# A PROPOSED MODEL TO GENERATE NEW REVENUE STREAMS FOR TELECOMMUNICATIONS CUSTOMER SERVICE PROVIDERS (CSP) BY LEVERAGING THE EXISTING INFRASTRUCTURE AND MARKET REACH

by

Abhijit Shamkant Atale

Bachelor of Engineering,

Master of Marketing Management

DISSERTATION

Presented to the Swiss School of Business and Management Geneva

In Partial Fulfilment

Of the Requirements

For the Degree

DOCTOR OF BUSINESS ADMINISTRATION

SWISS SCHOOL OF BUSINESS AND MANAGEMENT GENEVA

JANUARY 2025

A PROPOSED MODEL TO GENERATE NEW REVENUE STREAMS FOR TELECOMMUNICATIONS

CUSTOMER SERVICE PROVIDERS (CSP) BY LEVERAGING

THE EXISTING INFRASTRUCTURE

AND MARKET REACH

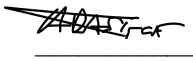
by

Abhijit Shamkant Atale

Supervised by

Dr. Eduard Plavec

APPROVED BY




Dissertation chair

RECEIVED/APPROVED BY:

Admissions Director

## Dedication

Pursuing a Doctorate in Business Administration has been a rewarding experience. It involved rigorous discipline in time management and intense efforts in literature reviews, conducting research, and building final reflections. I would not have done this without my wife, Priyanka's unwavering support.

Her encouragement has given me the strength and resolve during the most challenging phases of this academic pursuit.

I would also like to extend my special gratitude to my parents, Dr. Shamkant & Mrs. Anuradha, for my upbringing and instilling in me the tenacity, which was so critical in this endeavor.

**Acknowledgements**

I would like to extend my sincere thanks to Dr. Eduard Plavec, for his guidance and support throughout the journey. For a corporate executive like me, the DBA research could have been much more overwhelming initially. However, the guidance provided by Dr. Eduard to take one step at a time and maintain a laser-sharp on the specific tasks in each step made it simpler and easier to follow, moreover, it also made the whole engagement a lot more enjoyable.

I want to extend my sincere thanks to the support faculty of SSBM for their insightful webinars and student connections from time to time which not only made the DBA journey easier, but it also created networking opportunities for all students.

I would also like to thank fellow researchers whose documents were referenced for the literature review, without their excellent work it would not have been possible for me to build on my research topic and frame a concise research structure.

I would like to thank the participants of the surveys and interviews for their honest insights on my research topic.

My special thanks to Prof. Dr. Sudan Jha for his guidance which has helped me immensely in compiling this document.

A PROPOSED MODEL TO GENERATE NEW REVENUE STREAMS FOR TELECOMMUNICATIONS

CUSTOMER SERVICE PROVIDERS (CSP) BY LEVERAGING

THE EXISTING INFRASTRUCTURE

AND MARKET REACH

Abhijit Shamkant Atale

2025

Dissertation Chair: <Chair's Name>

Co-Chair: < Co Chair's Name >

Telecommunications Customer Services Providers, also known as customer service providers or CSPs have experienced a significant drop in their profitability in recent years. This phenomenon is global, in developed and developing markets alike. With new developments in the technology around 5G, IoT, Cloud, Blockchain and AI, many new avenues for revenue growth are opening up for the Telecom Service Providers (CSPs). While many Telecom Service Providers (CSPs) have tried various initiatives with new technologies, it has given only moderate success so far. There is no clear business model which would unlock sustainable and profitable growth for the Telecom Service Providers (CSPs). Through this research, I have tried to co-relate inside-out and outside-in perspectives through targeted interviews with senior professionals associated with the Telecom industry as well as consumers of telecom services in retail and enterprise segments, in to derive a framework model for the Telecom Service Providers (CSPs) to return to profitable growth, backed up with a comprehensive set of recommendations for the Telecom Service Providers (CSPs) to adopt in their business strategy for the future.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

# CHAPTER I:

# INTRODUCTION

## 1.1 Introduction

10th of March 1876 was the day when Alexander Graham Bell made the first Telephone call and revolutionized human social connections. From that day onwards Telecommunications continued to play a pivotal role in shaping human society. After fixed-line telephony, we saw the birth of mobile communications in 1990, which grew rapidly through early 2000.

Then came the evolution of mobile communication technologies through generations of 2G, 3G and 4G in the subsequent two decades. This evolution brought sequential improvements in features and especially the data throughput capacity of mobile networks. From early 2000 to present state, the Telecom Service Providers have improved the user data throughput from a meager 100 kbps in the 2G era to well over 100 mbps in 4G. Now we are in the era of 5G technology, which promises significantly higher data rates of multiple Gbps and with significantly low latency. This is opening significant opportunities in digital transformation across all industries.

Telecommunication Services Providers, commonly known as CSPs in the industry, have played a significant role in enabling connectivity to the masses through the years.

However, having witnessed highly profitable growth in the last 2 decades, most of the CSPs in the telecommunication industry are witnessing revenue stagnation. This phenomenon is common in developed as well as developing markets. All major operators in developed markets like the Americas, Europe as well as operators in developing markets in Asia have been reporting only marginal revenue growth for the past few years (IDC, 2023).

Due to the improvements in 2G, 3G and now 4G technologies, we are witnessing exponential growth in retail market data consumption, average data consumption per user has grown significantly from under 1 GB per month in 2011 to well over 10 GB per month in 2022, across OECD region (The OECD Going Digital Toolkit, 2011-2022) but the same is not being translated into the revenue for the CSPs (IDC, 2023). The main reason behind this is the fact that most of the Telecom Service Providers (CSPs) are relegated to just the fat data bit pipe enablers with very little or no market differentiation. All Telecom Service Providers (CSPs) have been focusing on extending the data connectivity to the masses with limited focus on value-added services to create market differentiation.

It has therefore become a key imperative for the Telecom Service Providers (CSPs) to reinvent themselves and offer new services in the market. There could be many possibilities in retail market segment as well as enterprise segment, for example in the retail market segment can the Telecom Service Providers (CSPs) look at extending their market reach to other players like small retailors to enable them sell the goods and services, similarly in the enterprise segment there could be possibilities of bringing multiple enterprises on a common platform to build end to end offerings. Some examples can be : Edge Cloud hosting services for small, and medium enterprises, SD-WAN enterprise connectivity, Digital channels for Multimedia Content and Games etc.

