# User Driven Service Innovations in Telecom Industry: Indian Experience

by

Dharmesh Gupta*

Ruchita Gupta

Karuna Jain

*Indian Institute of Technology Bombay, Mumbai, India,
National Institute of Industrial Engineering (NITIE), Mumbai, India

Wednesday, April 14, 2016

## Abstract

Technological advancement has been the main driver for development of telecom services. Convergence of telecom and internet played a significant role in growth of user driven services in terms of variety, number and revenue. Open access platforms and technological capabilities have empowered small entrepreneurs in India to develop services collaboratively benefiting to society. A new ecosystem has emerged (shift from value chain to value web) around telecom operators with multiple stakeholders—content and application providers, technology enablers and platform providers. This new ecosystem with user participation has potential to bridge the digital divide and foster inclusive growth.

The primary objective of the study is to understand nature of interplay between technology development, technological innovation and service innovation. The secondary objective to study how needs of users are imbibed into technology development. We also investigate the role of technology management and its implication on telecom operators in changing face of digital economy. Qualitative case based research method is used. Cases are selected from one of the key Indian telecom operator. The findings of the study provide interesting insights to effectively manage new technologies to create user driven services.

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## Outline

- ❧ Introduction
- ❧ Motivation of Research
- ❧ Research Question(s)
- ❧ Literature Review and Research Gaps
- ❧ Research Methodology
- ❧ Research Objectives
- ❧ Cases Study and analysis (two cases of user-driven innovations)
- ❧ Findings
- ❧ Conclusions
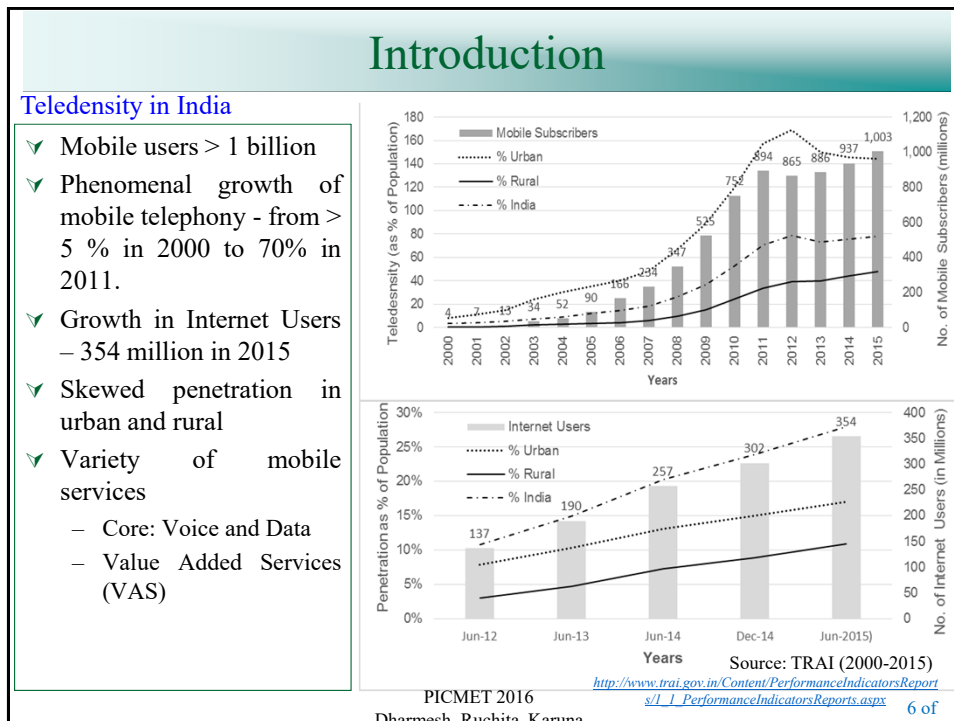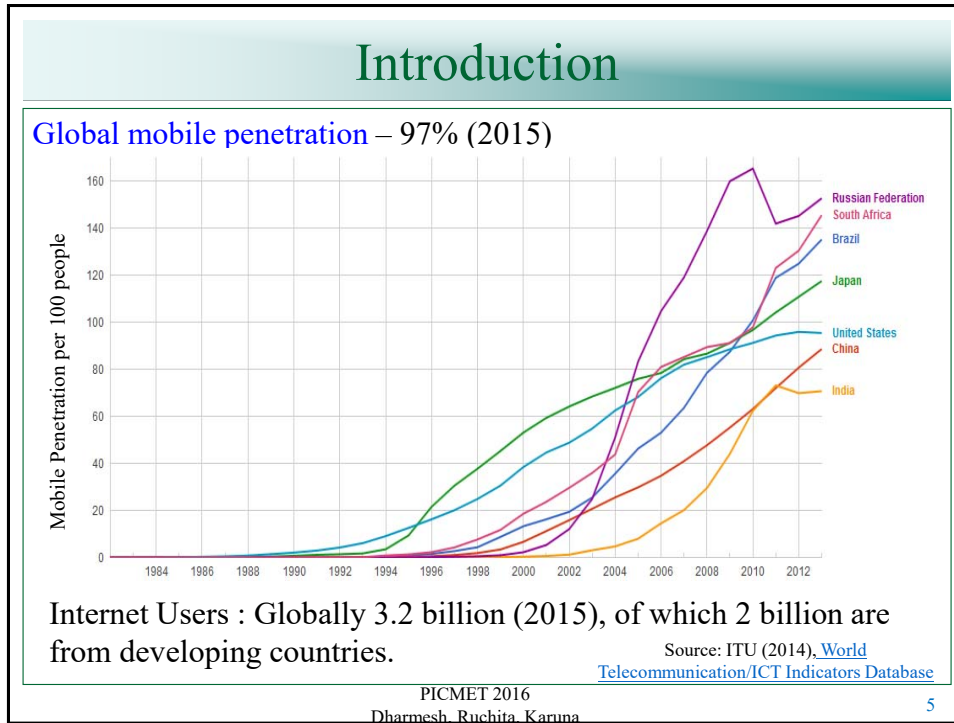
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## Introduction



