characteristics and reliability. In order to provide a product-related response to the customer, the departments of manufacturing and technical services need to support the B2B business manager.
2. **Price:** This includes the listed price, discounted price, volume-related commercial benefits. In this the manager of strategic business unit (SBU) along with the corporate level manager must support the business manager.
3. **Technical services:** This includes customer training installation and commissioning and equipment handover. The technical services department has to support the business manager in order to provide a response to the customer.
4. **Logistics:** This includes inventory and customer service level which need to be informed by logistics and manufacturing.
5. **Sales force training:** This needs to be taken care of by technical services department.
6. **Marketing and advertising:** This will need the consent of marketing team
7. **Channel:** This is again a function of logistics.

	Organisational Function						
Decision Areas	**Marketing**	**Manufacturing**	**R&D**	**Logistics**	**Tech. Services**	**SBU Manager**	**Corp. Level Manager**
Product		Y			Y		
Design specifications							
Performance character							
Reliability (influencer)							
Price						Y	Y
List/discount (buyer, influencer)							
Tech. services					Y		
Customer training (user)							
Logistics		Y		Y			
Inventory							
Customer service level (buyer)							
Sales force					Y		
Training (user)							
Advertising	Y						
Message development (decider)							
Channel				Y			
Selection (buyer)							

Depicted above is a sample responsibility matrix which enumerates the roles and responsibilities of various divisions. One of the important tools for tracking roles & responsibilities is the Responsibility Assignment Matrix (RACI matrix). RACI stands for:

Responsible—Who is responsible for the execution of the task?
Accountable—Who is accountable for the tasks and signs off the work?
Consulted—Who are the subject matter experts who to be consulted?
Informed—Who are the people who need to be updated of the progress?

❒ 5.9 INTERRELATION-B2B MARKETING AND CRITICAL FUNCTIONS

Despite their importance, the linkages between marketing and other functional areas of B2B organisation are neglected and relatively unexplored.

The interface between marketing and various business functions takes two major avenues. First, in developing a business plan, it is essential to coordinate the marketing component with the other functions of the organisation, in other words the marketing plan should be coordinated with the financial, production, procurement, personnel, R&D plans and the short- and long-term corporate strategies and objectives. Furthermore, marketing plans should be consistent with the financial and accounting perspectives of the firm, be in agreement with the organisation's personnel and procurement procedures and aimed at achieving the corporate objectives. Second, it is essential to incorporate marketing inputs in the other corporate plans (e.g., financial, production, procurement, R&D and personnel) as well as the overall short- and long-term plans of the firm.

It is obvious that the marketing activities may be numerous and varied, depending on the size of the organisation, the short-term medium and long-term goals, the importance of marketing within the organisation and the developments and conditionings of the external environment (customer needs, number, structure and actions of competitors, developments in economic and business environment).

The starting point in identifying the main marketing activities of an industrial organisation is the general structure of a classic marketing support plan, a brief example is mentioned as follows:

Department	Strategic Contribution	Support Required from Marketing
Manufacturing	• Determines volume, variety and quality of products	• Accurate and timely sales forecast
	• Influences B2B marketing response speed to customer and competition	• Competitive knowledge
R&D	• Technical roadmap in new product development	• Target segments requirements information by market research
	• To keep offers ahead of competitive pitch	• Data on market trends
Logistics	• Shipment delivery accuracy to meet customer contract requirements	• Accurate sales forecast
	• Timely order scrutiny, acknowledgement, status reports	• Realistic delivery contractual requirements
		• Capture all terms of delivery in contract

(*Continued*)

(*Continued*)

Department	Strategic Contribution	Support Required from Marketing
Technical	• Post sale services: installation and training	• Account/customer specific plans, expected technical support requirement
	• Trouble shooting customer problems	• KPIs commitment to customer
	• Repeat purchase consideration	• Training requirements

To achieve integrated plans of an organisation's functions, their development should be coordinated since the initial phase so that each function of the organisation has to know and understand what the others make. In addition, when developing plans for each function, each and every one must understand the impact of these actions on customers and the potential response from competitors.

❒ 5.10 UNDERSTANDING CUSTOMER PROFITABILITY

The infrastructure deals in telecom are few but high value. This includes swaps, expansions and Greenfield project deployments. In all these diverse business situations, companies selling equipment and service must understand the customer profitability in each deal.

Profits earned on customers and customer segments are one of the most important measures and yardsticks of organisation performance. The bottom line on any B2B deal represents the basic exchange of value between the organisation and its customers.

The value for the supplier is reflected in the cost and profit (or loss) of the products and services provided in a B2B infrastructure deal. Customer profitability calculations are typically made and reported on current deal and forecasted returns basis, while keeping the historical experiences in mind. More important to telecom is the Customer Valuation or the future value of the customer (maybe the first deal is at a loss with the hope of breakeven in future deals.

Projections of the future are significantly considered with actual data. Without understanding the profitability of customer, projections into the future would be futile or misleading. Given the importance and relevance of customer profitability information, telecom infra organisations make this calculation and include it on a balanced scorecard or a company approved profitability calculation tool.

The segments are traditionally divided into high cost to serve and low cost to serve. Such calculations help the operator and infra provider decide on the best fit of process and associated services.

High Cost to Serve	Low Cost to Serve
Order custom product	Order standard products
Order small quantities—lack of warehousing	Order large quantities, central warehousing

(*Continued*)

(*Continued*)

High Cost to Serve	Low Cost to Serve
Unpredictable order arrivals	Predictable order arrivals
Customised delivery—far areas, mode of transport differentiation	Standard delivery
Frequent changes in delivery requirement	No changes in delivery requirement
Manual processing	Electronic processing
Large amount of presales support—greenfield/new technology	Little to no presales support—expansions
Longer credit periods	Payment on time

The following are some indicators that cost to serve knowledge needs critical evaluation:

1. Low volume products with equivalent margins to high-volume products are thought of as equally profitable.
2. Operation managers frequently complain to sales about small unit-based orders.
3. Sales staff feels comfortable on selling only on price
4. A significant proportions of deliveries incur minimum freight charges from your transport provider.
5. Sales are increasing but profitability is static or declining.
6. Management KPIs do not include Customer product mix or Customer average order size

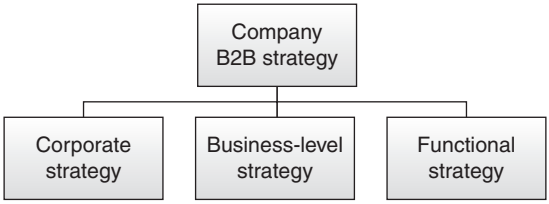
An infra deal whereby the value of $100 million and material is to be supplied to the customer warehouse will always be more profitable than a $100 million deal which has to be shipped in parts to various warehouses. While the company may celebrate both the deals, however the profitability calculations will show that the second deal is less profitable as compared to the first one. The only reason is the difference in cost to serve both the deals.

Understanding the cost of servicing telecom customers (e.g., Ericsson supplying to Airtel) requires a detailed analysis that link the supply chain from the point that finished goods are available for supply, through the capture of orders, to the delivery of the solution.

The breadth of the analysis required can be quite daunting for some suppliers but insights gained and resulting savings identified almost always outweigh the required effort. The outcomes from understanding cost to serve are far reaching and necessary for the reporting of true customer profitability as well as crucial for more strategic orientated decisions (whether to give a network swap for free or not). Cost to serve knowledge is essential when tendering a contract (ensuring pricing structure is aligned with you and your customers' profiles), establishing cost-based trading terms (what volume discounts reflect your transport savings?) and other costs that may be overlooked in the short term.

❒ 5.11 HIERARCHY OF B2B STRATEGIES

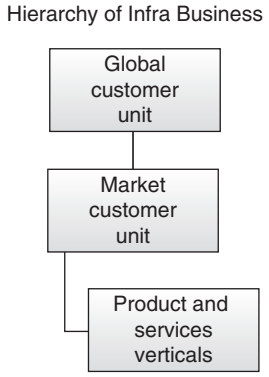
The B2B strategies of companies operate at three critical levels as depicted:



The corporate B2B strategy at a global level answers the following questions in the board rooms:

1. What businesses are we in?
2. What are our core competencies?
3. How should we allocate resources?
4. What businesses should we be in?

Based on the deliberations, companies may choose to increase or reduce investments in particular areas of the telecom business roadmaps. Such a strategic structure also has a second face in the telecom industry. For example, Vodafone is a global customer for infra sellers. The strategic global relationship with Vodafone will be managed by a Global Customer Unit (GCU). In each country where Vodafone has a relation with the infra supplier, the supplier will have an MCU or Market Customer Unit. Finally in the MCU there will be various product and service verticals to serve and manage the account business.



The corporate B2B strategy leads to the following strategic decisions:

1. Assess market attractiveness and competitive effectiveness of the firm
2. Promote customer orientation to Market Unit management
3. Formulate the company's overall value proposition synergised with customer, management and employees

Once the corporate strategy is established and is informed to the business/market units, the infra companies will create local level business strategies keeping in mind:

1. How do we compete in a given industry?
2. How should we position ourselves against competitors?

The functional strategy attempts to put across the following:

3. How can we allocate resources to most efficiently and effectively support business-level strategies?
4. How can we use resources to meet the firm's objectives within a specific product market?

The strategic analysis and inputs of the various decision-making points then get formulated into the annual operating plan, broken down into a business account plan for each key customer.

The fundamental of the definition for customer experience apply for B2B companies. In B2B deals setup, marketing do not dominate when it comes to point of contacts with the customer. It is often the key account and operations people who deal with customer projects, directly facing their customer counterparts. The relationship in a B2B setup is a functional, logical relationship by nature and creates a holistic awareness of the customer experience issues.

Consistent quality, short and smooth deliveries, these are all great for the service providers' experience. There is no substitute for having a good solution, but many other factors can be considered when trying to boost the experience in an infra deal. Whatever may be thee associated elements and components; it all comes down to a simple question of whether the customer wants to experience it again or not, with the existing vendors.

End Notes

Emerging marketing practices have recently been the growth engines for B2B. The boundary between voice and data, video and telecom, mobile and fixed are blurring; hence, each B2B buyer and seller needs to be on top of the changing trends. The new world is opening up path-breaking solutions and multiple B2B opportunities. The new-age telecom manager must be abreast with these latest changes. This may lead to new players entering the emerging markets and fragment the telecom and ICT infrastructure supply business.

Intense industry competition and the high cost of setting up and operating the infrastructure provide a strong business case for infrastructure sharing. Moreover, several benefits are associated with infrastructure sharing. For example, it helps in reducing capital and operating expenditure, and in achieving speed-to-market. It also allows operators to offer mobile services when their own network signal is not available, as well as ensures optimum usage of scarce national resources and access to areas where it is difficult to acquire sites.

Buyers move in and out of each stage. Firms need to be prepared to engage buyers throughout the cycle. Organizations have to become better at determining what need and what questions buyers have when they decide to engage in the sales process. Understanding the buying cycle and the key needs buyers have at each point can help marketers and sales reps to create a knowledge base with relevant content that a sales team can leverage during the sales cycle.

An infra deal whereby the value of $100-million material is to be supplied to the customer warehouse will always be more profitable than a $100-million deal which has to be shipped in parts to various warehouses. While the company may celebrate both the deals, the profitability calculations will show that the second deal is less profitable as compared to the first one. The only reason is the difference in cost to serve both the deals.

In telecom business management, it is very important for all the stakeholders to understand the responsibilities and accountabilities of each person. While smaller teams can have more informal rules to keep track of responsibilities, in bigger teams with cross-department and inter-organizational collaboration, it is very important to create a more formal process to track responsibilities. This helps reduce confusion and leads bid management and quotations to be generated fast.

Descriptive Questions

1. Explain the differences between B2B and B2C marketing.
2. What are the various B2B buying situations?
3. What are the steps in B2B buying process? Explain with a telecom-led example?
4. Write in detail the factors affecting cost to serve with suitable examples.
5. What are the hierarchies and structures in B2B telecom business management?

CHAPTER 6
THE SEMICONDUCTOR CHIPSETS ECOSYSTEM

Learning Objectives

After completion of this chapter, the students will have a good overview of the Indian telecom sector with regard to:

- The definition and importance of various chipsets in telecom
- Smart connected devices
- Chipsets ecosystems
- Practical problems in chipsets selections
- Chipsets business management and marketing
- Introduction to machine-to-machine (M2M)

❒ 6.1 INTRODUCTION

The good old days were about choosing a mobile phone based on mere design and exterior known hardware specifications. Now gone are the days when a mobile phone was judged by its design. In the past, no one really cared about the speed of the interface or the number of pixels in the display, a phone was popular because of the brand and the design. Let's evolve to the present mobile phone industry (tablets included) which is not just competing with the PC market but in fact has overtaken it by miles. Naturally, if mobile phones (smartphones to be specific) are being compared to computers then like any such gadget, the main processor or CPU is the first to come across major changes/upgrades and overhauls. Since at the end of the day, your camera, screen resolution, apps and OS can only improve if the CPU gets more powerful.

'Chipset' is defined as a group of specialised chips that connects the processor with external devices such as a graphics processor. In the telecommunications world, chipsets have become increasingly important, because they integrate the processing functions of a computer with a cellular connection, all of which goes into smartphones and tablets. Qualcomm's SnapDragon chipsets, for example, handle both the network connection and the processing power. They're also referred to as a system on a chip (SoC). Nvidia, meanwhile, also has a mobile chipset business, called Tegra.

Smartphones have gone from single core to dual core and now quad core and it's only going to keep increasing. With companies throwing around terms like Snapdragon, Tegra 3, Mali-400, Cortex-A9, etc., it's a daunting task to keep up with the different CPUs and chipsets in the market.

❒ 6.2 WHAT IS AN SoC?

SoC is short for System on a Chip, an integrated circuit that combines all the primary components of a computer into a single chip. You can consider it as your CPU, graphics card, memory controller and other components all rolled into a single frame of reference. The handset OEMs or ODMs can simply place this chip in their device layout and reap the benefits of reduced time to market. This saves time and effort of having to implement the CPU, graphic processing unit (GPU) etc. manually.