### 1.2 Research Problem

Telecom services providers experienced highly profitable growth from 1990 to 2010; however, gradually the revenue growth started to decline, and the current forecast is that Telecom Service Provider (CSP) year-on-year revenue is expected to grow just 3% from 2023 to 2030 (Moodys, 2022).

The main reason behind this phenomenon could be that most of the Telecom Service Providers (CSPs) have become just the fat bit pipe service providers, where the primary focus is just to extend data connectivity, and which has very little or no market differentiation. “Mobile wireless entrepreneurs have to understand the meaning and structure of the entire mobile wireless value chain in order to identify potential sweet spots such as the one Palm spotted in 1996 Personal Information Manager (PIM), or Personal Digital Assistant (PDA) and establish companies” (Sabat, 2002).

With the deployment of 5G the world over, the Telecom Service Providers (CSPs) are ideally placed to re-position themselves in the value chain. The key is to identify and develop the right business models to capture the value in the ecosystem. Telecom Service Providers (CSPs) may diversify their business into two streams “1. Continue to offer core mobile broadband services at scale backed by improved customer experience with deployment of 5G and 2. Diversify into digital services arena and transform themselves into digital enterprise i.e., an enabler of digital services to retail as well as enterprise customers.” (Sriganesh K Rao, 2018)

The Telecom Service Providers (CSPs) gather large amounts of data related to their retail consumers which is a valuable asset. The first value is enhancing existing business to optimize traditional telecom services, like customer experience, telecom product design and network management. The other is developing derivative businesses such as advertisement, marketing, financial or credit services based on the strength of telecom big data (Wang, 2020).

Secondly, the Telecom Service Providers (CSPs) have a network reach across every corner of the geography. Deployment of this large-scale network means having cell sites and data centers spread across a wide area. For example, Airtel in India building large data centers (Airtel, 2018) and many other Telecom Service Providers (CSPs) are also doing

the same. This could be an area of significant potential for the Telecom Service Providers (CSPs) to leverage their existing network infrastructure to launch edge cloud hosting services.

The emergence of several new computing applications, such as virtual reality and smart environments, has become possible due to the availability of a large pool of cloud resources. However, the delay-sensitive applications posed strict delay requirements that transformed euphoria into a problem. The cloud computing paradigm is unable to meet the requirements of low latency, location awareness, and mobility support. In this context, Mobile Edge Computing (MEC) can bring cloud services and resources closer to the user's proximity by leveraging the available resources in the edge networks. (Ejaz Ahmed, 2016).

The big data that the Telecom Service Providers (CSPs) are generating coupled with the deep reach of network and data center assets, can be leveraged to reposition Telecom Service Provider’s (CSP's) position at a higher level in the overall value chain and thereby securing profitable growth.

To realize this business outcome, the Telecom Service Providers (CSPs) will have to expand their portfolios and offer end-to-end services. To achieve this, they will have to modify their business model, which shows that innovation in the business model is as important as innovation in technology (Mihailović, 2019).

Developments in technology have created opportunities for the Telecom Service Providers (CSP) to re-work their business models and return to the path of profitable growth. What is needed is a comprehensive new approach to re-look at the existing business of the Telecom Service Provider (CSP) and rework the strategy to return to profitable growth. In the current market almost all Telecom Service Providers are looking at building new business lines which can generate new revenue sources that will be significantly more profitable as compared to the existing legacy revenues. Many Telecom

Service Providers (CSPs) have tried to enter into different business lines but that has given low to moderate improvements in the revenues and profitability.

### 1.3 Purpose of Research

Many research papers have suggested various ways and means for Telecom Service Providers (CSPs) to consider for returning to profitable growth but all those ideas in isolation do not give a comprehensive outlook on what approach Telecom Service Providers (CSPs) should take in order to re-secure their position in the ecosystem, where they should focus, what investments they should make, and most importantly what should be the strategic direction for the leadership.

Many Telecom Service Providers (CSPs) have tried in some shape or form to transform themselves e.g., Telco to Tech Co initiatives (Mariana, 2003), but to date most of the Telecom Service Providers (CSPs) world over are struggling to make that transformation fully and successfully. Legacy systems, organizational processes, people skillsets, regulatory environment, and constraints, are some of the factors preventing the Telecom Service Providers (CSPs) from taking a radical transformative approach.

With technological advancements, new horizons are opening for all industries and telecom field is no different, in fact, it is at the forefront, in terms of one of the sectors which will be impacted most by the latest technological innovations. Development of new technologies stands to provide many benefits to the Telecom Service Providers (CSPs) at the same time it may also create new threats to their businesses e.g. with 5G private networks could be a new and lucrative area for the Telecom Service Providers ( CSPs ) to consider, but at the same time the low orbit satellites providing high-capacity broadband even at the most remote possible locations (Pachler, et al., 2021), will post a significant

threat to Telecom Service provider (CSP) whose primary revenue source is data connectivity services.

End user expectation is another key factor which is impacting the Telecom Service Provider's (CSP's) business. In the late 1990's just a good quality voice call would suffice to keep a customer satisfied, but today the demands are vastly different. Voice is just one of many applications that a Telecom Service Provider (CSP) support, video streaming, mobile gaming, instant messaging, machine-to-machine communication, IoT, virtual reality etc, are some other services that are equally important, if not more than the traditional voice. This means the Telecom Service Providers (CSPs) need to pay special attention to the service quality of these new services and at the same time look out for any upcoming services which the customer may demand, e.g. driverless cars will demand high throughput data connectivity with millisecond RTT ( round trip time ) – i.e. fast turnaround time (Riccardo Coppola, 2016).

With so many technological choices, and customer expectations, where to invest organizational resources becomes a key decision point for the Telecom Service Provider (CSP). The Telecom Service Provider (CSP) cannot afford to spread its resources thin by trying to do everything in bits and pieces, and at the same time they cannot have too narrow a focus and just do one initiative e.g. Enterprise Cloud.

Telecom Service Providers (CSPs) will have to adopt a carefully thought-out approach taking into account a comprehensive view of the business environment : Technology capabilities, Customer Expectations and Organizational Resources and Skills Capabilities, Licensing Regulations etc.