Mobile is all-pervasive: Changing ways of life

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# Introduction

**Global mobile penetration** – 97% (2015)



Internet Users : Globally 3.2 billion (2015), of which 2 billion are from developing countries.

Source: ITU (2014), World Telecommunication/ICT Indicators Database

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# Introduction

**Teledensity in India**

- Mobile users > 1 billion
- Phenomenal growth of mobile telephony - from > 5 % in 2000 to 70% in 2011.
- Growth in Internet Users – 354 million in 2015
- Skewed penetration in urban and rural
- Variety of mobile services
  - Core: Voice and Data
  - Value Added Services (VAS)



Source: TRAI (2000-2015)
http://www.trai.gov.in/Content/PerformanceIndicatorReports/1_1_PerformanceIndicatorsReports.aspx

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## Introduction

### Use of Mobile in Services

✓ Potential to tap the traditional basic services in developing countries
- Banking, healthcare, education etc.

✓ Mobile – a potential platform to bridge this gap, through mobile VAS
- Information on demand
- M-Commerce
- Social

✓ User involvement in development of such Mobile VAS usher inclusive growth faster and effectively.

**Touch Points using all modes per '000 uses**

| ▶ Institution<br>▼ Country | Banks | Doctors | Schools* |
|---|---|---|---|
| US | 0.32 | 12.5 | 70.4 |
| Germany | 0.55 | 11.5 | 70.5 |
| South Africa | 0.08 | 4.9 | 28.1 |
| Kenya | 0.04 | 1.3 | 25.3 |
| Singapore | 0.14 | 5.9 | 37.8 |
| Japan | 0.13 | 11.6 | 52.2 |
| Sri Lanka | 0.1 | 2.3 | 44.4 |
| Bangladesh | 0.05 | 0.6 | 19.7 |
| India | 0.07 | 1.9 | 24.9 |

Source: RBI, Financial Access 2010-CGAP,World Health Statistics 2010-WHO,CIA World Fact Book, UNICEF, Government of Germany, Government of Singapore, UN Country Wise Statistic, Nationmaster

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## Introduction

✓ **Innovation Process for mobile VAS**

– Mobile Service Innovation process has four stages

Service Ideation → Service Development → Service Deployment → Service Delivery → User