6.2.1 What's so Important About Different Graphic Processing Unit?

Unlike the CPU component in an SoC, the graphics portion is manufactured by multiple vendors. This gives companies the option to pick and choose which GPU goes best with the CPU in their SoC. Today GPUs are used for much more than just playing games and are as crucial as the CPU. Today's operating systems rely heavily on the GPU. This is because the interface and all the animations are rendered on the graphics chip. It also comes in handy when watching HD videos and similar value added experiential services. Few popular GPUs are given here.

6.2.1.1 ARM Mali

Mali is a series of GPUs produced by ARM. The Mali chip doesn't actually have any display controller built-in to dive the LCD panel.

6.2.1.2 Qualcomm Adreno

After some company restructuring, AMD officially discontinued this line of mobile media chips in 2008 only to be bought by Qualcomm later that year for $64 million. After Qualcomm stepped in, they changed the branding to Adreno. It has since been used in Qualcomm's Snapdragon SoCs, their most popular ones being the Adreno 205, Adreno 220 and Adreno 225.

6.2.1.3 Nvidia Geforce

The name Geforce is synonymous with graphics cards ever since they introduced it, way back in 1999. Nvidia developed these graphics chips in-house and till now, only feature in their own TegraSoC.

❒ 6.3 THE NATURAL WAVE OF GROWTH

Mobile computing takes the impact of the web to the next level. It is for this reason that devices with high end operating systems need processing and graphics capabilities that are world class. The processors and associated chipsets need to consider a diverse set of applications like retail, advertising, media and entertainment.

The next wave of growth is coming whereby mobile and web will reshape the industries. While the domain is moving towards an M2M interface capability, there are devices evolutions to cater to sectors such as energy, healthcare, automotive,

banking and finance. Such applications on devices are extremely processor and GPU intensive. For this reason, chipsets ecosystem becomes important and critical for the telecom business management.

6.3.1 Smart Connected Devices (SCDs)

SCDs are defined as desktop PCs, portable PCs, tablets, 2-in-1s (tablet + smartphone) and smartphones converging into a simple and single ecosystem. Consulting firms expects the number of smart connected devices (SCDs) shipped worldwide each year to grow to 2.4 billion units. It is also anticipated that smartphone shipments will outpace total PC shipments by more than 6 to 1 in 2018.

According to a new forecast, worldwide phablet shipments (smartphones with screen sizes from 5.5 to less than 7 inches) will reach 175 million units worldwide in 2014, passing the 170 million portable PCs expected to ship during the same period. In subsequent year, total phablet volumes will top 318 million units, surpassing the 233 million tablets forecast to ship in 2015.

While phablets are a relatively new category of device, first picking up volume in 2012, the pressure that the category has placed on the tablet market has already been clearly observed as the growth of smaller, 7 inch tablets has begun to slow. More consumers will shift back toward larger-sized tablets with their next purchase.

As the SCD market matures, and emerging markets drive more of the growth, the percentage of the market made up of phablets plus regular smartphones is expected to increase. While consumers in places like the United States and Western Europe are likely to own a combination of PCs, tablets and smartphones, in many places the smartphone—regardless of size—will be the one connected device of choice.

Mobile computing is a space where consumers are still trying to figure out what mix of devices and screen sizes will suit them best. What works well today could very well shift tomorrow as phones gain larger screens, tablets become more powerful replacements for PCs, and even smart watch screens join the fray. This entire SCD phenomenon sits on the cusp of chipsets processing and graphical capabilities, shaping the future of connected devices.

6.3.2 Hardware, OS, Software and Ecosystem

There are four layers of chipsets ecosystem that completes the proposition from various vendors. They being the following:

1. **Hardware:** This comprises of the CPU, GPU, modems, memory, digital signal processors (DSPs), video audio capability, location-based support and sensors, wifi/Bluetooth capability, power management and various radio frequencies band support.
2. **Operating systems:** Android, BADA, blackberry, brew (qualcomm), windows and ios being the popular operating systems that top up the capabilities of chipsets. These two elements (chipsets and OS) have to work in sync and tandem.
3. **Software:** Advanced software technology for entertainment, camera, connectivity, web, computer graphics, augmented reality are few of the high level functionalities that have to be considered based upon the chipsets capability

4. **Ecosystem:** These are the externally impacting parts of the interfaces like carrier/operator flexible and friendly services, developer system and software tools, Application Interfaces, developer hardware elements.

All the above four elements are essential and important as a fulcrum to be based on the chipsets ecosystem considered for devices.

❒ 6.4 THE PRACTICAL UTILITY PROBLEM IN CHIPSETS SELECTION

We all know that the telecom devices are not stationary objects any more. They move within a location and to as far as other countries. Various countries have various RF bands and at times it becomes practically difficult to accommodate all of them in a single chipset configuration. Few examples of band support required for 3G by region are as follows:

6.4.1 North America

1. UMTS/CDMA 1900
2. UMTS/CDMA 850
3. LTE 700
4. TD-LTE 2600
5. MSS 1500
6. MSS 2100

6.4.2 South America

1. UMTS 2100
2. UMTS 1800
3. UMTS 1900
4. UMTS 850

6.4.3 Europe

1. UMTS 2100
2. UMTS 900
3. CDMA 450
4. LTE 1800
5. UMTS 1800
6. UMTS 2600
7. LTE 800
8. LTE2600-FDD
9. LTE-TD2100

6.4.4 China

1. UMTS/CDMA 2100
2. CDMA 850

3. CDMA 450
4. TD SCDMA 1900
5. TD SCDMA 2000
6. TD LTE 2300
7. TD LTE 2600

6.4.5 India

1. CDMA 850
2. UMTS 2100
3. UMTS 900
4. TD LTE 2300

6.4.6 Japan

1. CMDA/UMTS 850
2. UMTS/CDMA 2100
3. UMTS 1700
4. UMTS/LTE 1500
5. LTE 1500
6. LTE 850
7. LTE 900
8. TD LTE 2600

6.4.7 South Korea

1. UMTS 850
2. LTE 850
3. UMTS 2100
4. CDMA 1700

6.4.8 Australia

1. UMTS 2100
2. UMTS 850
3. UMTS 900
4. LTE 2600

The imminent problem is that internationally there are 40+ RF band plans that operate in multiple countries/continents. Chipset manufacturers have a tough time accommodating these band plans in the configurations.

❒ 6.5 CHIPSETS BUSINESS MANAGEMENT PROCESS

The chipset companies have to take variety of business management initiatives in order to be competitive in the market place. There are a few levels of influences that chipset companies need to be working upon regularly:

1. **Regulatory:** The regulatory decisions in India are critical to drive the wireless technologies in India. Based on the spectrum that is cleared and the timeline to implement the technology, chipset companies need to brace for the types of devices and such solutions that will appear in the telecom horizon.
2. **Infra:** The infra companies play a crucial role in decision-making of time to market for various technologies. A technology is as good as the variety of devices that are available. Hence, timely and widespread deployment of infra plays a paradigm role in chipset ecosystem.
3. **Deployment services:** The chipset companies help carriers in technology deployment which also helps the networks to get fine-tuned for devices supporting a particular technology and the extent of the same.
4. **Launch support:** Chipset companies have engineering services for launch support. For example if a chipset company is able to provide 3G launch support then proliferation of 3G devices will be faster and easier.
5. **Content management:** Chipset companies influence the content ecosystem based on the type of chipsets being deployed and their content handling capabilities.
6. **Customer:** Chipset companies give advertisements for end customer awareness to that the customer will ask for devices made with a particular brand of chipsets.

The second dimension of business management practices in chipsets companies are highlighted in the following:

1. **Operating Systems:** The operating system choice for a device becomes critical to the type of chipset selected. For example MS Windows on Lumia recommended Qualcomm Snapdragon exclusively. The OS makes are extremely aware of the performance impact that a chipset can have on the device and hence, don't take chances on the same.
2. **ODM/Reference Designs:** The chipset manufacturers create a reference design which can be used as is by device manufacturers. This gives the device manufacturers a facility to quickly put a new user interface and launch the products quickly in the market
3. **OEM:** The ODM-OEM relationship is catalysed and facilitated by chipset companies so that their preferred partners are able to get a lion share of business.

Chip makers are facing a new set of business challenges. While the typical corporate goals of introducing more new products with increased functionality at lower costs or tighter market windows still exist, the rules by which these need to happen have changed. No longer can chip designers depend on new tools from vendors to continually squeeze more performance out of their design processes—and staffing levels are continually under tight scrutiny. In order to be successful, chip makers need to address a new set of business challenges. These challenges include:

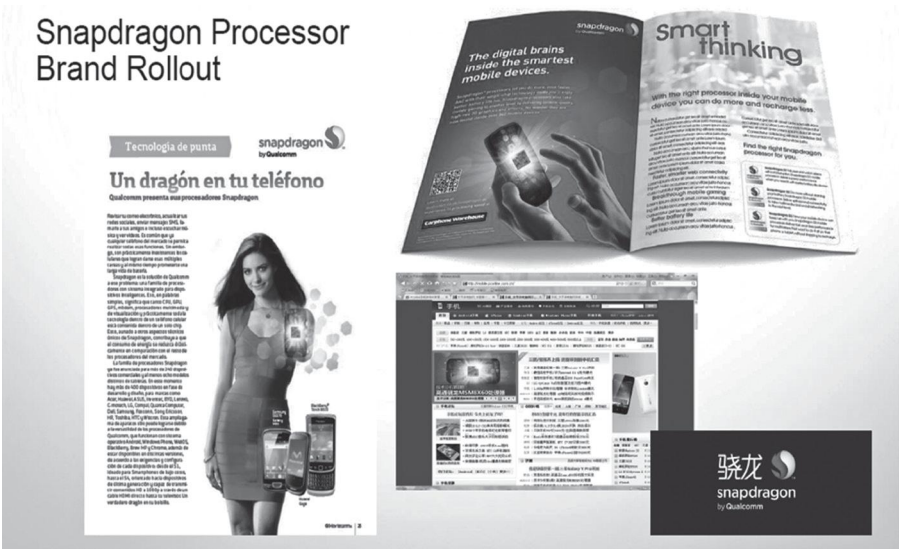
1. Managing a more disaggregated design supply chain, including resources spread across multiple locations, or even multiple companies
2. Increasing the use of design partners, outsourced resources and third-party manufacturing sites
3. Achieving more aggressive schedules and predictable results through better project management instead of adding new tools or resources

4. Increasing profitability by designing chips that can be used in more than one product—typically requiring design platforms that combine hardware, software and more computational functionality.
5. Leveraging the benefits of industry best practices and corporate standards to streamline design processes
6. Fully utilising existing resources in the most effective manner by assigning the right resource with the best skills to critical projects when they are needed
7. Enabling a collaborative design environment built upon effective communication and carefully planned design strategies
8. Continuously improving design quality and team efficiency, enabled by collecting design process metrics
9. Providing greater visibility and accountability into critical design tasks and daily events in order to make better decisions

The key to meeting these challenges is better project planning, marketing management execution and tracking. No given chip maker is likely to experience all of these problems at once, but without good project management tools in place the risk of running into any of these challenges, and their resulting consequences, is dramatically increased. The use of good project management tools, and methodologies to use them, will significantly mitigate such risks.

❒ 6.6 BRAND MANAGEMENT BY CHIPSET COMPANIES

It is evident in India that chipset companies plans to more heavily advertise its brand, including to smartphone users. These companies' new advertising push won't be as bombastic as Intel's 'Intel Inside' marketing effort but subtle and impactful.



Source: http://timdelucasmith.com/2012/05/31/advertising-snapdragon-to-smartphone-consumers/

The chipset companies work with their partners, including handset makers and operators, to promote their brand (including its Snapdragon brand) to end users. Some chipset companies provide marketing funds to partners for advertising their brands on their products.

Source: http://freshersplane.com/news/karbonn-and-innominds-unveil-agnee-7-inch-3g-tablet-android-ics-in-india/

Smartphone users sometimes have a personal relationship with their phones, and if the chipset maker can connect with the consumer about silicon can power that phone then the consumer can create a pull for the chipset-based devices.

The chipset companies use three types of brand management strategies:

1. **Cobranding:** Providing marketing funds for device users to co-promote the chipset and use the chip manufacturers name in marketing
2. **Advertising:** Self-promotion through TV, print and out of home.
3. **Retail:** Working with large format retail chains for device push based on a particular chipset.

Source: http://www.tataphotonplans.com/tata-photon-wi-fi-hub

❒ 6.7 REFERENCE DESIGNS

Tier-one OEMs have long resisted using the device reference design from chipset suppliers as they see it as an integral part of their brand and differentiation. However, fierce competition from small vendors is now forcing tier-one OEMs to change their strategy.

They are now considering using third-party reference designs, essentially in the cost-sensitive segments of the market (sub-$200).

There are researchers who believe that more than one-third of smartphones being shipped were based on reference designs supplied by key chipset vendors. Almost 70% of these devices on reference designs were launched at below US$200 price points. The emergence of reference design programmes by chipset suppliers such as MediaTek, Qualcomm intend to greatly help small vendors (read China) which provide the devices in India, to compete at the lowest tier of the smartphone market.

The following are the benefits of reference design approach:

1. **Reduced time to launch:** With accelerated design and engineering, as is or customisation options for comprehensive hardware and software, gaining trust with more track record of initial success
2. **Minimised Non-Recurring Engineering (NRE):** On tactical components provides effective cost savings, ensuring that saved investments can be used for differentiation. This also ensures maximum return on engineering investments
3. **Design flexibility and feature innovation:** Chipset companies offer a vendor list of preferred component suppliers, third-party component labs for testing and verifications. This helps in providing a rich software and development ecosystem.
4. **Broad portfolio enablement:** Offering support for worldwide technology support like CDMA, HSPA, LTE single mode and multimode with CSFB (and VoLTE in due course). This also ensures capability and interoperability across various technologies.

The next smartphone disruption comes not from the power struggle between Apple, Google and Amazon, but from chipset companies trying to make a mark in the market place

Chipset companies seek to build platforms to create some form of lock-in. Use one platform by an ODM/OEM can become hard to move off it, creating repeat business for the chipset company. A chipset platform can block out competitors, bind customers in and create valuable partnership opportunities for retention and development.

In the mobile industry, the most widely known platforms are probably the operating systems for smartphones, like iOS and Android, where we commonly speak of OS battles. However, there is another layer of platforms much further down the phone stack that can cause as much disruption to the smartphone industry, which operate at the chipset level.