It is therefore imperative that one must look at a 360-degree view of the business ecosystem in which the Telecom Service Providers (CSPs) operate today and more importantly in the future. Taking all aspects into consideration, build a step-by-step

carefully thought transformative approach to generate new revenue streams through portfolio redesign and augmentation, whilst retaining existing revenue sources.

In this research, we will take into account insights from multiple sources like industry leaders, end consumers of telecom services, as well as upcoming technology trends, which may impact Telecom Service Provider's (CSP's) business in the future. We would aim to 'Build a comprehensive approach for Telecom Service Providers (CSPs) to consider for generating new revenue streams and re-gain profitable growth in the future.

### 1.4 Significance of the Study

Telecom Industry is an important part of the economy across all countries. Today, mobile connectivity is essential in the lives of more than 5.4 billion people and contributes US$5.2 trillion to global GDP (GSMA, 2022). Hence continuous innovation and investments in Telecom Industry across the world is not only important from social impact point of view but also it has a direct link to the global GDP growth. Telecom Service Providers (CSPs) are a critical link in the telecom ecosystem. If their growth is slowed down then it can have an impact on the overall GDP growth worldwide. Hence importance of a comprehensive approach to bring Telecom Service Providers (CSPs) back to sustainable, profitable growth can not be over emphasised.

# CHAPTER II:

# REVIEW OF LITERATURE

## 2.1 Telecom Services and Telecom Service Provider (CSP)

Telecom Service Providers (CSPs) traditionally concentrated on voice, but in the last few years their focus has shifted to data. Internet majors like Google, Apple, and Facebook are forcing Telecom Service providers (CSPs) to evolve toward information centered business, if they want to maintain their ecosystem position. Information is more valuable than data, as information is a contextualized datum. This profound change is radically altering consumer behavior; consumers now show no loyalty to a Telecom Service Provider (CSP) just offering minutes of voice and gigabytes of data.

A Telecom Service Provider (CSP), basing its product offerings only on the minutes of calls and number of SMS messages is basing its competitive capacity exclusively on price, by offering an undifferentiated product. In this sense at least, it would be very similar to a utility that bases its business on delivering kilowatts.

This is basically what the Telecom Service Providers (CSPs) have been working with, within a highly regulated business environment. Most of the large Telecom Service Providers (CSPs) have its origins in former state-owned fixed carrier companies who had monopolies in the market. Some dating back to the early twentieth century. The telecom business back then, which involved heavy investment in fixed asset in the deployment of the network. These investments were easily recouped thanks to major entrance barriers and very low variable costs. This lasted for decades, and, throughout that time, the Telecom Service Providers (CSPs) worked in a routine based restricted environment. With developments in technology, the working environment has evolved too fast for the Telecom Service Providers (CSPs), who are accustomed to competing with a very few competitors or in many cases no competition at all. For the environment they operated in, they

developed complex routines based on improving efficiency in data transportation, on process efficiency and control, making them rigid, highly bureaucratized organizations. This comes through clearly in their client relations, and complex, highly standardized vendor contracts, with rigid, penalty-ridden rules but lacking other routines and powers required to operate in a new agile and rather hostile ecosystem.

### 2.2 Telecom Service Providers (CSP) Challenges

Over the years the market has reached saturation, thereby limiting prospects of significant growth for Telecom Service Providers (CSPs). In developed countries, the mobile penetration rate is already high, and the market may be considered mature, increasing competition on prices. In Spain, for instance, the penetration rate maxed in December 2009, at 114.3 %, and although the subsequent drop is almost certainly attributable to the economic crisis, it would seem to have peaked. Things are similar to Spain in most other European countries, where penetration rates are upwards of 100 % of the population. Competition between Over the Top (OTT) companies, with free voice and messages, negatively affects voice and data revenues, as can be seen in the figure below for one of the developed European markets, where revenues from voice and SMS have been declining steadily since 2007. (Urizar, 2016, p. 219).

What is interesting to note in the figure 1 is that there is no additional or new revenue source that has emerged from 2006 to 2013 the Telecom Service Providers are just leveraging legacy services for revenue sources such as SMS, mobile telephony and call related tariffs. When the market is saturated, there is limited scope of growth from traditional sources of revenues. This is possibly the main reason for the revenue stagnation which is being experienced by the Telecom Service Providers all over the world.

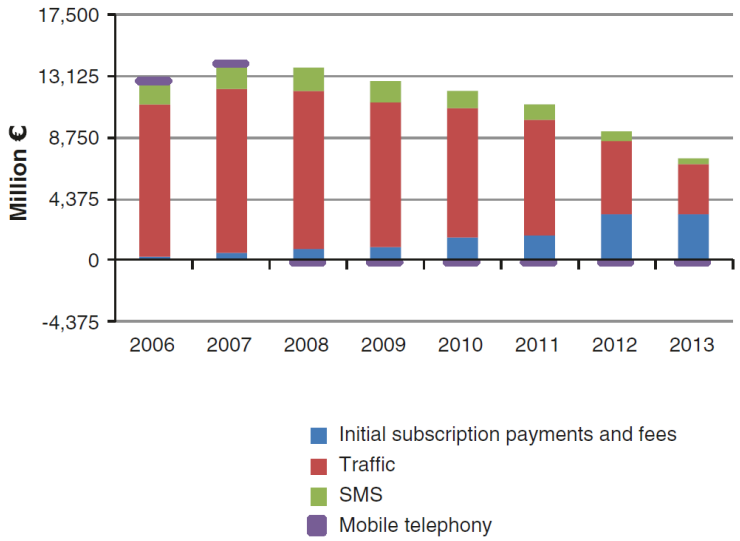



*Figure 1 Telecom Revenue Trend*

While this fall in the revenues continued the Telecom Service Providers (CSPs) continued to invest in deployment of 3G and 4G networks. During the 2007–2014 period Telecom Service Providers (CSPs) invested €155 billion in Europe on developing network infrastructure and further an estimated €170 billion during the 2015–2020 period. (Urizar, 2016, p. 220)