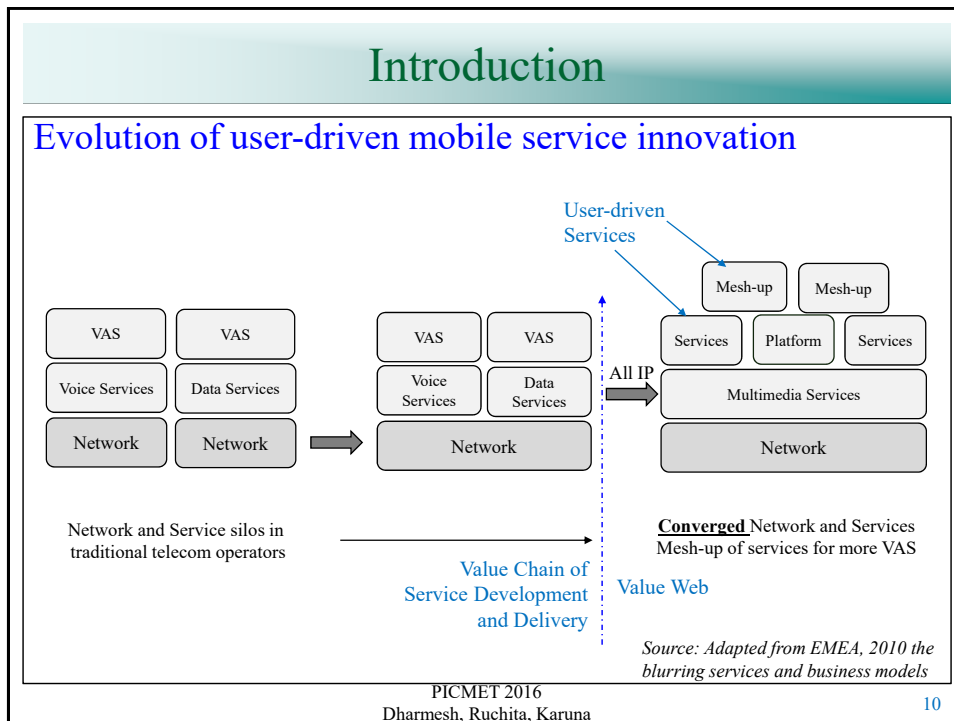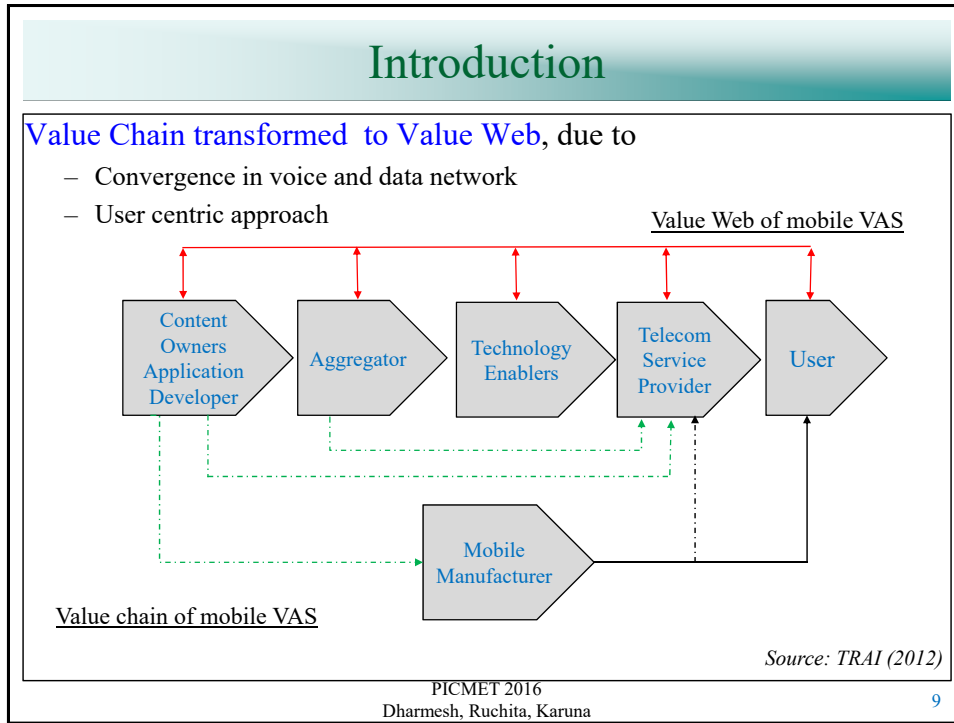– User involvement is growing at various stages of innovation

Service Ideation → Service Development → Service Deployment → Service Delivery

User

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Value Chain transformed to Value Web, due to

– Convergence in voice and data network

– User centric approach

Value Web of mobile VAS



Value chain of mobile VAS

*Source: TRAI (2012)*

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Evolution of user-driven mobile service innovation



*Source: Adapted from EMEA, 2010 the blurring services and business models*

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## Introduction

- ⋎ Convergence of existing /emerging technologies are blurring the boundaries of value chain partners.
- ⋎ User driven service development - creates new possibilities in mobile services innovation.
- ⋎ Mobile VAS: for inclusive growth
  - ⋎ The reach and penetration of mobile can deliver a large number of utility service in a cost effective, fast and seamless manner e.g. m-Banking, m-Health, m-Education.
- ⋎ Challenges for telecom stake holders
  - • Intense competition due to multiple players in value chain
  - • Differentiating services and sustaining innovation
  - • Growing diverse needs of users / customers
  - • Low service utilization and shorter service life-cycle
  - • Require lesser time-to-market