The chipset vendors have created a platform from various devices. The chipset companies commonly provide tools, testing and help with operator certification and field testing. The transition of mobile chipsets from a product business to a platform business took place few years ago, largely coincident with the rise of 3G networks.

❒ 6.8 THE M2M WAVE WITH CHIPSETS

M2M refers to technologies that allow wireless and wired systems to communicate with other enabled-devices.

Mahindra Reva partnered with telecom operator Vodafone for powering its electric cars with M2M communication services, with which users can remotely lock their car, control air conditioning as well as get emergency boost charge for their vehicle.

The telecom and consumer electronics market has experienced an incredible growth during the digitalisation era in the last decade. Today, dedicated devices such as digital cameras, handheld gaming consoles and PMPs are facing fierce competition from converged multipurpose devices such as smartphones and tablets. Mobility, connectivity and personalisation are three of the most important current trends within consumer electronics. Instant access to information, using social networks and consuming and sharing media are becoming important parts of people's digital lifestyles. Due to maturing markets and stunted ARPU growth, mobile operators all over the world are showing increasing interest in the consumer electronics market. The growing desire for people to stay connected makes wireless consumer devices an opportunity for the telecom industry to expand their market beyond mobile handsets.

Consumer electronics has emerged as a new major application category for cellular M2M in the past years. Consumer M2M devices are neither classified as handsets, PCs, tablets nor traditional M2M devices. The product category includes e-readers, portable media players, gaming consoles, digital cameras, digital photo frames, traffic information devices, personal tracking devices, wellness and fitness devices and user programmable sensor devices. The reasons for cellular connectivity vary and are often a way to meet the needs for connected features introduced in multipurpose devices. Media and entertainment devices can offer instant distribution of digital content. Imaging devices enable instant media sharing on social networks and seamless usage of cloud storage services. Personal navigation devices and speed camera warning devices can provide users with real time traffic information and other dynamic online content. Personal tracking devices and wellness products enable remote monitoring of sensor statuses such as location, blood pressure and glucose levels. Fitness applications allow for mobility that often is a necessity in these types of products.

The market for consumer M2M devices is still in its early stage. Until now, the most connected device categories are e-readers, PNDs, digital photo frames and handheld gaming consoles such as the recently introduced Sony PlayStation Vita. Berg Insight estimates that total shipments of consumer M2M devices reached 7.1 million devices in 2011. Growing at a compound annual growth rate of 39.8%, the shipments are expected to reach 37.9 million devices in 2016. Berg Insight estimates that the number of connected M2M consumer devices reached 12.7 million at the end of 2011. Growing at a compound annual growth rate of 38.6%, the number of network connections from consumer M2M devices are expected to reach 65.0 million in 2016. E-readers, digital cameras and handheld gaming consoles will then be the most common consumer M2M devices accounting for 45%, 32%, 8% and 6% respectively of the total number of connections. North America is currently the most important market for consumer M2M devices and accounted for about 5 million of the total device shipments in 2011. The second largest market is Europe with 1.7 million device shipments

followed by the rest of world with 0.5 million device shipments. North America will remain the largest region with a market share of 40% in 2016. Europe and the rest of world will account for 30% each of the connected device shipments in the same year.

Continuously decreasing prices of cellular modules and chipsets are key developments for growth in the connectivity market. The deployments of high-speed cellular networks such as HSPA+ and LTE on most markets are another important driver enabling bandwidth-hungry applications. The exploding sales of connected mobile broadband products such as tablets further illustrates the benefits of cellular connectivity and will increase the demand for other consumer M2M devices as well. The telecom industry is depending on multiple connections per user for growth but to make it attractive for consumers to have multiple devices with cellular connections, a great deal of business model innovation is required.

In order for the consumer M2M market to take off, price on mobile data has to decrease and subscription fees for every single connection need to be lowered. Instead, more consumers would be willing to have multiple connections, which will allow for an increased total ARPU. Device vendors and network operators are also advised to focus on bundling compelling services and products that include the price of mobile data instead of marketing actual mobile data subscriptions

The evolution of low cost and compact M2M devices with high uptime and battery sustenance are few functions that the chipset performance and power management has to deliver. M2M will be as good as the chipsets capability in the devices.

End Notes

'Chipset' is defined as a group of specialized chips that connects the processor with external devices such as a graphic processor. In the telecommunications world, chipsets have become increasingly important because they integrate the processing functions of a computer with a cellular connection, all of which goes into smartphones and tablets. Qualcomm's Snapdragon chipsets, for example, handle both the network connection and the processing power. They're also referred to as a system on a chip (SoC). Nvidia, meanwhile, also has a mobile chipset business called Tegra.

The imminent problem is that internationally there are 40+ RF band plans that operate in multiple countries/continents. Chipset manufacturers have a tough time accommodating these band plans in the configurations. The chipset companies have to take variety of business management initiatives in order to be competitive in the market place.

It is evident in India that chipset companies have plans to more heavily advertise its brand, including smartphone users. The emergence of reference design programmes by chipset suppliers such as MediaTek and Qualcomm intend to greatly help small vendors (read China) who provide the devices in India to compete at the lowest tier of the smartphone market.

Continuously decreasing prices of cellular modules and chipsets are key developments for growth in the connectivity market. The deployments of high-speed cellular networks such as HSPA+ and LTE on most markets are another important driver enabling bandwidth-hungry applications. The exploding sales of connected mobile broadband products such as tablets further illustrate the benefits of cellular connectivity and will increase the demand for other consumer M2M devices as well.

Descriptive Questions

1. Write a note on various components of chipsets like SoC and GPUs.
2. What are the challenges faced by chipsets manufacturers in technology and marketing?
3. What are reference designs and their advantages?
4. What are the steps involved in chipsets business management process?
5. Write a note on M2M ecosystem being fuelled by chipsets and devices.

CHAPTER 7

TELECOM OUTSOURCING, VENDOR AND TRANSITION MANAGEMENT

Learning Objectives

After completion of this chapter, the students will have a good overview of the Indian telecom sector with regard to:

- Definition of telecom outsourcing public managed services
- Reasons for outsourcing and deciding vendors capability
- Areas of migration and knowledge transfer
- Transition and transformation models
- Knowledge management engagement and business continuity planning

❒ 7.1 INTRODUCTION

Today's networked society is ever increasing in connects with one another. With multiple entities and devices connected with one another, the carriers and device companies are under severe pressure to increase/maintain quality of service, differentiate themselves from competition and move the consumer life cycle from acquisition to retention and further to loyalty/customer development The converging industries like telecommunications, broadcast media, utilities and transport must step up and innovate to meet these challenges. This can only be done by redefining the way they do business, the approach they take to selecting partners and what they expect from them. Here is the need of outsourcing and more critically vendor management which needs to be done consistently at world class levels.

Telecom outsourcing or managed services is a partnership between a vendor and a customer in which the vendor assumes responsibility for activities such as designing, building, operating and managing the day-to-day operations of the customer's network or solution. This could involve either the entire network or solution, or only a portion of it. An operator could choose to let a vendor, such as Ericsson, take responsibility for all activities within one network or for a specific activity across all networks. Or a customer could choose to hand over responsibility for all activities across all networks.

7.1.1 Change in Focus

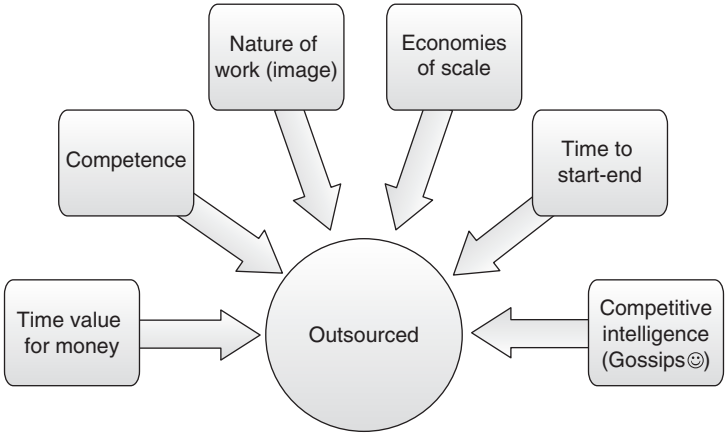
Network operations have traditionally been central to the business of providing communications services. In the past close to two decades, this has changed. The landscape of technology and telecom is changing and evolving at a rapid pace. Considering a customer centric approach, the telecom operators and broadcasters are re-evaluating

their position in the value chain. They are opting to choose focussing on offerings, marketing and end users requirements more than managing the back end and support systems. However, with multiple convergences and load on network from various domains, communications networks are playing a greater role in the operations of other businesses. Increasingly, it makes a lot of sense for all of these related entities to forge relationships with partners that have the technical expertise and experience required to manage and transform highly complex networks. The complexity of these networks stands to increase over time and no way can service providers keep pace with this change in terms of competence development and infra utilisation.

❒ 7.2 OUTSOURCING AND VENDOR MANAGEMENT

Outsourcing of networks or operations is predominantly done due to the following reasons:

1. **Time value for money:** If the operator staff can generate more value in the same time in which they are managing networks then the case for outsourcing favours time value for money
2. **Competence:** Complexity of networks causes competency issues and evolution of skills at a particular stage. This is taken care of if the same is outsourced to a company which actually created the products and is upgrading the same regularly.



Outsourcing Due To?

3. **Nature of work:** The operators may find their core competency in sales and marketing as compared to network management and business support systems.
4. **Economies of scale:** Outsourced partner will be supporting multiple entities with same staff modules and hence has tighter work integration. This will lead to lower opex at the operator level and predictable expenses for network management.

5. **Time to start-end:** The time to start-end is managed and ensured by a partner hence there are lesser chances of slippages. There are alternatives of liquidated damages and force majeure conditions which can be applied on partners whose performance is not up-to the mark
6. **Competitive intelligence:** Outsourcing leads to more learning about what's happening at the other end, though the same may not be explicit in the contract

The operator challenges that lead to outsourcing include:

1. **Operational efficiencies:** These are compromised based on the silo approach that starts getting practiced due to the sheer scale and footprint of organisations.
2. **Services launch:** Time to market issues due to network management can cause delay in service launches and hence makes a good case for outsourcing.
3. **Reduced opex:** Every operator envisions year over year reduction in operational expenses and sometimes the same is not predictable. With outsourcing, SLA-based parameters are put in place that make opex predicable.
4. **Staffing and competence:** This is a crisis area for any operator. With evolution in GSM/CDMA, EVDO/HSPA, 4G technologies it is hard for carriers to keep pace with competency development.
5. **Security and quality of service:** Each network element needs to be secure with expected quality of service which becomes an issue for day-to-day network operations management.

The four elements that are forcing the operators to take measures for sustainable differentiation are:

1. **Dynamic changes in business:** Voice is saturating, data is under QoS issues, new devices and services are evolving every day.
2. **Technology evolution:** This is unprecedented and unpredicted and hence the sustainable difference issues keep hounding the service providers.
3. **Financial pressure:** With debts surmounting and voice ARPUs under pressure, operators will do what it takes to reduce capex and opex.
4. **End user focus:** This is primarily what the operators believe is their core competence and hence they are willing to consider outsourcing of support and network aspects in order to focus more on the sales, marketing and customer lifecycle value impacts.

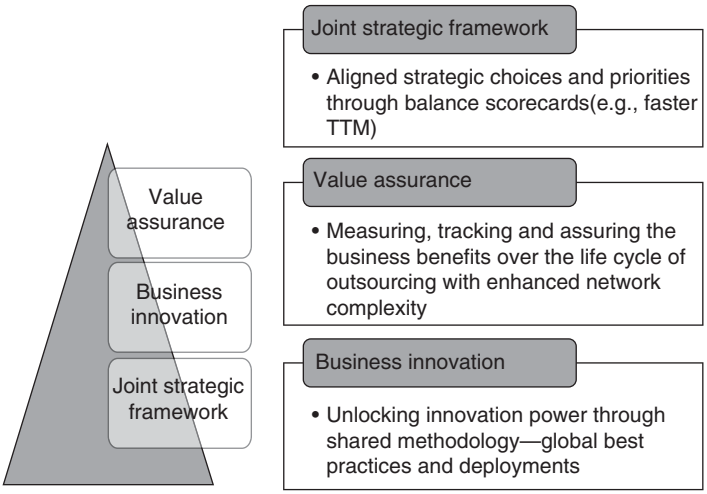
7.2.1 Deciding Vendor's Capability to Insource

Before the service provider decides to outsource its services, they will look up at vendor's operational readiness to insource. The operational readiness can be evaluated on the following parameters:

1. **Business and technology transformation:** CDMA to GSM
2. **Green fielder:** This includes build operate and transfer networks
3. **Technology migration:** HSPA, LTE
4. **Platform evolution:** IMS platforms evolution
5. **New to market:** Launching 3G in the market in early stages

❒ 7.3 AREAS OF MIGRATION AND KNOWLEDGE TRANSFER

There are three elements which are critical to effective to migration and knowledge transfer.



Source: http://archive.ericsson.net/service/internet/picov/get?DocNo=36/28701-FGB101127&Lang=EN&HighestFree=Y

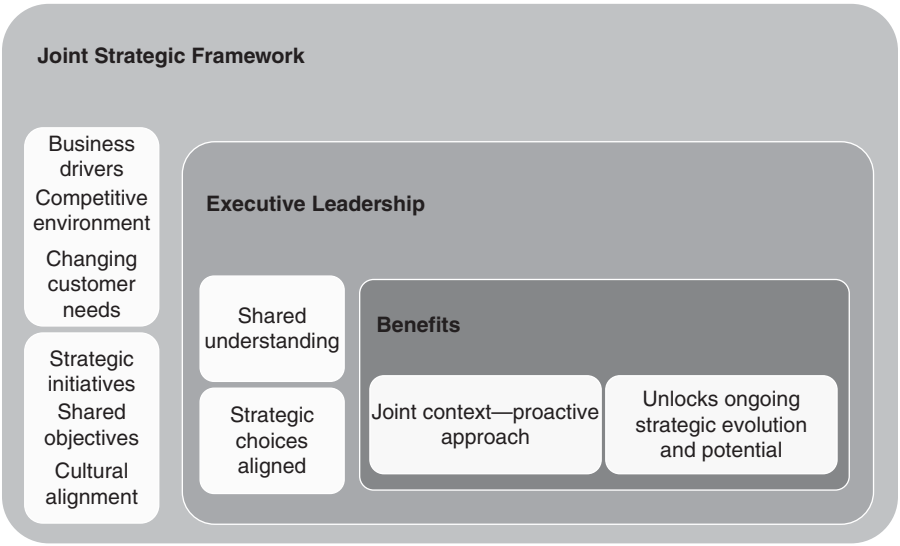
They being the following:

1. **Joint strategic framework:** This includes aligned strategic choices and priorities which may be exchanged through balance score cards. For example, faster time to market.
2. **Value assurance:** This involves measuring, tracking and assuring the business benefits over the life cycle of outsourcing with enhanced network complexity.
3. **Business innovation:** This involves unlocking innovation power to a shared methodology. This includes global-based practices and deployments.