Given there is very little product differentiation amongst all the Telecom Service Providers (CSP) players in almost all markets, the analysts are also considering all the Telecom Service Providers (CSPs) as mere utilities and do not expect them to grow beyond nominal GDP growth. This view has significant consequences for all the Telecom Service Providers (CSPs). If the market does not expect major growth in revenues, it will prefer profits to be shared out as dividends rather than be ploughed back into the business, penalizing companies that do not give dividends in their market value (Urizar, 2016, p. 222). Those Telecom Service Providers (CSPs), who do not share a sizable part of their profit earnings as dividends, see a major drop in their market to book value ratio. E.g., Telecom Italia gave 74% of its profits as dividends in 2004 as against 13% in 2009, this

resulted in a significant decline of its market to book value from 2.62 to 0.76. All other major players have also experienced similar trends and hence most of the Telecom Service Providers (CSPs) have maintained a stable high dividend rates. E.g., AT&T @ 75%, Telia Sonera @ 86.8%, while Deutsche Telekom and Telefonica almost exceed 100% in 2014 and 2011 respectively to maintain its market valuation. When we compare this with OTT and other internet majors like Apple, Microsoft etc, we see a completely different picture. For the similar time frame as above, where all Telecom Service Providers (CSPs) have been sharing major part of their profits as dividend, the internet majors like Apple and Microsoft maintained dividend share of around 26% and 30% respectively from their annual profit earnings, in-spite of maintaining huge cash reserves.

As can be seen from the table below, the markets tend to treat these internet giants through a different lens when compared to the Telecom Service Providers (CSPs), which are looked upon as mere utility service providers, (Urizar, 2016, p. 223)

| Carrier | Percentage Payout Ratio | Market to Book Value | Internet Players | Percentage Payout Ratio | Market to Book Value |
|---|---|---|---|---|---|
| AT&T | 75% | 2.08 | Apple | 26% | 5.26 |
| Telefonica | 111% | 2.6 | Facebook ( Meta ) | 0% | 6.14 |
| Deutsche | 116% | 2.6 | Google | 0% | 4.28 |
| Telia Sonera | 88.8% | 1.9 | Microsoft | 30% | 3.96 |
| Vodafone | 31% | 0.91 | | | |

*Table 1 : Market to book value vs Dividend payout percentage out of income*

Prima facie this phenomenon seems to indicate that the product innovation and the expected exponential future revenue growth that these internet giants promise to the market, makes them more attractive for investors, whereas the Telecom Service Providers

(CSPs) struggle to maintain their market value due to lack of product differentiation and limited growth prospects.

However, the latest developments in the technology could provide Telecom Service Providers (CSPs) with the necessary tools they need to regain the rightful position in the overall industry ecosystem and thereby improve the market valuation and shareholder value. Economies across the globe are turning digital and in this emerging digital economic landscape, tectonic changes are seen in the way in which the businesses would function and interact with their customers and that is driving restructuring across many industries. These changes are affecting particularly the mobile telecommunication market, and are driven by a large number of factors that span from technological advances (convergence), market demand, sophistication, regulatory evolution, and more competitive industry dynamics (Katia Passerini, 2004)

How could Telecom Service Providers (CSPs) leverage the latest developments in technology to create differentiation and re-establish their position in the market ecosystem to regain profitable growth? This is a question on top of mind for analysts as well as CxOs and top management at the Telecom Service Providers ( CSPs ). The strategic approach of Telecom Service Providers (CSPs) need to be based on rethinking their relationships with the OTTs, other industry players and on entering the digital economy and transforming themselves from Telco to Tech-co. Many CSPs are already taking this path of transforming from Telco to Tech-co. E.g., Vodafone Group's 2020 strategy indicates: "As part of its 'telco to tech' evolution, Vodafone plans to jump-start the transformation process by positioning networking as an enabling foundation for digital business offerings. Leveraging its experience and expertise in mobility, 5G, IoT and SD WAN, the company is betting that automation and industrialization of networking in the form of scalable platforms will attract both the IT and application developer partners and digitizing

enterprise customers needed to drive the use cases for business models incorporating multi-access edge computing and low-latency applications. As cloud, IoT and networking converge, partnerships offer Vodafone the opportunity for scale-oriented growth and expansion via business-outcomes focused end-to-end industry platforms. Telcos and other service providers with legacy value propositions would do well to accelerate their efforts to digitize their business operations, 'platformize' their core offerings, and work with partners to execute on the (long-awaited) promise of network/IT convergence." (Posey, 2020)**.**

Another major European CSP, Telefonica talks about launching Telefonica Tech in its 2020 strategy: "This new venture seeks to capture the growth of the digital services market in order to complete the connectivity offering to corporate customers. The initial focus has been on a service offering in three businesses: Cybersecurity, Cloud, and IoT/Big Data." (Telefonica, 2020)**.**

A similar trend is also seen in US markets where a major CSP: T-mobile is aggressively pushing Digital Transformation offerings with 5G : "Digital transformation is about reimagining your enterprise to meet changing market needs and take advantage of new business opportunities in an increasingly digital world. And because fast, flexible, and reliable networking is essential to connecting and innovating, 5G is at the heart of delivering what's next" (T-Mobile, 2023)**.**

In developing countries where one would think that there is still substantial penetration growth left, the major Telecom Service Providers (CSPs) are already talking about becoming a digital service provider. Airtel in is 2023 strategy indicates its focus on building an integrated digital ecosystem: "Build an integrated digital ecosystem to solve real customer problems through digital services at scale" (Airtel, 2023)**.**

One can sight many more examples from other countries like Indonesia where Indosat is adopting similar approach to offer enterprise cloud services, Singtel Singapore's 'Cube' initiative for unified network services for cloud centric digital infrastructure, Japan's NTT group is working on organization wide transformation to deliver new experiences and excitements to its consumers.

From above examples it is clear that Telecom Service Providers (CSPs) are trying to re-invent themselves by leveraging latest developments in technology, however so far, they haven't managed to create a WhatsApp moment or an iPhone phenomenon, where a completely new market got created and the exponential take-up is witnessed across the globe.

Having said, one can explore clear areas where a Telecom Service Provider (CSP) can focus to create incremental revenue lines in its business. Following are some of the areas for Telecom Service Providers (CSPs) to explore.