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## Research Query

- ⋎ How telecom operators and users are engaging in mobile service innovation?
- ⋎ What is the role of technology management to enhance telecom operator's ability to innovate ?
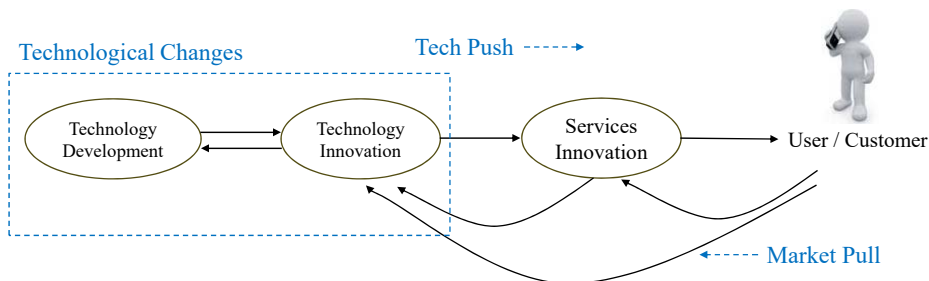


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## Literature Review

⍥ Three facets of technology and innovation literature were reviewed:

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                          Technology Innovation          Models of Innovation
                          and Development                (Rothwell, 1994,
                                                         Chesborough, 2003,
                                                         Narvekar & Jain, 2006)

                                                         Integrated framework for product
    Literature            Service Innovation in          and service (Saviotti'84,
    Review                Telecom                        Gallouj,94, 2007)
                                                         Six dimension model (Hertog,
                                                         2010)

                          User Driven Innovation         Democratizing innovation
                                                         (Von Hipple, 1990)
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## Literature Review

### User Innovation

– Innovation created by intermediate users (user's enterprise) or consumer users rather than by suppliers.

*(Von Hippel, 2005)*

### User-driven Innovation in Telecom

– Development of innovative mobile VAS that meets the users' needs and wants will provide competitive advantage.

*(Gordon eat at 1993;Barczak, 1995; Martin & Horne, 1995, Storey & Easingwood 1996;Kelly & Storey 2000; Lettl 2005).*

– Wireless service providers has now began to involve potential users in the innovation process.

*(Fujita, 2000, Magnusson, 2003)*.

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## Literature Review

### Analysis of Literature

– Understanding the enterprise's and their customers' tacit requirements and utilizing this insights in developing new services is an important element of service differentiation and competitive advantage.

– There are very few empirical evidence, how user involvement contribute to product innovations.

– User involvement for service innovation is still in early stage, and further research is needed.

## Literature Review

### Research Gaps

– A very few studies to understand how operators and customer get engaged for service innovation process, and how tacit needs of customer are imbibed into to technology development.

– Limited empirical studies focusing on understanding the interplay between technology development and service innovation.

– Limited studies regarding the user-driven mobile service innovation, particularly user-driven mobile value added service innovation in Indian context.

## Research Objectives

I. To study the process of technology development with user engagement.

II. To study the interplay among technology development, technology innovation and service innovation.

III. To identify the changing role of technology management and its implication on telecom operators.

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## Research Methodology

⋁ Case-study based qualitative research methodology is used.

⋁ Case Selection Criterion
   – Type of service – B2B or B2C
   – User involvement in service innovation process
   – Researchers involvement in the service development

⋁ Data Collection approach
   – Secondary Data collection
      • Annual reports, Documents, agreements, minutes of meeting (s)
   – Primary Data Collection
      • Open ended interviews through discussion guide
   – For Each Case :
      i.   4-5 interviews were conducted with executives - AVP (VAS), GM (Marketing), Principle Architect, Project Manager and lead user(s) involved in value addition activities associated with the two case studies considered for this research.
      ii.  In addition, 2 senior executives from the operator's office (Chief-IT and Chief-HR)
      iii. Responses form these executives / users were noted, compiled, and analyzed.