7.3.1 Joint Strategic Framework

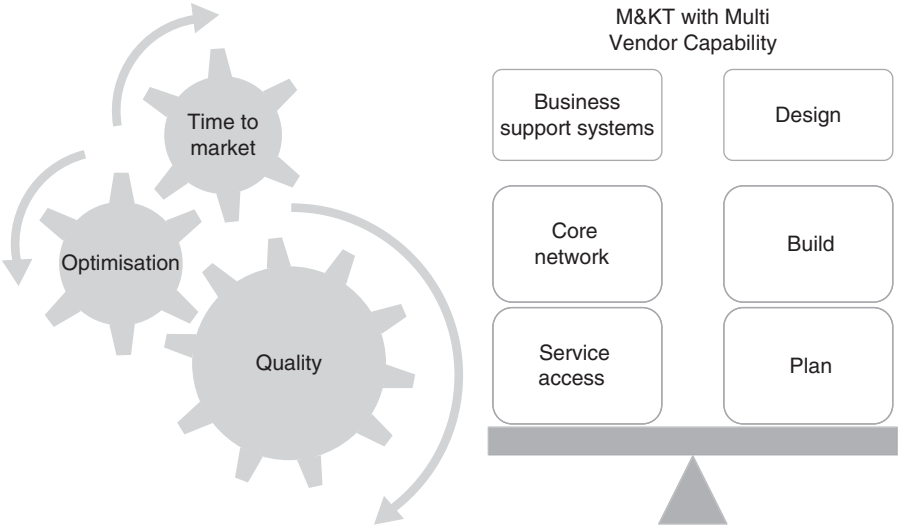
Joint strategic framework includes business drivers which ultimately look at the competitive environment to approach and address the changing business needs of the customers. This framework also includes strategic initiatives which lead to shared objectives. This helps in cultural alignment between the vendor and the customer.

It is important that in joint strategic framework the executive leadership on both sides should also been mutually aligned. This is only possible by shared understanding and the strategic choices on both sides to be mutually agreed. The benefits of joint strategic framework are evident because a joint context is created which ensures proactive approach. The other benefits are that it unlocks ongoing strategic evolution and potential.



7.3.2 Value Assurance

Value assurance has the following important aspects to be considered:

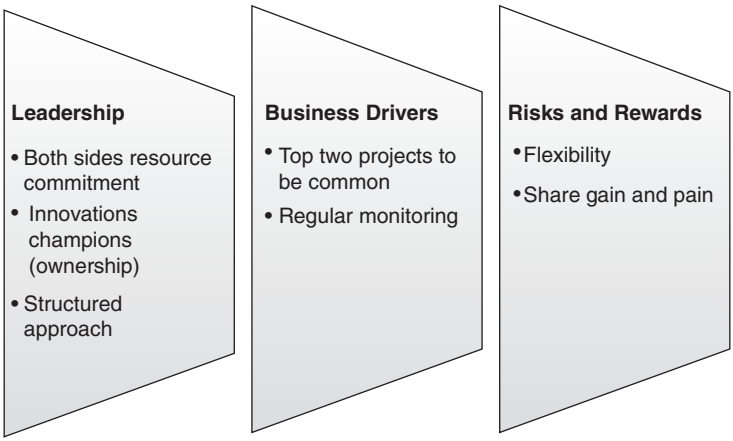


1. Ensure network quality during launch or while swapping/modernising an existing network. The value assurance also improves accessibility; retain ability, quality, mobility, data performance of the various key performance indicators that are measured. The time to market impact results in shorter time to profit with assisted network migration and launch. The migration and knowledge

transfer also gains importance during multi-vendor network management which includes designing, building and planning of business support systems, core networks and service access.

7.3.3 Business Innovation

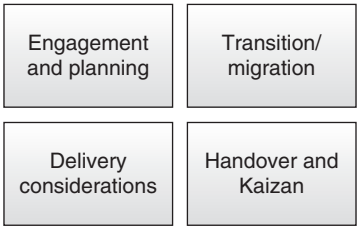
For joint business innovation resources are equally committed on both sides. There are innovation champions identified on the both the vendor and service provider end which ensures innovation ownership such commitments also lead to a structured approach and commitment to innovation.



It is recommended that the top two innovation projects should be common between both the organisations and regular monitoring mechanism must be in place. Finally the risk and rewords need to be shared and there must be adequate flexibility at the leadership end to keep meeting regularly and monitoring required course of action and required course correction if any.

❒ 7.4 TRANSFORMATION MODEL

Once it is decided to outsource operations, the transformation model has the following four important elements:



1. **Engagement and planning:** This includes due diligence, risk analysis, transition and communication.
2. **Transition and migration:** This includes people migration, service delivery migration, contracts migration, assets migration and processes engagement.
3. **Delivery consideration:** Local processes and tools, global processes and tools
4. Handover and Kaizan is about full services cut over and ongoing improvement.

A managed services agreement gives operators a clearer, more precise cost structure that they can use to reduce network operating costs. However this is with a premise that at least 15–20% cost saving will be incurred based on the outsourcing and vendor management business model. The time and resources saved allow operators to increase their investments in activities such as sales, product development or customer management.

7.4.1 Engagement Sustainability

Currently, many networks are outsourced just for operations but also for Energy Management. This means that vendors operate infrastructure on behalf of operators with the aim of reducing energy-related costs, promoting efficient use of energy and improving network availability. The service includes around-the-clock, real-time monitoring of both active and passive infrastructure. 'Active infrastructure' is equipment such as base stations and antennas that directly facilitate telecommunications, while 'passive infrastructure' is equipment such as generators and batteries that play a supporting role. Remote and onsite problem resolution is available for all operator sites.

❒ 7.5 EVOLUTION IN MANAGED SERVICES MODELS

In the evolved models the role of managed services has changed since operators are searching for further values and benefits which differentiate one managed service partner from the other. More than ever, operators are looking for new ways to stand out from the growing competition since sustainable innovation is an important aspect for benefits accrued by managed operations.

Ultimately, every service evolution must finally rest on the difference it can make to the customer experience. The experience centric managed services model focuses on customer expectations and demands, aligning service delivery in accordance with these requirements. This is based on focussing toward the customer's customer (e.g., what would a customer demand from Airtel that a managed services vendor like Ericsson can provide).

Each managed service vendors' differentiated engagement models are designed to meet the unique needs of each operator. The traditional telecom managed services model is focused on reducing cost and reducing complexity.

The experience centric managed services model aligns service delivery with the operator's strategic and business objectives, securing a customer experience centric operation that proactively drives business innovation.

7.5.1 Scale, Skills And People

Managed services are about people, and over the years lakhs of employees would have been transferred to managed services provider from operators around the world. The managed services partner has to invest heavily in people and focus on competence development and employee engagement. This is the only way they can create a culture centred around innovation in a knowledge-based organisation. This will be the catalyst for unlocking value to levels previously not thought possible with managed services. The way the managed services vendor is perceived as an employer is also important, and their goal is for that impression to be characterised by core values or equality and equal opportunity for all. The employees who joined from operators not only improve understanding of customers, but also of the needs of consumers around the world.

Scale is also about replicating success for customers around the world. By using common tools, methods and processes, vendors develop and industrialise new ideas rapidly while achieving greater efficiency in network operations. Furthermore, the vendor's purchasing power with third-party suppliers makes them more effective negotiator than individual operators can be on their own. This leads to economies of scale and benefit transferred to the operators in reasonable proportions. It is a well-known fact that highly motivated and empowered employees are the key to migration and outsourcing success—and also the success of the service providers KPIs meeting.

The concept of delivering managed operations has been industrialised with Global Network Operation Centres and field service organisations setup by various outsourcing partners. The major investments are in tools, methods and processes for service delivery.

The Global Service Centers allow the vendors to reach significant efficiencies of scale and focus on deliveries through remote management and maintenance. In combination with technology leadership of vendors, the research and development efforts and long arm innovation, makes for a very strong proposition for outsourcing and vendor management.

7.5.2 India

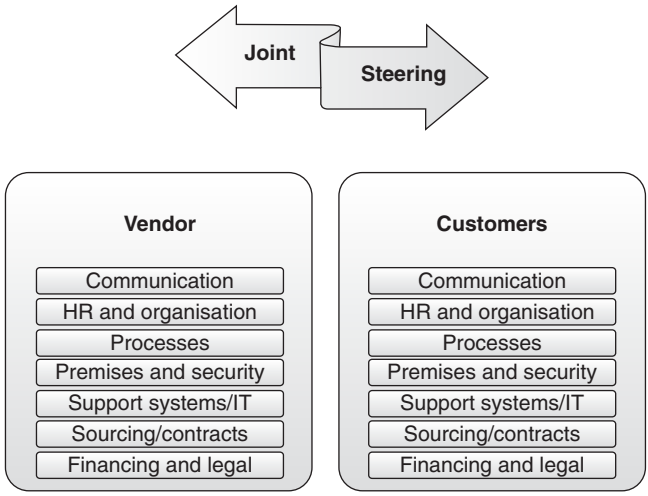
Ericsson signed its first managed services contract in India in 2004 with Bharti Airtel, India's largest telecommunications company. Toward the end of 2011, Bharti Airtel expanded its managed services partnership with its vendors for its operations in India.

Early last year, fully integrated telecommunications service provider Reliance Communications selected Ericsson to operate and manage its wireline and wireless networks. In 2012, Idea Cellular, the leading mobile services operator in India extended a managed services agreement first signed in 2007. Their vendor focus on ensuring network performance and a superior experience for users of Idea's 2G and 3G mobile networks.

Wireless broadband provider Augere entered into a 3-year managed services partnership with Ericsson in India in 2011. Ericsson is responsible for planning, designing, building, operating, maintaining and providing spare-parts management for Augere's TD-LTE (4G) network.

7.5.3 Migration and Knowledge Management Engagement

Migration and knowledge management engagement is a joint steering process for outsourcing and vendor management. In this context, the various functions on both sides need to start communicating with each other in order to develop and execute a robust outsourcing migration and knowledge transfer platform. The HR organisations on both sides need to sit together and understand the values and policies of employees. They have to agree on a common minimum program in terms of people transition. Such transitions need to be communicated to the employees well in advance. Each employee has the right to decide on their own fate, whether they would like to look for external opportunities or be a part of the transition.



Once the communication plan and transition plan is agreed between the organisations, the processes on both sides are put on the table and an alignment plan is initiated. This also includes the authorisation of people who will be granted access to premises with various levels of security clearance. The organisations then align together for understanding the sourcing processes and policies of the customer. Since the entire or part operations are going to be outsourced, it is important that the existing suppliers of service provider are aligned to the outsourcing partner. The validity and legality of contracts that need to be transferred has to be worked on a tri party basis. This needs to be worked upon in a tri party manner where the service provider, operator and the outsourcing partner needs to work together on the contracts and sourcing migration. Finally the legal and finance departments have to work together in terms of the process alignment and issues related to ownership, indemnification and other associated elements.

7.5.4 People Transition Management

The statement 'You are being outsourced' brings about various reactions amongst people. Some employees may think that the company is going out of business. Few employees might not react at all, however will be deeply concerned inside. There can also be opinions of insanity at the management level or considered to be a game of chess being played between two organisations. In order to overcome the aforementioned fears, there are three corner stone of successful people transition management during outsourcing.

1. People an organisation—capability and culture
2. Robust methods, processes and procedures
3. Systems and tools

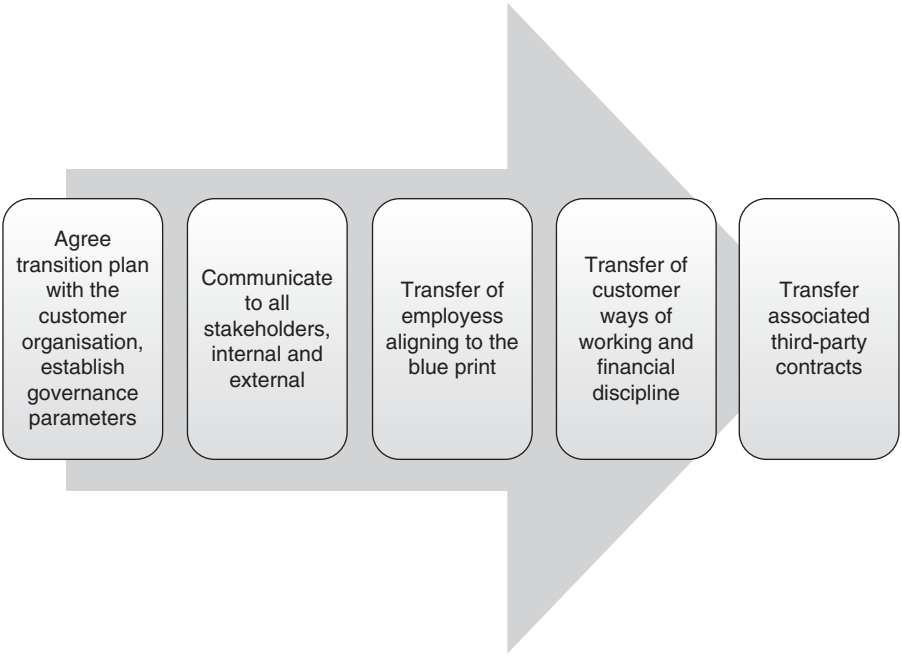
A vendor's HR experience during in sourcing is always a competitive edge due to the following reasons:

1. Managed services and outsourcing should be the vendor's core business and not a struggling vertical.
2. The vendor should be ready to instill continuity in managed services operations. This implies that the vendor should have fail safe fall back mechanisms.
3. Vendor and customer must agree that integrating the customer's resources in vendors' organisation is of uncompromised strategic value. This implies that the customer needs to ensure that his employees are not mistreated and disadvantage at the vendors end. The vendor should ensure that customer employees should always get fair treatment and equal opportunity. It is imperative to understand that service deliveries capabilities can be maintained and develop only with the right people.
4. The vendor must have strong experience in people management. This helps in right sizing the process during industry recession while ensuring that maximum employees are retained. It is good to have evidences at the vendor side about successfully transferred sizable staff strength in some parts of the world.
5. Industry reputation as an employer—The customer always considers the industry reputation of the vendor as an employer. Vendors employment reputation also plays a critical role during managed services decisions.