**Telecom Service Providers (CSPs) and Entertainment Industry:**

Improvements in network quality and capacity because of 4G and 5G technology and the ultrafast fiber broadband to homes with speeds in excess of 1 Gb per second is accelerating momentum for digital media and content consumption, that began with 3G way back in 2007. This is driving all Telecom Service Providers (CSPs) to make incursions in the content and media distribution business. Entering pay TV may be considered a straightforward path for the Telecom Service Provider's (CSP's) business because high-definition content consumption on the hand-held devices like smart phones and tabs as well as smart home TVs is a major source of high-performance network data consumption in fiber, 4G and 5G alike.

Multimedia content delivery through Telecom Service Provider (CSP) networks. (Rehman, Wagas 2019)

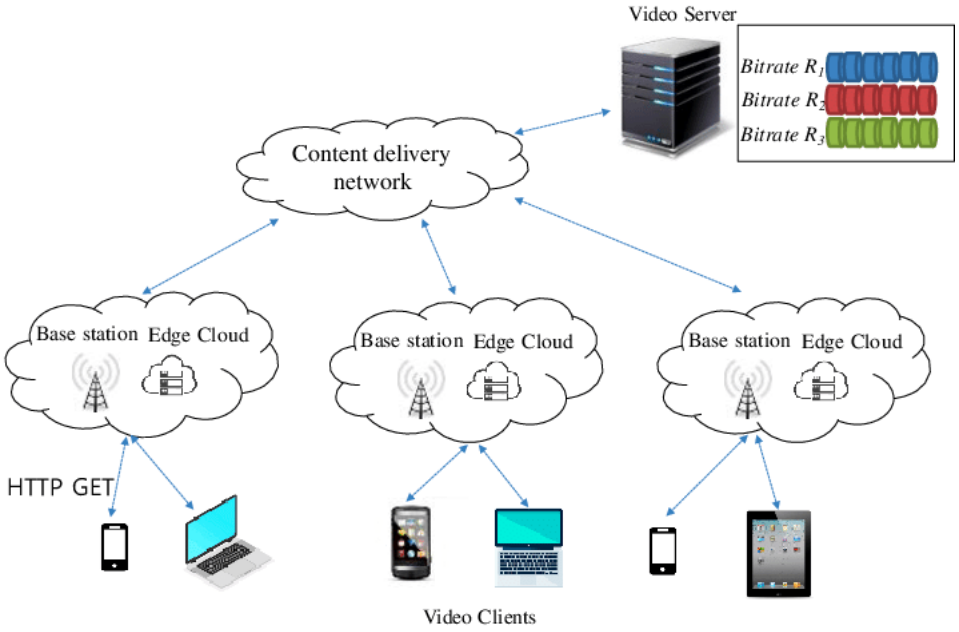


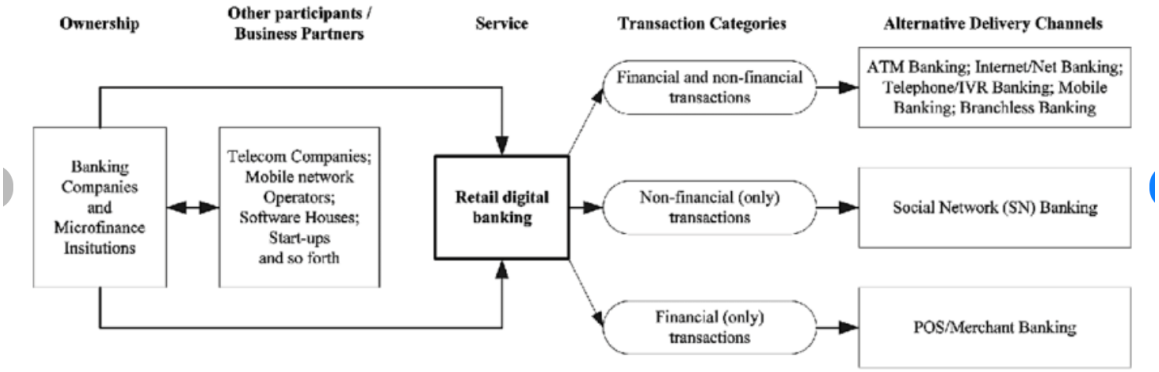

*Figure 2 Multimedia content delivery through Telecom CSP*

In the immediate future this approach may give Telecom Service Providers (CSPs) the edge in the market, however in the long run when everyone is offering the same media services then the product differentiation again will become a question mark, unless the Telecom Service Providers (CSPs) can get into exclusive distributive rights for certain contents like sport or concert events.

**Telecom Service Providers (CSPs) and financial services:**

All economies across the globe are going through transformation towards becoming digital economies. Local mobile wallets are available across all countries, internet giants like Google, Amazon, Apple, Facebook etc have deployed their own payment solutions.

There is a debate in the market on whether these OTT players can fully take over the role of a Bank. There is no clear answer as of now, given local regulations are a critical factor for an organization to be considered as financial intermediatory. A Bank is basically a financial intermediatory taking money from people who do not need it immediately (depositors) and lending it to anyone who needs it immediately but can repay over a period of time (debtors). While it may look simple but there is a big element of authentic information management in the middle. If perfect information were available, Banks would not be needed, as matching those needing the money and those who can offer, would not be costly at all. People would lend money to those who they know can repay in the specified time. But in reality, this is far from truth and so managing this information asymmetry the main role that Banks play in the market. Telecom Service Providers (CSPs) could have a role to play in helping Banks manage this information asymmetry. Telecom Service Providers (CSPs) have authentic information about all its consumers through KYC which is mandatory before availing a mobile connection. This can be a vast asset for Banks trying to penetrate deeper into the markets. This is especially true in growing economies like Indonesia where the mobile penetration is well over 100 mil however the banking penetration has just reached only 50 to 60 mil people. (International Financial Corporation - World bank Group, 2010)**.** Telecom Service providers (CSPs) will have to be open to enter into an ecosystem play where information sharing can be mutually beneficial for Banking and Financial Services Institutions (BFSI) as well as Telecom Service Providers (CSPs). The BFSIs will benefit through the authentic information about an individual trying to avail a certain service, the Telecom Service Provider (CSP) on the other hand will get a new revenue stream through this identity verification services.