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## Research Methodology

### Case Selection (from an Indian telecom operator)

| Services Name | Customer Type | Customer Ownership | Tech. Push / Market Pull | Service Sector | User Involvement |
|---|---|---|---|---|---|
| Photon | B2C | Telecom Operator | Tech Push | Mobile Broadband | No |
| SMS Platform | B2B | Telecom Operator | Tech Push | Platform | Significant for services (Implementation & reuse) |
| Ringback tone | B2C | Telecom + (VAS) | Tech Push | Entertainment | No |
| Group Messaging | B2C / B2B | Enterprise / User | Market Pull | Platform, Productivity | Significant (Implementation & reuse) |
| Drishti: Call Center solutions for blind | B2B | Telecom Operator | Market Pull | Social Sector | Significant (Concept to operation) |
| Smart Energy Meter (SEM) | B2B | Enterprise | Market Pull | Productivity | Significant (Concept to operation) |
| Mobile ATM | B2B | Telecom Operator | Tech Push | Productivity | Yes |
| WhatsApp | B2C | VAS Provider | Tech Push | Social Networking | No |
| Musical Greetings | B2C | Telco (VAS) | Tech Push | Entertainment | No |
| mKrishi | B2C | Telco | Market Pull | Utility | Yes (Ideation) |
| Vernacular SMS | B2C | Telco (VAS) | Tech Push | Utility | No |
| Blackberry | B2B, B2C | VAS Provider | Tech Push | eMail | No |

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## Case 1: Drishti - Call Center Solution to Employ Visually-Impaired

⩔ User
- – An NGO supporting visually impaired (end-users)

⩔ User Challenges
  i.   India is a home to the world's largest number of blind people. Of the 37 million people across the globe who are blind, over 15 million are from India.
  ii.  Low employment opportunity.
  iii. Existing tools to access read text on personal computer (PC) is cumbersome. (e.g. check mails, news)
  iv.  Learning time for tool (for reading / internet access) is significant and only few users can grasp.

⩔ Requirements
  i.   Simplified access to text information kept on PC or Internet/Intranet.
  ii.  Each one of visually challenged person be able to use it.
  iii. Easy to learn.

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## Case 1: Drishti - Call Center Solution to Employ Visually-Impaired

⋎ **Mutually developed and agreed Functional requirements**

    i.    Interactive Voice Response (IVR) based interactive platform allows to 'talk' computer system and customers over phone.

    ii.    Work from anywhere, no need for travel to office every day.

    iii.    Short and easy learning curve (1-2 days).

⋎ **Innovation opportunity for mobile operator**

    i.    Open doors for equal employment opportunity as agents in BPO industry.

    ii.    Low cost of call center operation.

    iii.    Social responsibility

    iv.    New business model and revenue stream

⋎ **Solution developed by the operator**

– Text to speech conversion

– Tow way interaction with system using phone key pad (1,2, … *, #)

– Two phone for Call Center (BPO) like solution for visually impaired people to be employed as caller agent in BPO industry.

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## Case 1: Drishti - Call Center Solution to Employ Visually-Impaired

⋎ **How it works**

– Drishti - a 'Call Centre' solution specially designed keeping in needs of visually impaired people to act as 'Call Centre Agents', using an IVR platform technology.

– Visually impaired people use two telephone lines – one to connect to call centre system (get updated information in real-time) and other line to make call to customers of an enterprises. Any enterprise who would like to contact to its customers, uploads the data and information on IVR based call centre platform.

– Visually impaired people act as 'Call Centre' agents and each agent is paid as per call basis. Since this services use voice technology, there is no need for internet connection and computer – allowing call centre agents to operate from anywhere including using mobile.

– This 'IVR based Call Centre' platform thus provides equal employment opportunity and social status to visually impaired people.

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## Case 1: Drishti - Call Center Solution to Employ Visually-Impaired

### Process of Service Innovation for 'Drishti' Service

User and end-users involvement

User Requirement

Requirement identification and Analysis

(Cross Functional Team)

Operator

- Technology Scan
- Feasibility
- Re-engineer user Requirements
- Revised functional solu$^n$.
- Business Case

Operator

Service Innovation

(Development And Integration Capability)

Operator

Pilot (Testing)

Operator

Operation by User

User

In-House R&D

Operator Managed Service Development and Deployment

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## Case 1: Drishti - Call Center Solution to Employ Visually-Impaired