7.5.5 Transition and Transformation

The most important business consideration while managing people during transition is business continuity. This means that during transition the service quality should not be affected and worst case there should not be a complete suspension or lock down of services.

The objective of transition and transformation is primarily based on faith and trust. The transition needs to ensure smooth movement of employees, assets and responsibility from the customer over through the vendor. The transformation process is important to optimise the outsource service delivery organisation through best practices with the use of world class tools and operational processes.

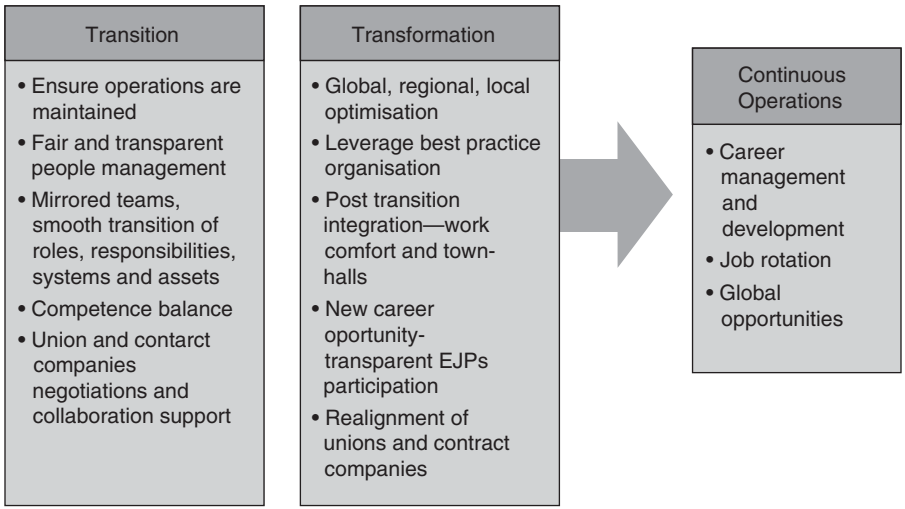


Transition management has the following steps, that need to be agreed between vendor and customer.

1. Agree on the engagement plan with the customer organisation and establish governance parameters. Good governance implies control over process and flow of information. Excellence in governance is much more critical in multi-vendor networks. Governance will enable customer to communicate and also major the performance of vendors. This also establishes a proper framework within which the customer expects the vendor to innovate such that alignment between both the businesses demonstrated. Good governance also ensures that the customer and vendors understands the mutual risks of process failure. For these reasons governance has to be consistently plan for ensuring accountability and responsibility.
2. Communicate to all stake holders (internal and external)—Planning stake holder communication is very important for stake holder management. This is critical for success of every project in any telecom organisation. This process starts with identification of stake holders till the job and their positions clearly marked out and mapped. Stake holder planning which is the process to plan the communication in a way that the stake holders are persuaded to engage with and support the project. This communication also becomes relevant in case of crises management.
3. Transfer of employees aligning to the blue print—The transfer of employees from customer to vendor must align to a blue print linked to the company strategy. It is important that these teams are affective collaborative and innovative. With respect to the aligning blue print, the expectations from people in several critical engagement areas is outlined and highlighted. The areas include values and

behaviours, team building, technology optimisation, increase in service coverage and capacity with work flexibility, individual performance management, managing work load and deadlines, work process redesign, work to focus more on results rather than face time, team success metrics with regard to the goals needed to achieve as a team and improving collaboration, knowledge transfer through communication strategies. After the blue print alignment process, individuals feel more supportive and their perceptions about stress and work load improve.

4. Transfer of customer ways of working and financial discipline—When people are transferred from one organisation to another, they may experience different ways of working, changed in protocol and financial discipline. For example, if a person moves from service provider to vendor, his financial entitlements of claims may undergo a change. Simultaneously, the declarations required to claim money may also vary. Post transition the employee may also need to change the financial reporting structure. The ways of working can even be impacted with simenly smaller things like reporting time, duty hours, dress code to name a few.
5. Transfer associated with third party contracts—In the managed services contracts, the supply chain relationships as well as supplier contracts, associated financial assets and liabilities are also transferred. For example, if an infrastructure company takes a managed services contract from an operator, then the supply and maintenance arrangements of passive infrastructure like real estate and air conditioning also gets transferred to the managed services partner. The sourcing contracts which are in force between service provider and suppliers will be transferred from suppliers to managed service partner. This also comes with associated risks. Since the performance of the supplier becomes responsibility of the managed services partner.



The fundamental measurement of success and failure of transition and transformation depends on operations and business continuity. Transition needs to ensure that business operations are maintained. During transition and post the same, there must

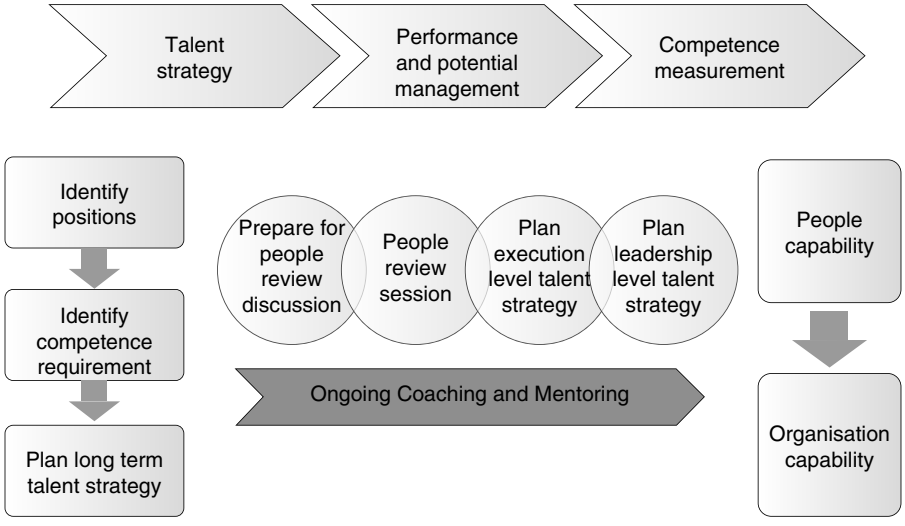
be fare and transparent people management. During the transition, mirrored teams, smooth transition of roles, responsibilities, systems and assets must be done. This has to be taken care with effective competence balance. The transition also needs to carefully handle sensitive matters like negotiations with union and contracts with third parties.

Transformation on the other end needs to consider global, regional, local optimisation of resources. It is also required to leverage best practices in the organisation. The transformation process needs to undertake post integration work comfort and collectively addressing all employees during town halls. To make transformation affective, the newly transferred employees must be given equal carrier opportunity with transparent Electronic Job Posting (EJP) participations. It is also required to realign the contracts of employees which are on third-party role and make the transition and transformation seamless and smooth. Ultimately this must leave to continuous operations including carrier management and development, job rotation, and global opportunities. In order to make this process effective, the customer people are transitioned to the vendor side and in the transformation phase, they are explained the reasons, the benefit of transformation is told to them along with maintaining a continuous and effective communication.

7.5.6 Managing Insource Talent

In sourcing by the vendor require meticulous planning precise data points and strong attention to risk management. While managing in source talent, three elements are critical. They are Talent Strategy, Performance and Potential Management, and Competence Measurement.

For effectively completing the tasks first of all adequate and appropriate positions are identified along with competence requirement. This is then extrapolated to a long-term talent strategy. In order to ascertain people capability an execution level and leadership level, talent strategy is made. This is done with ongoing coaching and mentoring to build the right-sized organisation capability.



7.5.7 Disaster Recovery and Business Continuity Plan

The management teams of both vendor and outsourcing partner have to critically evaluate and agree on the business continuity and disaster recovery plan, lest something goes wrong during handover or in due course of time. The disaster recovery and business continuity plans include:

1. Details of how the partner will implement the plan: with timelines, soft and hard cutover and handover of assets
2. Details of how the plan inter-operates with any other disaster recovery and business continuity plan of the operator—this has to be notified by the operator to the partner so that the information is transparent on both sides.
3. Details as to how the utilisation of the plan may impact on the operation of the services (short term to medium term) and a full analysis of the risks (including potential root causes) to the operation of the services
4. Identification of all reasonably possible failures of or disruptions to the Services
5. Back-up methodology
6. Data verification procedures
7. Identification of all potential disaster recovery scenarios
8. Provision of appropriate levels of spares, maintenance equipment and test equipment
9. Responsibilities of sub-partners in the event of a disaster
10. Hardware configuration details, network planning and invocation rules and procedures
11. Data centre site audits
12. Service levels that the partner will have to comply with in the event of a disaster
13. The partner should also ensure that the plan defines the processes, activities and responsibilities relating to the application of emergency fixes in business-critical emergency situations. It shall also define the rules for storing data, the required availability for that data and the mechanisms for making that data available. It should also include:

    (i) Risk analysis (including failure scenarios, assessments, identification of single points of failure and ways to manage such failure and business impact analysis)
    (ii) Possible areas where system critical elements can be "dual sourced" so as to eliminate or minimise single points of failure
    (iii) Business continuity maintenance
    (iv) Documentation of business processes, procedures and responsibilities
    (v) Procedures for reverting to normal service

End Notes

Telecom outsourcing or managed services is a partnership between a vendor and a customer in which the vendor assumes responsibility for activities such as designing, building, operating and managing the day-to-day operations of the customer's network or solution. This could involve either the entire network or solution, or only a portion of it. An operator could choose to let a vendor, such as Ericsson, take responsibility for all activities within one network or for a specific activity across all networks. Or a customer could choose to handover responsibility for all activities across all networks.

The management teams of both vendor and outsourcing partner have to critically evaluate and agree on the business continuity and disaster recovery plan, lest something goes wrong during handover or in due course of time. Managed services are about people, and over the years lakhs of employees would have been transferred to managed services provider from operators around the world. The managed services partner has to invest heavily in people and focus on competence development and employee engagement. This is the only way they can create a culture centred around innovation in a knowledge-based organisation.

The fundamental measurement of success and failure of transition and transformation depends on operations and business continuity. Transition needs to ensure that business operations are maintained. During transition and post the same, there must be fare and transparent people management. During the transition, mirrored teams, smooth transition of roles, responsibilities, systems and assets must be done. This has to be taken care with effective competence balance. The transition also needs to carefully handle sensitive matters like negotiations with union and contracts with third parties.

In the evolved models, the role of managed services has changed since operators are searching for further values and benefits which differentiate one managed service partner from the other. More than ever, operators are looking for new ways to stand out from the growing competition since sustainable innovation is an important aspect for benefits accrued by managed operations.

Descriptive Questions

1. Why is outsourcing done? Which operator challenges are leading to outsourcing decisions?
2. Explain the transition and transformation process in detail.
3. Migration and knowledge management engagement is a joint steering process for outsourcing and vendor management. Comment on this statement and justify.
4. What are the elements involved in evolution of managed services models?
5. Elaborate on the steps that are involved in disaster recovery and business continuity planning.

M-HEALTH AND TELEMEDICINE IN INDIA

CHAPTER 8

Learning Objectives

- Current state of telemedicine and M-health in India
- Technology enablers of mobile-based healthcare and its future
- Various broadband technologies and their impact on Indian M-health initiatives
- Potential of M-health services in India
- Challenges and opportunities for telecom-facilitated health services

❒ 8.1 INTRODUCTION

India is home to 1.24 billion people of which rural dominates most of the population spread. Due to the diversity in geographical landscape, with mountainous terrains to a long sea shore, it obstructs access to direct as well as long distance healthcare services to the remote and remotest part of the country. Our varied geography and associated diversity challenges the reach of traditional medical systems, coupled with the fact that traditional healthcare system in India is primarily managed by the government, with an attempt of being complemented by various private healthcare institutes. This lack of private participation in rural healthcare stems from the fact that the cost of infrastructure and services required to deliver medical services to rural India is extremely revenue-unfriendly with very high operational expenses. Hence, the private healthcare institutions might find such things a stumbling block.

India follows a three-tier healthcare system: (i) primary health centre (PHC), (ii) community health centre (CHC) and (iii) tertiary care centre (government hospitals, medical colleges, etc.). The PHC is a state-run entity that is responsible for basic medical facilities in remote and rural India. In turn, their responsibility is to address the last mile and grassroot-level issues like pre-natal, vaccinations and awareness drives. Each PHC provide services to about 30,000–40,000 people.

It is quoted by sources that while the public sector and government remains at the helm of providing healthcare services for India's general population, approximately 69% of the population claim to have inadequate/lack of access to available healthcare resources. The healthcare infrastructure has not kept pace with the economic growth and fails to satisfactorily meet healthcare demands of the present with a vision to be developed for the future. The statistics also enumerate that the public health facilities are also insufficient to cater to the needs of masses. India needs about 75,000–80,000 CHCs per million people, but the current estimates hover at almost half the required number.

In terms of the expenditure on healthcare services, private service providers contribute to about 80% of total healthcare expenditure in the country, complementing CHCs. However, due to the issues of reach, viability and government support, almost 70% of the healthcare infrastructure focuses on a few metropolitan cities. This seems concerning, since issues such as greater mortality rates, water contamination, epidemics and lack of vaccinations occur in rural areas. It is the need of this hour to ensure that healthcare innovation reaches and provides healthcare services to the wider and untapped population. The urban dwellers have multiple choices and channels for healthcare services; however, the impact needs to be taken to rural India where there are almost no choices for effective and efficient healthcare services, whether traditional or through technology.