Digital banking ecosystem. (Sheikkh, Aijaz 2016)

*Figure 3 Digital Banking Ecosystem & Telecom Service Provider (CSP)*

While this may sound relatively straightforward, however there are elements of regulation and also me-too effect which may limit the upside potential for Telecom Service Providers (CSPs) if all the players start to offer similar kind of services.

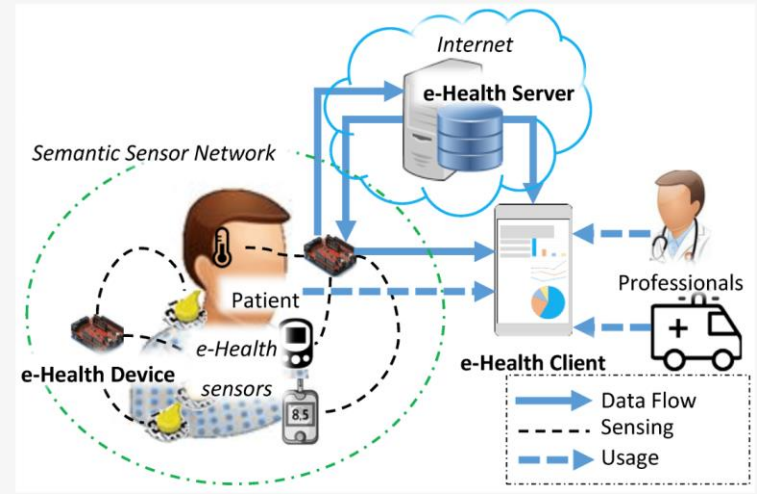
**Telecom Service Providers (CSPs) and E-Health :**

Healthcare is intricately linked to population age. Most of the countries in the world the population is aging, this is especially the case in developed world. The majority of the population aged over 65 suffers from some or the other chronic illness, this brings significant exposure on healthcare expenses for individuals as well as on public healthcare systems. Governments world over have realized the gravity of this impending issue and realized the need to change the current health care system model.

Emphasis is shifting to preventive health care rather than corrective health care as is the case as of now. Experts are also advocating ‘self-care’ with the help of smart wearable devices (also known as E-Health). This ‘E-Health’ market is growing rapidly, and it could be a potential area for Telecom Service Providers (CSPs) to look at for generating new revenue streams.

E-Health is becoming a large ecosystem, enabling significant benefits for caregiver as well as receiver. It helps Patients, to control their own health better through continuous monitoring of their body parameters using smart wearables, at the same time the Healthcare Professionals get more information about their patients, thus facilitating preventive diagnosis and treatment of chronic illnesses, and Insurance Companies also gets benefitted because E-health promotes healthier lifestyles and reduces their service costs.

4G, 5G high speed data transmission capacity also facilitate personalized services, customized to the needs of individuals through increased doctor - patient interactivity. This is where Telecom Service Providers (CSPs) can play the role of an E-Health service enabler by bringing together, the consumers, healthcare professionals and industry players like smart wearables, insurance companies etc, to enable an ecosystem for preventive healthcare.




A generic view of the E-Health Ecosystem**.** (Kim, 2018)

*Figure 4 E-health & Telecom Service Provider (CSP)*

Healthcare data is extremely sensitive given it is hypersensitive personalized information. While developing and more importantly scaling the E-health ecosystem plays,

the Telecom Service Providers (CSPs) will have to collaborate amongst themselves as well as other industry players to build a safe and secure and most importantly universally acceptable framework for enabling comprehensive E-Health services.

**Telecom Service Providers (CSPs) and Internet of Things (IoT) :**

Internet of things also known as IoT is a high growth area across the globe in a wide range of industries thanks to the high speed and low latency connectivity which has become pervasive after 4G and 5G network rollouts by Telecom Service Providers (CSPs) across the globe. IoT brings high potential profits for firms by digitizing the value chain they operate. The IoT's disruptive potential in some sectors is very high, because it changes the rules of the game and alters business models, enhancing production efficiency enormously. By 2025 best-in-class organizations are expected to be making widespread use of IoT technologies in their products and operations to improve their profitability.

Many Telecom Service Providers (CSPs) have expressed interest to move into the IoT field. The reason is relatively straightforward, there are many more devices to connect in the world as compared to humans. So IoT is a clear area for revenue growth, for a Telecom Service provider (CSP).

IoT is inherently an ecosystem play where Telecom Service Providers (CSPs) will have to work with multiple partners to enable a service. This includes players in devices and sensors, IoT platforms, Industry sectors like manufacturing, logistics, retail, transformation, infrastructure, utilities etc.

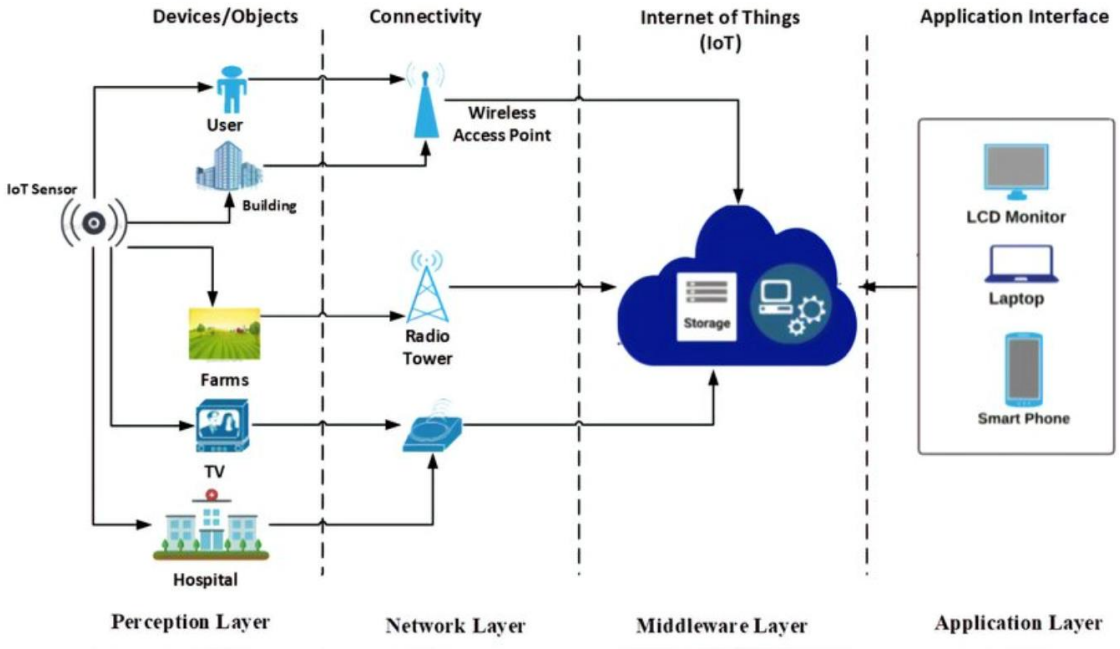
IoT devices are a critical part of the value chain. These includes sensors (NFC, RFID, temperature, humidity, location, wind, rain, etc.), specialized devices like electricity, water, gas meters etc, appliances like smart air conditioners, refrigerators, water