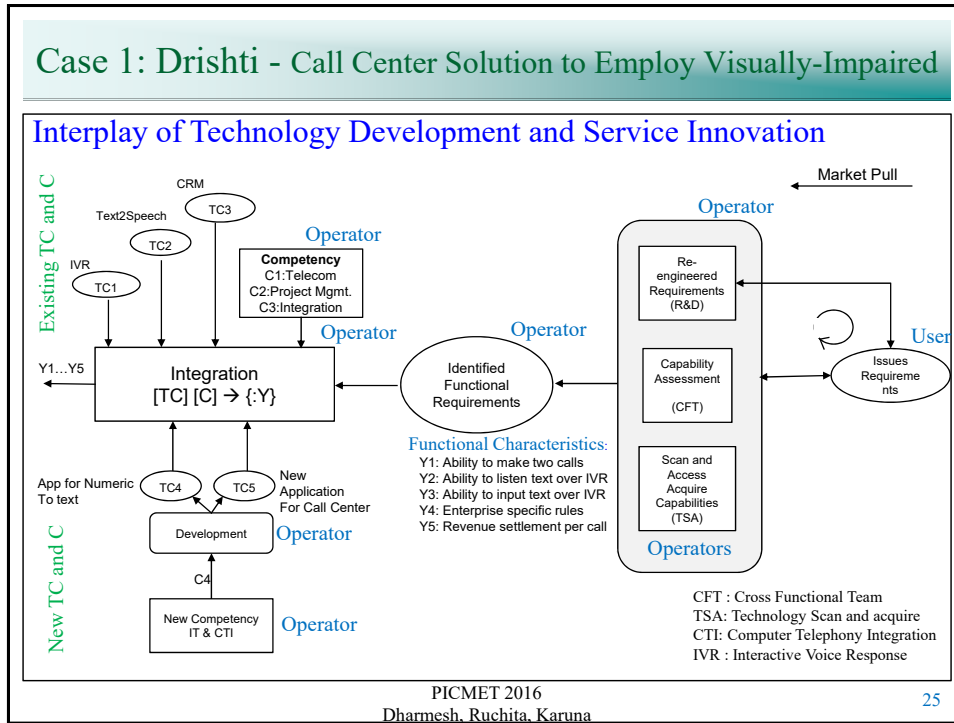### ⱱ Interplay of Technology Development and Service Innovation

– Technological; Capabilities (TC)

  • TC describe the organization's tangible and intangible systems used in the production of the service.

  • Group of technical characteristics combined to offer a function / benefit to user is called Technological Capability.

– Core Competencies (CC)

  • Core competency is defined as unique combination of individual skills/capabilities of the service provider and the user (customer).

– New services are described as set of function characteristics ($Y_n$), which is combination of technological capabilities ($TC_m$) and core competencies ($CC_l$).

Technology capability

$$\begin{pmatrix} TC1 \\ TC2 \\ .. \\ TCm \end{pmatrix}$$

Core Competency (User or Provider)

$$\begin{pmatrix} CC1 \\ CC2 \\ .. \\ CC_l \end{pmatrix}$$

$$\begin{pmatrix} Y1 \\ Y2 \\ ... \\ ... \\ Yn \end{pmatrix}$$

Functional Characteristic of new Service

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## Case 1: Drishti - Call Center Solution to Employ Visually-Impaired

### Interplay of Technology Development and Service Innovation



Existing TC and C

CRM — TC3
Text2Speech — TC2
IVR — TC1

Operator
**Competency**
C1:Telecom
C2:Project Mgmt.
C3:Integration

Operator

Market Pull

Operator

Re-engineered Requirements (R&D)

User
Issues Requirements

Operator

Operator

Y1...Y5

Integration
[TC] [C] → {:Y}

Identified Functional Requirements

Capability Assessment (CFT)

Functional Characteristics:
Y1: Ability to make two calls
Y2: Ability to listen text over IVR
Y3: Ability to input text over IVR
Y4: Enterprise specific rules
Y5: Revenue settlement per call

Scan and Access Acquire Capabilities (TSA)

Operators

App for Numeric To text — TC4 — TC5 — New Application For Call Center

New TC and C

Development — Operator

C4

New Competency IT & CTI — Operator

CFT : Cross Functional Team
TSA: Technology Scan and acquire
CTI: Computer Telephony Integration
IVR : Interactive Voice Response

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## Case 1: Drishti - Call Center Solution to Employ Visually-Impaired

### Role of Technology Management for Telecom Operator

i.   Accessing existing competencies.

ii.  Developing technological solutions to build capabilities to address  appropriate solution for the user requirements.

iii. Developing technological capabilities and the deployment plan for the service offerings.

iv.  Implementation of the service and transfer to operations.

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## Case 2: SEM- Mobile for Reading Energy Meter Data

⅋ User
  – Electricity Service Provider Company (enterprise)

⅋ User operational issues
  i. The long cycles, from manual meter reading to bill, generation, payment and collection .
  ii. Limited visibility in over usage by customer and thus larger exposure to revenue leakage.
  iii. Lack of visibility in current usage pattern resulted in unpredictable power cut.
  iv. Consumer also lacks the visibility of their usage pattern and could not control the usage pattern.
  v. Possibility of manipulation by middle man.
  vi. Low operational efficiency.