In praise of public sector initiatives, it is worth mentioning that there have been multiple projects launched by the government to facilitate healthcare services in rural India. Further, telemedicine and technology-based mobile healthcare has been identified as an area which can definitely facilitate appropriate reach and delivery of vital healthcare facilities to the remote parts of India. Over the last decade or so, the government along with private healthcare providers have begun investing time, money and efforts, alongwith research projects and efforts to explore the possibilities of utilising the telecom landscape technology for providing healthcare-related services (including M-health education) to rural India.

Telecommunications and the usage of mobile phones are exponentially growing in India by almost 20 times since the past 10 years. With the advent of wireless mobile technology, the associated services can be quickly prepared for faster deployment. It is in the wake of this phenomenon that mobile-based healthcare services are expressing strong upside and potential for India. This in turn may help to provide higher quality healthcare facilities to a larger population which is in dire need of healthcare support.

We now begin to discuss the implications of current telecom setup in India including the mobile wireless technology and services. Keeping in view the prevalent telecommunications landscape and services and the anticipated roadmap for immediate future, this chapter would highlight the healthcare services that can be extended through M-health technology and the ways and means to do the same.

❒ 8.2 REGULATORY GUIDELINES FOR HEALTHCARE SERVICES IN INDIA

In our markets, every facilitation or lack thereof is dependent on the regulatory framework of that particular service, be it telecom, IT/ITeS or healthcare. It is required and rightfully so to abide by the Indian regulatory framework, since it is critical in order to launch and deliver telecom-based services in India, which are associated with multiple verticals. One such vertical is M-health services. These services can be conceptualised and launched based upon the regulator's approval that evaluates the services as per the guidelines that have been proposed by the Government of India as a guiding frame of reference. The regulatory guidelines are also critical for such initiatives since the services are not owned by any particular ecosystem

partner. This becomes a bone of contention in terms of deciding roles and responsibilities of various partners that get involved in the conceptualisation, bearer ship and delivery of services like mobile healthcare. Due to this diversity in the industry ecosystem and multiple partners involved in the whole initiative, the first step in setting standard operating procedures and regulations is done by the government and to be followed by the industry.

8.2.1 Telemedicine Setup in India—Supported by Government Initiatives

With the growing demands and expectation for healthcare services, it seems that India's present health services infrastructure may not be adequate to meet the requirements and demands of population. Government-run healthcare facilities when attempted to be deployed in outreached areas have lack of equipment, service and maintenance of the equipment, technological sophistication, availability of medical and administrative personnel. In order to meet the challenges of assuring quality and reach of healthcare services to the masses, medical fraternity and infrastructure owners are exploring various new innovative models to improve their performance while maintaining their head above the water (being at breakeven level of profitability), by using technology to introduce telemedicine services focusing on specialty centres and day care centres.

There are various entities that are supporting M-health and telemedicine initiatives in India. To name a few, The Department of Information Technology (DIT), the Ministry of Communication and Information Technology, and the Indian Space Research Organisation (ISRO) are actively working on deploying and penetrating telemedicine services in India. The Oncology Network in Kerala, the network for speciality healthcare access in rural areas of Punjab, diagnosis and monitoring of tropical diseases in West Bengal are some of the successful pilot projects sponsored by DIT.

It is noteworthy to mention that ISRO also launched an ambitious program called GRAMSAT (rural satellite) in 2001. This program uses providing satellite services to connect 315 hospitals all over India for sharing information that can facilitate healthcare services in rural areas, including remote regions of north-eastern states of India.

8.2.2 Brief on Indian Telecom Services and Landscape

The telecommunication industry (mobile and internet services) has grown multifold in the last 10 years. Being next to China in population, India naturally also gets the tag of being world's second-largest wireless phone user base. Of this existing user base, approximately 37–40% are rural subscribers. The urban regions of India face the stiffest competition in telecom subscriber management having a teledensity of approximately 140% as of now. In contrast to the urban teledensity, the rural teledensity is hovering around 37–40% which leaves immense scope of growth and delivery for M-health services.

It is also claimed that approximately 50% of total wireless users have access to data services (either by service provider capability or the handset supporting data services) and can use applications if they are deemed relevant. While the number of

subscribers having data access is quite big, only 10–15% of this potentially use it. In fact, Idea cellular has a policy to remove subscribers who use less than 1MB data on their network. While Indian telecom landscape seems the need for increase in data services and associated ARPU, the present low percentage of subscribers using the services provides a large window of opportunity for connecting rural India to deliver M-health services.

While India had a lag in telecom infra, now it is at the helm of the globally available data technologies. This lag has actually helped India in terms of the ecosystem for India fully developed and learnings of failures from global launches not being repeated in India. Now the GSM, CDMA and HSPA data technologies are matured and widespread in India. With time-tested wireless broadband and narrowband data technologies already deployed in India, the need is for a robust ecosystem of services which can leverage the networks for mobile healthcare services. A reliable devices and services ecosystem is all that is needed for M-health and telemedicine services to succeed with a fast and business-viable data network penetration coupled with services deployment ownership by telecom ecosystem providers and participants. There lies the issue of an entire nation having a world class wireless telecom infrastructure, but no single entity being ready to provide a 360 degree and holistic solution for mobile-based healthcare services.

Considering telecom data technologies, they are discussed in light of two variables: narrowband and broadband. This demarcation is important keeping in view the services that can be supported by narrowband and broadband services. Technically, the general packet radio service (GPRS) and enhanced data for global evolution (EDGE) are termed as narrowband technologies. The networks supporting these services are available across India, right to the deepest and remotest corners. Secondly, it is also a blessing in disguise that CDMA (EVDO), a 3G wireless broadband service using CDMA, is also available PAN India. This technology can be effectively leveraged across India for broadband mobile-based healthcare services till such time HSPA and other services gain popularity in remote hinterlands. The CDMA/EVDO business ecosystem can be maintained and further enhanced with more spectrums to deliver last mile capability of broadband-based mobile healthcare services. This CDMA/EVDO technology is deployed in 850 MHz spectrum which makes it optimal with capex and with best-in-class quality of service as well. Furthermore, due to its spectrum ability, unmatched in-building coverage and penetration, the technology becomes very viable for semi-urban and rural M-health and telemedicine applications.

India is witnessing a declining CDMA subscriber's base which is evident from various statistical reports that are available. This is making EVDO subscribers base the predominant reason for CDMA sustenance in India. Effectively, there are many reasons that go in favour of CDMA/EVDO to be a technology that can be the front runner for deployment and delivery of M-health services in the most effective and efficient manner. As for every other service, the cost of patient/subscriber acquisition on M-health and the capital and operational expenses for services deployment are to be in a very critical balance. This can be adequately managed with CDMA/EVDO services and devices, since all it needs is a realisation to improve the devices ecosystem of CDMA to be as strong as USA and China. Alongside, India has also evolved

very strong business models for sharing passive infra which further gives operational bandwidth and conservatism to the service providers. Companies like Indus Towers and Bharti Infratel are making all the difference in passive infrastructure.

The sharing of passive infra and leveraging of semi-urban and rural assets of government operators will effectively save capex for operators and this money can be used to then provide further impetus to mobile healthcare services deployment.

❒ 8.3 WHY SHOULD TECHNOLOGY MATTER FOR M-HEALTH?

1. **Cost-effective technology with proven stability:** The data technologies of CDMA EVDO, GSM (GPRS and EDGE) and High Speed Packet Access (HSPA) are proven globally on mobile phones as well as dongles on USB.
   (a) CDMA EVDO and GSM (GPRS and EDGE) have the widest reach in technology and economy of scale. These could be the cost-effective wireless technology alternatives that may be used in areas deprived of healthcare in India. They are the more widely available technologies connecting most of the states in India and incur very low cost to the end user for using the services.
   (b) 3G-HSPA will be able to provide higher speeds for data transmission of larger files, which can provide advanced healthcare facilities. The only impediment is that 3G is not yet available PAN India, the handsets are still getting penetrated and the services are costly. Along with this, only 5 MHz spectrum of 3G is allocated to each operator.
   (c) Time-Division Duplex, Long-Term Evolution (LTE) technology still not fully launched in India. This is due to the fact that most of the mobile devices are not equipped to support it. LTE TD rollout obligations are over a long duration of time. LTE is being launched in 2300 MHz in India. This spectrum band is for TDD and makes it capex-intensive. It is for this reason that while the technology supports strong broadband speeds, the cost of deployment and lack of devices makes it uncertain if LTE will be made available far-reaching rural areas, especially with low return on deployment and loading of networks/towers.

   Choosing the appropriate technology is an integral part to successfully scaling M-health services to reach the wider population.
2. **M-health can play on multiple technologies:** Working on basics, it can be considered that one need not start with state-of-the-art data applications only. There are enough evidences to support the claim that SMS-based M-health applications can be supported by all the wireless technologies. The choice of technology becomes imperative depending on the data quality and nature of data that one needs to share between the entities. This can include simple body metrics to sophisticated radiological images, vital statistics analysis. Hence, single- or multi-dimension data might require a higher data transmission protocols like HSPA or LTE.

8.3.1 Few M-health Services Launched in India

Some of the services providers in India have taken small steps to initiate certain M-health-related services. A few examples are quoted as follows:

1. Airtel formed collaboration with Healthfore (a division of Religare Technologies) and Fortis Healthcare (a Religare group company) to offer healthcare services to its mobile users. This service allows users to access basic medical information on health problems that are not urgent in nature, over the phone. Being an offer of telecom service provider, the service can be availed 24 hrs a day at very affordable rates.
2. Aircel and Idea are also other service providers that launched similar services in 2011 in collaboration with HealthNet Global, which is a Hyderabad-based healthcare management services company. In this service offer, the mobile phones users calling to utilise healthcare advice are paid a visit by a competent medical person. They are equipped with a laptop and certain diagnostic equipment. These professionals can conduct consultations via video conferencing to a remotely located physician and provide services to the end user.
3. In December 2011, Equitas microfinance started offering tele-healthcare delivery centres in association with HealthNet Global. Equitas service is called *Consult 4 Health and Call 4 Health*. This offers its members to consult physicians from the Apollo Hospital over video for a nominal charge for each consultation. The user's data is safely saved for further prescription, evaluation, treatment and subsequent follow-ups.
4. Considering few new models in M-health that are emerging, it is noteworthy to mention Mumbai-based service called MeraDoctor (My Doctor) founded in 2010. This service provides healthcare consultation over the phone to mass users.

The figure below is the process followed by an M-health network. This process is used for connecting a patient, hospital staff and the medical team to complete the ecosystem cycle. In this process, a healthcare device can be made to communicate and transmit/receive data across a mobile phone through wireless (Bluetooth) transmission. This can facilitate to provide immediate inputs to and from the patient in dire need situations. The data is then transmitted through secured services (important to maintain data sanity and sanctity) to central secured internet services. It can be viewed by hospital staff in real time by doctor. Then the data can be made to go through intelligent analysis data monitoring algorithms for advanced healthcare analysis and reporting. The hospital staff and the medical team can communicate back to the patient whenever they deem appropriate.

M-health network process via mobile technology and using internet services

8.3.2 Wireless Technology Requiring to Carry Forward M-health Services

The most proliferating and efficient technologies are in the spectrum band of 850 MHz (CDMA) and 900 MHz (GSM) for India. Both these technologies are widely deployed and ready for introducing advanced data services along with supporting SMS-based applications as basic. These services are required to manage mobile healthcare applications which need support of high data speeds. Some of the healthcare facilities that can be provided using this service are as follows:

1. **SMS consulting:** SMS is the most popular data exchange medium for spontaneous information exchange. SMS has become popular since it doesn't need a data connection. The development of SMS services allows for the exchange of vital information and expert opinions in near real-time, though the information might be limited in nature. The application format is simple yet effective. This simple format provides a trusted resource for seeking time-bound questions while providing a secured forum to gain and update insights on sensitive subject matters. Precise information and details are spread easily.
2. **Healthcare through E education:** Mobile platforms are effectively used for mobile-based education. This medium can be effectively used for broadcasting useful healthcare-related information to masses at the same time. The development of high speed mobile networks and enhanced technology and user interface on devices allows for much better content quality and context which can either be stored and viewed or streamed live from servers. This further enables access to the entire portfolio of video tutorials that are available on the internet. For example, do it yourself programs, virtual e-learning classrooms, person-to-person consulting on health tips, etc. This enables users to be informed wherever they are and can learn adequate details like first aid and up-to-date medical information on various aspects of interest.
3. **Do it yourself (DIY) check-ups:** This is a fact becoming popular behaviour at least in the more developed communities. The DIY program includes self-screening tutorials including but not limited to techniques for brushing teeth, hygiene matters, preparation and consumption of ORS, and appropriate milk-feeding techniques for mothers.
4. **Mobile alert update system:** This is used to inform people about required drugs-related compliances to improve patient monitoring and drug compliance. One of the successful examples is multi-drug therapy (MDT) for tuberculosis which needs to be continued for 6–8 months. The failure rate in MDT is considerably high due to poor patient compliance to use of the medicine in right quantity and right time. Recent studies have exposed that the success rate of treating this disease can be significantly improved if the patients have mechanisms to set up automated reminder, which can be either be done for self or someone else getting an alarm to remind the patient to consume the medicine.

8.3.3 Advanced Data Technologies for M-health

The broadband networks that have been launched by CDMA operators are potentially the most effective efficient solution for M-health services which are required to handle large amounts of data and large file sizes required to be transferred like real-time patient consulting or teleradiology. However, due to various reasons, CDMA devices ecosystem in India is not very strong and isn't evolving as well. Therefore HSPA+ might be the next best alternative available, provided large chunks of spectrum can be allocated.

The potential use of EVDO and HSPA technology in facilitating healthcare services can be conceptualised for the following:

1. **Distance education-based and diagnosis:**
   (a) Mobile-led video-assisted healthcare awareness: In such services, the videos are loaded on mobile phones of volunteers who go door to door and demonstrate various health services or get a group of people together for the same.
   (b) Connecting hospitals at a distance: In late 2009, hospitals in Sierra Leone launched a satellite linkup to connect doctors in the country to doctors in India where there is better equipment for data analysis. This facilitates real-time consultations between doctors in the field and specialists in hospitals.
      (i) Remote patient monitoring
      (ii) Web tutorials-based healthcare
2. **Handheld devices-based services:**
   (a) Mobile phone-based ophthalmic test equipment
   (b) Mobile phone-enabled biometric and vital signs tester
3. **Tracking services for medical use:**
   (a) Tracking medicines delivery
   (b) Smart labels for medicine time reminders
   (c) Mobile RFID-based patients records tracking in hospitals

While we embark on a journey towards M-health's future, it is unclear as to which entities within the telecom ecosystem will take the lead in facilitating an M-health solutions, putting it on the telecom network, encompassing medical experts for service delivery and making the services reach the wider population in India, along with billing mechanisms.