heaters, smart wearables etc, and also a wide range of connected transportation elements like smart 2 wheelers, smart cars, trucks etc.

IoT platforms are essentially the nerve center for the IoT service, where all devices and sensors interconnect to share the data and receive execution instructions e.g., a smart air conditioner sending the data about ambient temperature and then receiving instructions on when to turn on or off.

Application developers are another key element in the IoT ecosystem, they leverage the IoT platform capabilities to develop bespoke applications to meet enterprise client demands.

Connectivity where Telecom Service Providers (CSPs) play a critical role is essentially the most important element of the IoT ecosystem as such, as it interconnects all other elements to enable a service offering.




A high-level view of IoT ecosystem (ResearchGate, 2019)

*Figure 5 IoT Ecosystem & Telecom Service Provider (CSP)*

Telecom Service Providers (CSPs) have a natural control over this ecosystem as they play a pivotal role of enabling interconnectivity amongst all other players. Many Telecom Service Providers (CSPs) have already started offering IoT as a service however their success has been limited so far, prima facie reason being that the Telecom Service Providers (CSPs) are traditionally good in enabling connectivity, but they lack the system integration capabilities required to enable and maintain IoT platforms. The sales organization's capabilities of a Telecom Service Provider (CSP) are also limited in this area as of now. So, while IoT is a clear area for Telecom Service Providers (CSPs) to develop new revenue streams, Telecom Service Providers (CSPs) will have to embrace the IoT ecosystem play and build their organizational capabilities to sale and support IoT platform services.

**Telecom Service Providers (CSPs) and Cloud Computing :**

Cloud computing is a major growth area. In 2008 this sector earned $46 billion, a figure that had risen to more than $150 billion in 2014, a cumulative annual growth rate of 21.8 %, and for 2016 it will top the $200 billion mark. (STL, 2012)

Cloud computing is divided into three major categories: IaaS (Infrastructure as a Service), SaaS (Software as a Service), and PaaS (Platform as a Service). Market Forecast Suggests, IaaS would have a CAGR of 41.3 %, PaaS, 27.7 % and SaaS 19.5 %, and would grow most in Pacific Asian countries and Latin America. (Garther, 2012)

With IaaS, the service provider makes servers, storage systems, routers, and other infrastructure features available to the client, together with applications. The provider is responsible for maintenance, backup, and security. Clients pay according to the use they make of the resources available to them in terms of time or amount of space used. This

type of service enables enterprises to avoid both investments in hardware and software and the associated technological risks.

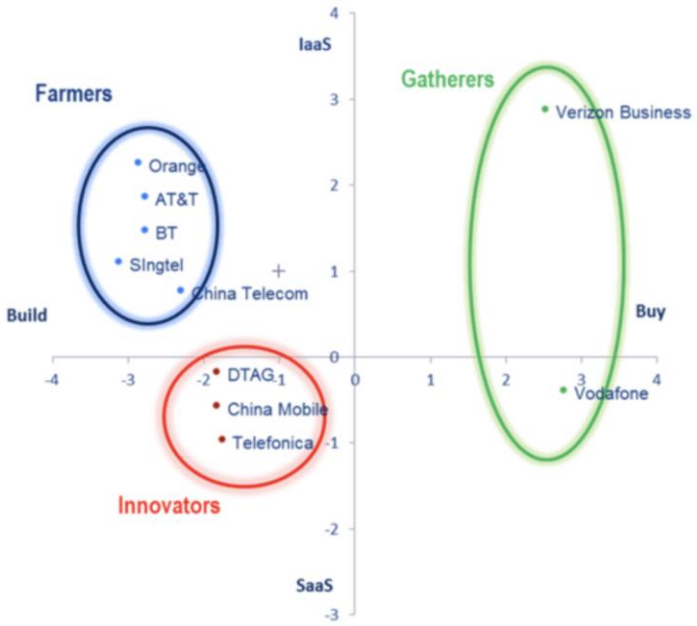
With Platform as a Service (PaaS), the provider supplies the infrastructure, the clients (developers of cloud native apps) need to be able to concentrate exclusively on writing software and ensuring it is optimized to consume least resources. These services greatly reduce complexity in the deployment and maintenance of applications. Some of the prominent cloud service providers are Microsoft (Windows Azure) and Google (Google App Engine), although Cloud Foundry has recently enjoyed major growth. The latter is an open-code platform also being developed by corporations like IBM (Bluemix), HP (Helion).

Software as a Service (SaaS) is a software distribution model where programs and data are stored in the cloud, in the servers of an ICT company, and are accessed via the Internet. For enterprises it is a way of simplifying access to data and software because they can do so from any part of the world and from any device, as they are not physically installed in a client's computer; access to them is gained through a browser. The service provider is responsible for development, maintenance, updating, and backup copies, which means the client controls the applications it handles. Examples of SaaS include Google Docs, Webmail (Gmail), online CRM, and Dropbox.