⅋ User requirements identified
  i. Reduce human error in meter readings
  ii. Minimizing manual intervention in processes (from reading to payment)
  iii. Online Load monitoring and remote re-routing of power in case of outage

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## Case 2: SEM- Mobile for Reading Energy Meter Data
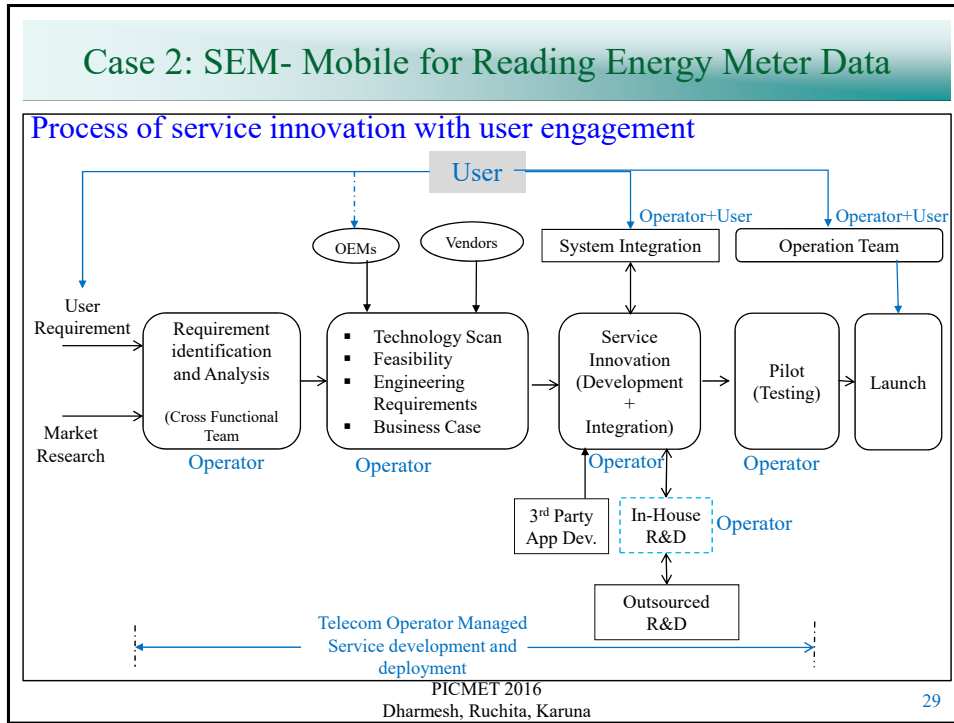
⅋ Mutually agreed functional requirements
  – To make electricity meter accessible remotely over mobile network
  – Electricity Services can be managed remotely using SMS text/Internet.
  – Provide ability to read, configure, disconnection, temper alerts, and predict usage statistics, remotely.
  – Functional Characteristics:
    i. Y1: Meter Access via SMS
    ii. Y2: Ability to configure over SMS
    iii. Y3: Read the readings and send via SMS
    iv. Y4: Control Connection / Disconnection
    v. Y5: Alerts on predefined rules

⅋ Innovation opportunity for mobile operator
  – Service innovation for customers' customer
  – Expanding reach mobile services, and new business model innovation
  – Recurring revenue for usage of telecom network
  – Early mover advantage in 'Smart Metering' domain.

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## Case 2: SEM- Mobile for Reading Energy Meter Data

### Process of service innovation with user engagement



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## Case 2: SEM- Mobile for Reading Energy Meter Data

### Interplay of Technology Development and Service Innovation



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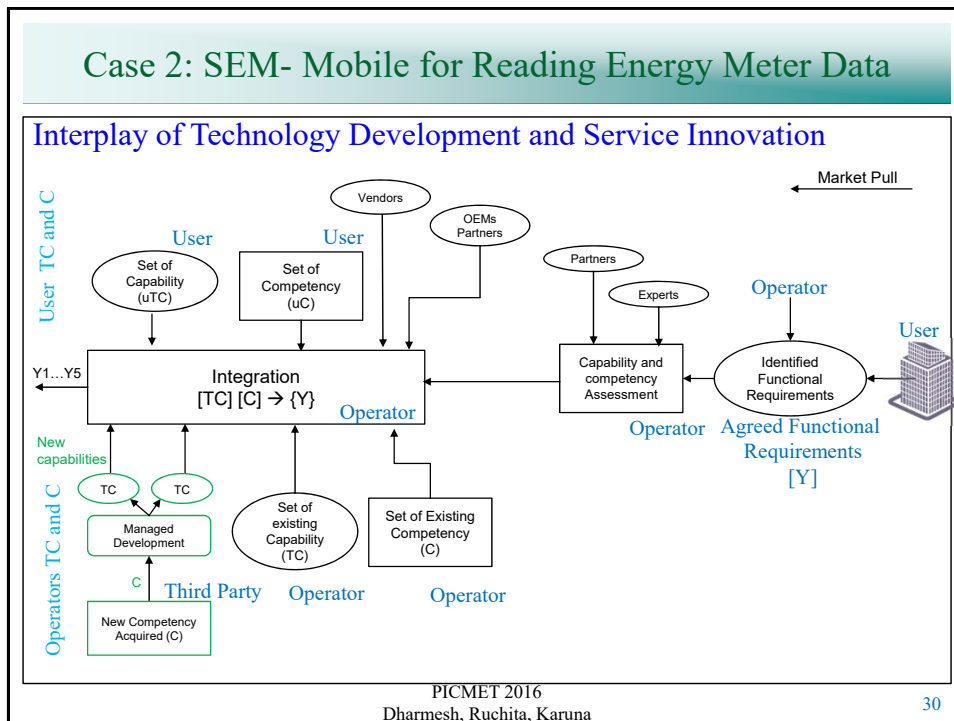
## Case 2: SEM- Mobile for Reading Energy Meter Data