8.3.4 Advanced M-health Solutions for Chronic Diseases

In addition to teleconsultation, M-health might be useful in providing more advanced facilities to patients in the form of diagnosis and monitoring of the diseases. Research has shown that mobile technology can provide the means for accurately monitoring symptom severity for diverse pathologies, including diabetes, coronary artery disease and Parkinson' disease. These are only indicative and are highlighted as fine examples of M-health-assisted healthcare potentially making an impact in thousands of lives.

8.3.5 Coronary Artery Disease and Remote ECG Monitoring

There are around 45 million patients with coronary artery disease (CAD) in India and one-fifth of total deaths in India are caused by CAD. It is important in CAD management to regularly monitor the patient's cardiac function for which the patient has to regularly visit medical experts to perform an electrocardiography (ECG) examination. The regular monitoring of ECG can be a lifesaving procedure as appropriate measures can be initiated in time for patients who are vulnerable to heart attack. Smart heart devices are designed to record the 12-lead ECG and can transmit securely encrypted data to a mobile phone. The ECG signal can then be transmitted to a central processing unit at the patient's hospital where the medical team can assess and advise appropriate further action.

❒ 8.4 POTENTIAL FOR GROWTH

A recent report entitled *Global Telemedicine Market Analysis* by RNCOS Industry Research Solutions, an India-based market research and information analysis company, projects that the global telemedicine market will grow at a compound annual growth rate (CAGR) of around 19% from 2010 to 2015. An earlier report in 2009, titled *Global Telemedicine Market: 2008–2012* and published by Infiniti Research, a London-based market intelligence firm, estimated the size of the global telemedicine market in 2008 at US$9 billion. According to this report, Asia is the fastest growing region for the telemedicine market with India and China leading the growth.

The current size of the telemedicine market in India is difficult to be accurately estimated. Murali Rao, associate vice president for healthcare at the New Delhi-based research and consultancy firm Technopak Advisors, estimates the current size of the Indian telemedicine market to be around US$7.5 million suggesting 'This is expected to grow at a [compound annual growth rate] of 20% over the next five years'. That would take it to around US$18.7 million by 2017. Mehta of PwC on the other hand notes: 'Studies indicate that the size of India's telemedicine market is expected to be US$500 million by 2015'.

❒ 8.5 CHALLENGES REMAIN AND OPTIONS AVAILABLE

Although telemedicine is gaining ground in India undergoing considerable development, various challenges still remain.

8.5.1 Choice of Wireless Technology

CDMA EVDO is a technology well placed to leverage M-health and telemedicine solutions. However, with availability of other technologies, CDMA operators are returning precious spectrum back to government and not contesting for more CDMA spectrum. This in effect will make CDMA dormant and M-health solutions on HSPA will not be as cost-effective. Secondly, for wireless-led healthcare, data networks should be stable and promise a ubiquitous experience across geographies. This

again is compromised due to the overpriced and patchy HSPA spectrum presently, and lack of investment continuity on HSPA from operators, since the existing investment awaits returns. Moreover, no operator has a PAN India HSPA presence; so there is a lack of solution ownership. The LTE spectrum available in India is in 2.3 GHz, which is a very capex-intensive setup to deploy and that too on LTE TDD which is a lesser popular technology globally. Hence, LTE network owners will restrict themselves only to top 10–20 cities. In this scenario, it is important that more CDMA/EVDO spectrum is auctioned by the government at affordable prices, which will encourage these operators to take this cost-effective technology to the far-reaching rural areas in India.

8.5.2 Doctor—Patient Relationship

Mutual trust between a doctor and a patient is developed by the physical presence of both at the same time, while discussing the medical condition of the patient. In telemedicine or M-health services, a virtual world is being created that might be a key challenge to establishing this doctor—patient relationship. The potential of M-health in India is still under-realised because of lack of awareness among the population and lack of an appropriate service providing model. This would mainly require an initiative from both government agencies and private healthcare providers. In effect, M-health services might never reach the critical mass until the doctors are excited about it and realise it as one of the most cost-effective mode for providing quality healthcare in India. This qualitative matter of relationship can be addressed if the well-recognised leaders in semi-urban and rural Indian states can be made to use telemedicine solutions and project them as role models. This will reduce perceived risk of relationship with other population in near vicinity. In addition, projects like Gramjyot should be encouraged where the larger community sees delivery of a physical service through the virtual world. The success will be a function of demonstration and not advertising and promotion.

8.5.3 Strengthening of Ecosystem and Its Awareness

The Indian telecom and medical ecosystem has limitations of dependence on regulators, technology providers, technology deployment agencies, content providers, devices developers, sales and marketing companies. With so many moving wheels, lack of ownership is imminent, since each ecosystem partner will have to make sizeable investments. The potential of telemedicine is under-realised due to lack of awareness among the masses, and lack of a business model, for catering to satisfy the appetite of all stakeholders. The technology barrier that existed a decade ago has been lifted but still the economic barrier needs to gate crash. The ecosystem drivers like incentives for the hospitals, the broadband service providers and the patients need to be defined, facilitated and executed. This combined with technology and affordable devices will be the tipping point. So awareness of services can be countered provided all the moving parts of the telecom ecosystem come together to make a deployment solution mechanism.

8.5.4 Standardisation of the Solutions

The public awareness is growing owing to media and exponential information technology. In M-health, the accountability of error needs to be counted in and when more services providers enter the domain, will need to standardise the quality of consultation and telesuggestion. Standardisation will lead to seamless adoption by relevant agencies and also ensure timely upgrade is offered so as to not make the services redundant as technology and sophistication of solutions is on the rise. In line with global telecom standardisation agencies like ITU-T and 3GPP/3GPP2, India should have telemedicine and healthcare service standardisation authorities that can lend a common approach to the partners at large.

❒ 8.6 REFERENCE

Central Asian Journal for Public Health, http://cajgh.pitt.edu/ojs/index.php/cajgh/article/view/116

❒ 8.7 APPENDIX

Technological details of current telecommunication services and its launch in India

Data Technology	Data Speed	Global Launch Year	India Launch Year	India Coverage
GPRS	40 Kbps	2000	16th Jan 2002 by BPL Mobile	PAN India by all GSM wireless operators in 900 MHz and 1800 MHz spectrum band
EDGE	120 Kbps upto 384 Kbps	2003	28th July 2004	PAN India by all GSM wireless operators in 900 MHz and 1800 MHz spectrum band
1X CDMA 2000	153.6 Kbps	2002	May 2003	First launch by Reliance, followed by Tata Indicom, BSNL and MTS. Reliance and Tata provide PAN India 1X CDMA 2000 network, launched in 850 MHz spectrum band
EVDO Rev A	2.1 Mbps UL and 1.8 Mbps DL	2006	2008	Launched by Tata under the brand name of Tata Photon, followed by Reliance, BSNL and MTS in 850 MHz spectrum band. Tata and Reliance provide EVDO Rev A coverage PAN India
EVDO Rev B	9.3 Mbps UL and 5.4 Mbps DL with 3 carriers	2010	Sept 2011	Available in Top 16 cities across India, by Tata, Reliance and MTS, in 850 MHz spectrum band
HSPA/ HSPA+	Upto 14.4 Mbps/42 Mbps with MIMO	2005/2009	Feb 2009 limited launch by BSNL; First private operator HSPA launch in India on 5th Nov 2010, Tata Teleservices	No operator has PAN India 3G coverage on 2100 MHz spectrum band; Limited 3G coverage and mobile broadband experience on HSPA+ yet to stabilise. Only 5 MHz of 3G spectrum allocated by government
LTE	Upto 100 Mbps	2009	April 2012	LTE-TDD in 2.3 GHz spectrum band, launched by Airtel in 3 cities. No further launches till date. Expensive technology with no LTE TDD Handsets available

End Notes

India has the second largest mobile subscribers based in the world, with good teledensity and telecom penetration in urban as well as rural hemispheres. The need is to identify the appropriate mobile data bearer and transmission technology. This is more so due to the fact that whatever technology finds its way for M-health, it should have optimal and long-term future. In this chapter, the experts will be providing insights into the telecommunication setups in India that is helming the mobile technology and services evolution. In line with the prevalent telecom landscape, the present and future of M-health services is shared and elaborated herewith.

The broadband networks that have been launched by CDMA operators are potentially the most effective efficient solution for M-health services which are required to handle large amounts of data and large file sizes required to be transferred like real-time patient consulting or teleradiology. However, due to various reasons, CDMA devices ecosystem in India is not very strong and is not evolving as well. Therefore HSPA+ might be the next best alternative available, provided large chunks of spectrum can be allocated.

The Indian telecom and medical ecosystem has limitations regarding dependence on regulators, technology providers, technology deployment agencies, content providers, devices developers, and sales and marketing companies. With so many moving wheels, lack of ownership is imminent, since each ecosystem partner will have to make sizeable investments. The potential of telemedicine is underrealized due to lack of awareness among the masses, and lack of a business model for catering to satisfy the appetite of all stakeholders.

In addition to teleconsultation, M-health might be useful in providing more advanced facilities to patients in the form of diagnosis and monitoring of the diseases. Research has shown that mobile technology can accurately provide the means for monitoring symptom severity for diverse pathologies, including diabetes, coronary artery disease and Parkinson' disease. These are only indicative and are highlighted as fine examples of M-health-assisted healthcare potentially making an impact in thousands of lives.

Descriptive Questions

1. Write a note on the current status of mobile-based healthcare initiatives in India.
2. What steps should be taken to strengthen telecom ecosystem for supporting M-health?
3. CDMA may be a better choice of technology for M-health? Comment and justify.

CHAPTER 9

EARLY START FOR CAREERS IN TELECOM INDUSTRY

Learning Objectives

- Career options in Indian telecom ecosystem
- Various telecom verticals and core competencies required
- Focus and approach required for telecom careers
- Brief in Telecom Sector Skill Council

❒ 9.1 INTRODUCTION

India's Honourable Prime Minister himself has been leading the initiative for skill development in the country as the Chairman of the National Council for Skill Development (NSDC). In order to support NSDC's initiatives, the telecom industry collectively has set up Telecom Sector Skill Council (TSSC) under the aegis of NSDC. TSSC is registered as a society with members from the various telecom bodies like COAI, AUSPI, TAIPA, ICA and representation from the government and government agencies and academia. There are premier institutes in India like MIT School of Telecom (MITSOT), Symbiosis Institute of Telecom Management (SITM) and Balaji Institute of Telecom and Management, in Pune that specifically focus on telecom sector-led skills enhancement in the students. These institutes need to be better known to the ultimate destinations of telecom professionals that contribute to the The Great Indian Telecom Ecosystem.

❒ 9.2 TELECOM SECTOR SKILLS COUNCIL (TSSC)— PIONEERING SKILLS FOR TELECOM

The objective behind establishment of TSSC is to identify and prepare a group of skills needed by telecom industry in various verticals. For each skill type, it would then finalise the curriculum in consultation with the industry as well as the various training organisations currently engaged in such trainings so as to have common standards and skills mapping. It would thereafter plan and institutionalise an effective system for training the trainers and grant affiliation and accreditation to various training agencies. This would be a major boon for the telecom industry, which today struggles to have standards and processes for each skill set individually. The skill inventory maintained by TSSC would provide ease of recruitment to the industry and save tremendous amount of cost and effort that the individual companies presently put in training and recruitment.

Having said this, it is important to note that there is little evidence to show that students at all levels are specifically aiming to pursue careers in telecom industry. It is for this basic reason that telecom industry has become more an extension of either FMCG or IT sector. For the centres of excellence and institutes to deliver world class leaders in end-to-end telecom business and technology management, it is important that the students are encouraged and more so instigated at a very early stage to embrace the telecom industry.

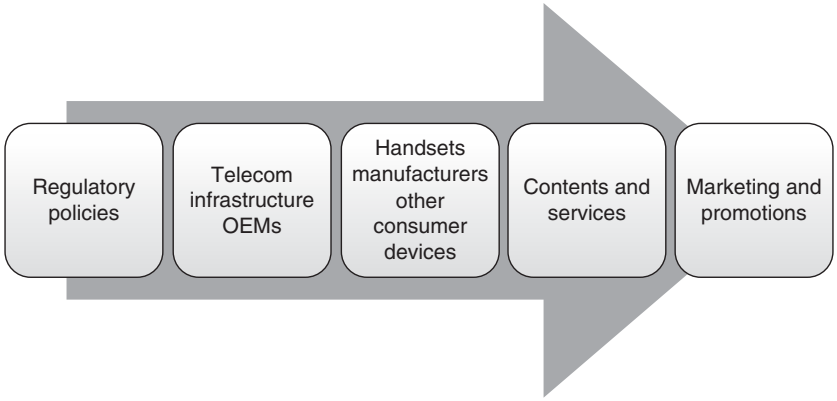
It is certainly a fact that not many students, pursuing graduation and/or post-graduation, today would have a structured insight into the potential, scale, revenue, verticals and constituents of the telecom industry. Most would either consider it the handsets or 'towers' industry, which is a very myopic view of the massive multi-billion dollars telecom industry that India is nurturing.

❒ 9.3 TELECOM INDUSTRY ECOSYSTEM

There are two routes of telecom industry ecosystem that distinctively evolve opportunities for the Indian youth and will lead to a critical mass for employment right from the Feet on Street to managerial level vacancies.