### Role of Technology Management for Telecom Operator

i. Accessing existing capabilities and competencies of the user and the operator

ii. Acquiring and developing technological solutions to build capabilities for appropriate solutions for user

- Requirements-Partner with organization of appropriate competency.

iii. Developing technological capabilities and deployment plan for service offering-

- Team composition,

iv. Technology transfer and Implementation of the service

- Operators role is crucial and is more of a orchestrator in managing team(s).

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## Comparison of Two Cases

| Key Attributes | Case 1: Drishti Call Center | Case 2: Smart Energy Meter |
|---|---|---|
| Ideation : Source of Requirements | Problem identification and narration by end-users (visually impaired person of NGO)<br><br>Re-articulation of problem and constrains there in, are summed up by telecom operator.<br><br>End user is fully involved in this process. | New idea identified by the enterprise (utility provider) (not the end-user) and proposed to telecom operators to provide an end-to-end solution.<br><br>Intermediate user (Utility provider) fully involved |
| Technology Development for service Innovation | R&D team interacted with end-user, re-articulated the problem, and thus re-engineer the specification for required solution.<br><br>R&D team used their knowledge to scan-through available technologies, and then adapting one of the known technologies for appropriate use – to built an innovative solution.<br><br>Development is categorized as "In-house" development by Telecom operator.<br>End user not involved. | Development team of telecom operator interacted with utility provider for product specifications.<br><br>Exchange of know-how expanded the knowledge base. Engaging multiple cross functional team for development which requires complex project management<br><br>Development is categorized as 'collaborative', developed by managing and sharing know-how among different partners.<br><br>Intermediate user partially involved in this process. |

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## Comparison of Two Cases

| Key Attributes | Case 1: Drishti Call Center | Case 2: Smart Energy Meter |
|---|---|---|
| Service Deployment | Deployment has been stand-alone and relatively simple with fewer integration.<br><br>End user partially involved (only in testing) | Deployment has been relatively complex with many integration point, spanning across organization.<br><br>Deployment has elements of over-lap between the two organization and also exclusivity to each of the organization.<br><br>Intermediate users are fully involved. |
| Service Delivery (and operation) | Delivery and operation managed by end-users. | Joint service delivery and operation. For end-users, service ownership is with utility provider. |
| Service Impact | New ways of utilizing existing technology for social innovation. | Enhancing the reach and boundaries of telecom services to provide innovative enterprise solutions in different industry vertical, serving customer's customers.<br><br>Creating additional revenue stream and new business model. |

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## Findings from the cases

ⱴ User-driven innovation uses customer requirements as starting points, but often creativity and technology development is required to create new functional capability.

ⱴ In both cases user played critical role in defining the service attributes and service delivery process.

ⱴ Role of the operator changes based on the number of partners involved in creating services.

ⱴ For the successful adoption and diffusion of the services, users involvement in all three stages-development, deployment and delivery is critical.

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## Contributions

➤ This research adds to the service innovation literature through real-life mobile VAS cases from India, a developing country.

➤ Understanding and validating, the dynamics of technological & service innovation, and the role of end-user & intermediate users in service innovation process through real life cases.

➤ Research highlights the importance of changing role of technology management in the complex collaborative multi-partner ecosystem. Empowered cross-functional teams resulted into creative solutions. Also, such teams stretch beyond the traditional boundaries to acquire and develop innovation capabilities.

➤ User involvement is important for developing mobile VAS services. It is observed that user brings unique competencies to the service design and delivery process.

➤ This research provides a framework and several cases to help organizations better manage mobile VAS innovations.

➤ Learnings can be extended for development of future mobile VAS applications - mHeath, mEducation, mAgriculture.

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