❒ 9.4 INFRASTRUCTURE-LED ECOSYSTEM AND ASSOCIATED SKILLS

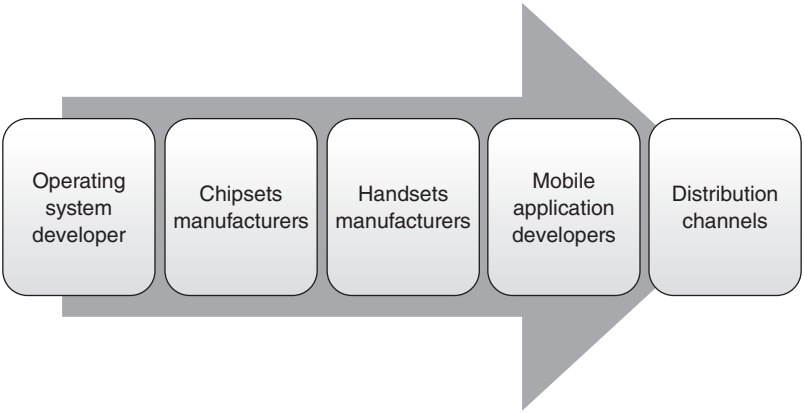
While handling 900 million subscribers in 26 Indian states, India's telecom infrastructure industry has evolved a lot. The nature of telecom infrastructure that the country demands is based on the regulatory condition and environment in the country. For more than a decade and a half, all the equipment vendors were selling GSM equipment, till the sniff of potential 3G auctions started to take shape. With the advent of new technology, and associated regulatory framework, the shape of infrastructure networks begins to evolve. Now India boasts of leading wireless technologies launched across 800 MHz, 900 MHz, 1800 MHz, 2100 MHz and 2300 MHz spectrum bands. In effect, India today has LTE TDD, HSPA+, EVDO, CDMA 1x and GSM networks in various spectrum bands. These spectrum bands and technologies lead to infrastructure OEMs deploying different equipment to manage the multi-technology networks and hence there is a spurt of skill required in such diverse requirements. Once the regulatory framework is setup for new technologies leap-frogging in Indian telecom industry, with multiple technologies playing in the battlefield, the consumer connect happens through devices. The ecosystem of devices is most critical to technology adoption. If the technology get deployed but not followed by a supportive ecosystem, then the technology is as good as not available. Therefore, voice and data access devices make or break the technology and become the interface to technology experienced by the customer. Each device has a uniqueness of its own and that differentiates the consumer pull. The user interface layer with content and services is a key to devices differentiation in terms of user experience. Lastly, with the entire ecosystem chain ready to unleash, the wireless



services get promoted and devices reach the hands of consumers. The wireless service providers launch various services and are steadily converging to defining sales and marketing as their exclusive core competence. This is the reason why most of the wireless operators are outsourcing functions like network management, capacity and services management, IT and consumer service solutions. What they retain is core sales and marketing functions, mostly being spear-headed as well as executed by professionals having FMCG experience. In all the stages of ecosystem evolution, specific competence management is required and employment specialisations/vacancies can exist for students, provided they understand the categories, nuances, challenges and opportunities.

❒ 9.5 DEVICES-LED ECOSYSTEM AND SKILLS REQUIRED

Any technology is as good as the variety of devices and associated user experience. The devices ecosystem starts with the choice of operating system a handset will support. There are a host of open standard and proprietary OS that the manufacturers are able to choose from. Once that's done and the supported technology is nailed, chipsets are identified that will maintain and enhance the performance of the OS and technology. It is important that the chipset assuring the most optimal performance is selected so that the user experience doesn't suffer in terms of processing power and battery life. Once the horizons of OS and chipset are identified, the devices OEM create a reference design and handsets are manufactured with a variety of screen sizes, camera and audio capability. Next comes the differentiating universe of mobile application developers where masses to niche solutions are available both for consumers and enterprise with single or multi-screen support. Finally, companies that manufacture the devices don't distribute the same directly. Considering this, large distribution solutions companies come into play that import and distribute devices at a national or a regional level. This is a clear evidence of the fact that each vertical in the devices ecosystem retains its core competence and they all are well knit into the system.



❒ 9.6 TELECOM SECTORS LACK A FOCUSSED APPROACH IN CAREER CHOICE

Considering the above distinct ecosystems in the telecom sector, it is clearly evident that this sector lacks a focussed approach in career development at an infancy stage. Take for example the mobile phones distribution. There are global players in distribution business here but no educational institution targets this competence in students who can actually land coveted roles in mobile phones sales and distribution corporates. Same is for content ecosystem, whereby companies need telecom specialists to market and sell the distinguished user experience led content being generated.

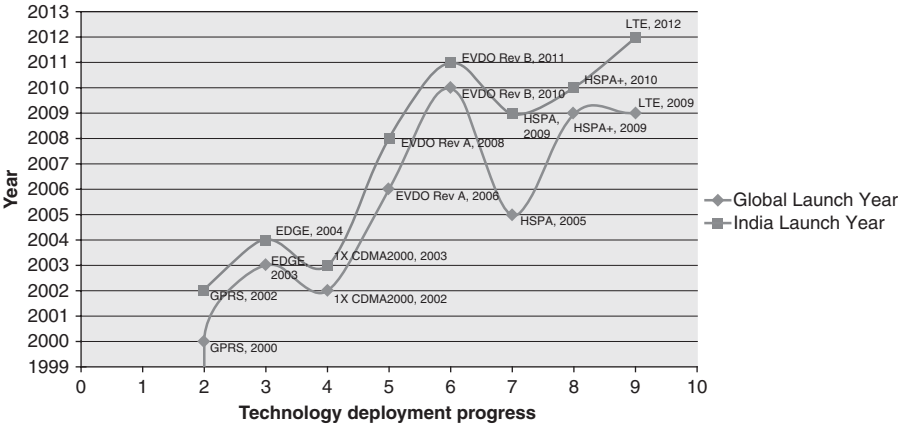
A real estate agent uses a smartphone as a compass; a dual income single kid (DISK) family wants their maids to carry rattler and mosquito repellent application in the phones. How many people really are geared up to understand the changing consumer behaviour? And that too on multiple screens!

Telecom sector has evolved beyond service providers and devices manufacturers to a truly convergent ecosystem. This also implies that aspirants willing to make a career out of this sector must have a 360-degree approach in terms of being masters of their domains but jacks of the entire telecom-related community. Traditionally, content or VAS was distributed by service providers, now it is being distributed by smartphone manufacturers. In some time, the content providers themselves will need to create their brands and entity, and hence, will need better and closer intimacy and competence of professionals in telecom domain.

❒ 9.7 CONCLUSION

India Telecom Story is going strong and both infrastructure and devices-related ecosystem is developing well. The country is at par with the world now with regard to latest wireless technology being available. The mobile market in India is contributing to upwards of 10% of the total telecom market. VAS companies are beginning to organise themselves better and started promoting richer content due to better data bandwidth being available. However, the impetus on telecom careers right from higher

secondary into colleges is still not adequate. Since telecom is a fast paced and changing industry, specific telecom-related programs must be introduced in curriculum and efforts of TSSC under the aegis of NSDC have to be supported strongly by the industry, in order to evolve a competent and creative telecom workforce.



Wireless data technology deployment lag- India vs Global

Each educational institution needs to include a specific module/workshop on telecom sector so that the students are able to concentrate on telecom-related competencies. Telecom is one of the top 10 hiring sectors in India. To maintain this growth, corporates driving India telecom ecosystem must pledge to hire candidates that acquire specific telecom-related skills. This loop of early start with hiring commitment from the industry must be closed fast enough for the Indian Telecom Story to keep shining.

❒ 9.8 REFERENCES

1. http://www.imanagerpublications.com/ViewIssueDetails.aspx?JournalIssueID=437
2. Anand R. *India Telecom Industry to Touch Revenues of Rs. 3,77,683 Crore Between 2010 and 2014*: http://techcircle.vccircle.com/2011/06/13/india-telecoms-industry-to-touch-revenues-of-rs-377683-crore-between-2010-and-2014/, June 2011.
3. Frost and Sullivan. *Dynamic Applications to Help Smartphone Market Generate INR 192.74 Billion and Mobile Handset Market, INR 350.04 Billion in 2016*–http://www.frost.com/prod/servlet/press-release.pag?docid=226800646, March 2011.
4. Telecom Sector Skill Council–http://www.tsscindia.com/aboutus.html
5. Government of India, Ministry of Labour & Employment, Directorate General of Employment & Training. *Course Curricula Under SKILL DEVELOPMENT INITIATIVE SCHEME (SDIS) Based on Modular Employable Skills (MES) On TELECOM SECTOR*–http://www.dget.nic.in/mes/curricula/Telecom_Sector.pdf, 2011.

6. Chandana C. *Skilling India*–http://www.nsdcindia.org/pdf/good-news-tab.pdf, April 2013.
7. Telecom Regulatory Authority of India. *Annual Report* http://www.trai.gov.in/WriteReadData/Miscelleneus/Document/201301150318386780062Annual%20Report%20English%202012.pdf, 2011.
8. India Telecom Online. *Telecom Spectrum Allocation in India*–http://www.indiatelecomonline.com/telecom-spectrum-allocation-in-india/, 2010.
9. Goldstein Phil. *Qualcomm: 40 Manufacturers have Built 170 Phones Using Reference Design Program*–FierceWireless http://www.fiercewireless.com/story/qualcomm-40-manufacturers-have-built-170-phones-using-reference-design-prog/2013-04-03#ixzz2VPI0z0ao, April 2013.
10. VAR India. *Top 10 Distributors in India*–http://www.varindia.com/Sep2010_top10distibutors.htm, Sept 2010.
11. PwC. *Connect with Consumers Value Added Services: The Next Wave*–http://www.pwc.in/en_IN/in/assets/pdfs/publications-2011/vas_landscp.pdf, 2011.
12. Reddy Ashok, MD, Teamlease India. *5 Sectors on a Hiring Spree*–http://businesstoday.intoday.in/story/retail-infrastructure-healthcare-sectors-to-hire-more-in-india/1/19528.html, Nov 2011.

End Notes

The Indian telecom sector remains a significant contributor to GDP and employs close to 10 million people (3 million directly and 7 million indirectly). Over the next decade, this sector is expected to double the employment of people and hence, makes it one of the most lucrative industries to aspire for a successful career. Indian telecom employment will be on a continuous rise. However, the Indian education system does not provide for a telecom-led vocational skill and thus, the need for students to start early for a career in telecom.

Telecom sector has evolved beyond service providers and device manufacturers to a truly convergent ecosystem. This also implies that aspirants willing to make a career out of this sector must have a 360-degree approach in terms of being masters of their domains but jacks of the entire telecom-related community. Traditionally, content or VAS was distributed by service providers, now it is being distributed by smartphone manufacturers. In some time, the content providers themselves will need to create their brands and entity, and hence, will need better and closer intimacy and competence of professionals in telecom domain.

Each educational institution needs to include a specific module/workshop on telecom sector so that the students are able to concentrate on telecom-related competencies. Telecom is one of the top 10 hiring sectors in India. To maintain this growth, corporates driving India telecom ecosystem must pledge to hire candidates that acquire specific telecom-related skills. This loop of early start with hiring commitment from the industry must be closed fast enough for the Indian telecom story to keep shining.

Descriptive Questions

1. Write a detailed note on infra-led telecom ecosystem.
2. Explain in detail the devices-led telecom ecosystem.
3. What are the potential areas of careers for professionals in telecom?

INDEX

About the Authors

Rishi Kappal holds a Bachelor's degree in Electronics Engineering, degree in Law and Postgraduation degree in Business Management from IMI. He has also done a Certificate Course in Strategy from XLRI. He is pursuing a second Masters' degree in Marketing from Pune University and authoring a book on *The Cusp of Transitions* alongwith *Next Generation Mobile Communications*.

Beginning in 1993, his career spans coveted roles with leading Indian and multinational organisations. He has handled various strategic and leadership roles in sales innovations and operations, marketing, business development, people management and corporate strategy. With impeccable communication and presentation skills, he is now associated as an academician and a mentor with premier institutions and corporates for skills development, faculty development, transition management, leadership and entrepreneurship workshops. Mr Rishi is also associated with Telecom Sector Skill Council as Industry Skill Specialist. In the past, he has served as Vice President and Interim Managing Director, Sony Mobile Communications; Director of Business Management, Qualcomm India; Business Unit Head—Sales and Marketing, Ericsson India and Sri Lanka; Head of B2B Marketing and Sales Management, Castrol India; Regional B2B Sales Head, Tata Telecom (Avaya); Technology Business Manager, CDIL; and Customer Engineer—Technical Support Group, HCL OA Systems. Presently he is associated with MIT Pune as Chief Executive—Program Innovations and Skill Development.

Mr Rishi has been honoured with *Best Sales Manager and Team Excellence Award* by Tata Lucent; *Club Ace Award* by Ericsson; and *Qualstar Hall of Fame Award* by Qualcomm. He is also credited with conducting India's first *Telecom Train the Trainer Program* for Telecom Management Institute, MITSOT. Mr Rishi has also participated in various conferences and workshops, and has several publications to his credit.

Dr Milind Pande is Post-Doctoral Research Fellow from Ministry of HRD, Government of India for research work on *Telecom Technology Options for Indian Rural Education*. He holds a dual PhD degree in Electronics and Telecommunication Engineering (Wireless Technology) and Business Management (International Trades). He is also an MBA in Marketing and ME in Electronics.

Dr Pande is presently associated with MIT, Pune as Project Director of School of Telecom Management.

He is a staunch researcher and an educationist with more than 23 years of academic experience as Professor and Director in MBA departments. His areas of expertise include Technology Transfers in Mobile Domain such as M-Education, M-Agriculture, M-Health, Smart Sensing Networks and ICT Innovations.

Dr Pande has been conferred with various awards in the span of his long career like *Best Business School Leadership Award* from the Prestigious 19th Dewang Mehta Business School Awards, *Ideal Teacher Award* at the hands of the Minister, Government of Maharashtra, *Jewel in the Crown Award* by the Ministry of HRD, Government of India, New Delhi. He was also awarded with *Accredited Management Teacher (AMT)*, in the area of *Management of Technology and Innovation and Concern 2012* by ASSOCHAM and Bal Bharti Academy, New Delhi, India.

Dr Pande successfully completed *Innovating for Excellence: Program for Leaders in Management Education* organised by IIM Ahmedabad. His research papers have been reviewed at various International Conferences and Journals of IEEE, IIM Ahmedabad, ISB Hyderabad.

Recently, a patent for a research product developed by Dr Pande, *H2E2—an energy efficient advanced wireless sensor network (WSN) technology*, developed with novel technology for Precision Agriculture Management, has been filed.