Telecom Service Providers (CSPs) have shown interest in entering the cloud market, what most differentiates their behaviour is the emphasis they place on their investments in being providers of infrastructure as a service (IaaS) or on being providers of software as a service (SaaS), and the decision as to whether to build or acquire cloud capabilities. STL partners found that carriers grouped into one of three clusters depending on their behaviour regarding two variables. The first, the farmers, is formed by Orange, AT&T, BT, Singtel, and China Telecom. They are large, fixed telephony operators that preferred developing

rather than buying Infrastructure as a Service. The second group, which STL calls the innovators, includes DTAG, China Mobile, and Telefonica. These corporations placed more emphasis on Software as a Service and tended to pursue more diversified technology strategies. Finally, the "gatherers," like Verizon Business and Vodafone, basically tend to pursue acquisition strategies, Verizon concentrating on the American IaaS market and Vodafone investing heavily in SaaS. (Partners, 2012)

The benefit for the enterprise clients is that it saves on costs and investments in IT platforms and is left free to concentrate on developing the key competencies of its business. The downside is that the client will barely have any control over its IT infrastructure going forward.




CSPs in cloud computing (Partners, 2012)

*Figure 6 Cloud Computing & Telecom Service Provider (CSP)*

While Cloud offerings seems like a natural extension of the communication services which Telecom Service Providers (CSPs) already offer, however, to manage cloud

applications and workloads on a day-to-day basis requires a different skillset and more importantly the mindset, which is nimble, flexible, agile and one which is focused on system integration rather than network focused which is where the Telecom Service Providers (CSPs) have been traditionally focused. Telecom Service Providers (CSPs) will have to invest heavily to acquire skills to manage enterprise demands and also maintain a multi cloud environment which is capable of serving their enterprise client demands.

### 2.3 Summary of the Literature Review

Many research papers have suggested various ways and means for Telecom Service Providers to consider for returning to profitable growth but all those ideas in isolation do not give a comprehensive outlook on what approach a Telecom Service Provider (CSP) should take in order to re-secure their position in the ecosystem where they should focus, what investments they should make and most importantly what should be the strategic direction for the leadership. Many Telecom Service Providers (CSPs) world over have tried in some shape or form to transform themselves from Telco to Tech Co (Mariana, 2003), but till date most of the Telecom Service Providers (CSPs) world over are struggling to make that transformation.

Hence this research proposes to consider views of experts and senior executives associated with the Telecom industry, demands from the end consumers, both in retail as well as enterprise space, and all the work done by various researchers on current state of Telecom Industry, to come up with concrete recommendations for the Telecom Service Providers (CSPs) to create new sources of revenue and regain profitable growth.

# CHAPTER III:

# RESEARCH METHODOLOGY

## 3.1 Understanding Telecom Service Provider's (CSP's) business

The aim of this research is to provide a comprehensive framework for Telecom Service Providers (CSPs) to return to profitable growth. Hence it is important to understand the overall business environment that the Telecom Service Provider (CSP) operate in. What are the key success factors today as well as in the future, which are critical to scure profitable growth. Various market analysts track the growth and overall performance of Telecom Service Providers (CSPs) with different performance indicators, also commonly known as KPIs. Analysts have used different nomenclutures to describe these KPIs, however almost all have focused on following 9 areas to measure the prerormance of a Telecom Service Provider (CSP).

1. **Average Return per User :** The name of this KPI is self-explanatory. Average return per user (ARPU) gives an indication of how much revenue a Telecom Service Provider (CSP) makes on an average each consumer or user of its services. Although ARPU is not a precise indicator of profitability, it generally shows how much an average user is paying for the services, it is similar to the average order value for an FMCG companies. Higher ARPU is an indication of better or more profitable business for Telecom Service Provider (CSP).
2. **Customer satisfaction**: Customer satisfaction score (CSAT) is a key performance indicator that impacts company's success. It is calculated by measuring customer feedback through various feedback surveys. On a scale of 1 to 10, anything in excess of 8 is considered a good CSAT score. Better CSAT score is an indication of reduced churn resulting in improved customer loyalty enabling better revenue quality for Telecom Service Provider (CSP).

3. **Network Reach :** This indicates how much of the total addressable population is covered by the network that a Telecom Service Provider (CSP) operates. This KPI is important when a new telecom network rollout is happening in the market, e.g 5G. In the recent past the market observers rate Telecom Service Providers (CSPs) by the network reach e.g. 80% to 90% of population covered. This KPI has a direct relationship to the revenue market share that a Telecom Service Provider (CSP) will be able to traget. This KPI is also monitored by the regulators to ensure that Telecom Service Provider (CSP) is compliant to the license conditions requiring minimum population coverage across the geography of the licensed area given to Telecom Service Provider (CSP).
4. **Network availability:** This KPI is a quality indicator, it shows service availability, average downlink uplink data speeds, voice call completion rate, and latency. In the telecom industry, achieving “five nines” availability, or 99.999%, is considered the gold standard. This KPI also has a direct impact on the revenue market share that a Telecom Service Provider (CSP) can achive.
5. **Subscriber Acquisition Cost (SAC):** An essential KPI for Telecom Service Providers (CSPs), SAC represents the true cost of gaining a new customer. This is an extremely difficult metric to accurately measure. Although it seems straight-forward. It reflects the effectiveness of sales amd distribution engine of a Telecom Service Provider (CSP).
6. **Churn** : Churn is a measure of how many consumers the Telecom Service Provider (CSP) is losing in a given period of time. Typically it is calculated for a month or a quarter. By monitoring Churn for particular package or bundles and price points, broadband speeds, or handset types, one can get an insight into how satisfied the customers are. Churn rates in the telecom industry have

shown some variation but often range between 2% and 3% annually at an average. The churn rates varry significantly depending upon market conditions. In fast growing markets like Africa, churn rate for Telecom Service Providers (CSPs) is relatively high as compared to matured markets like Europe.

7. **Ending consumers or subscribers :** Increases and decreases in number of consumers or subscribers are also closely monitored and are identified as net additions. Every new addition adds new revenue for a Telecom Service Provider (CSP), and every subscriber disconnecting the service results in churn for the Telecom Service Provider (CSP) and represents a loss of revenue.
8. **Capex to Sales ratio :** The capex-to-sales ratio helps investors measure how much revenue is ploughed back into capital expenses by the Telecom Service Providers (CSPs) as they continuously maintain the network, and invest in building new network assets as well as upgrading existing network assets.
9. **EBITDA Margin and Free Cash Flow:** Investors evaluate profitability by looking at the level and directional change of the EBITDA (earning before interest Tax and Depreciation). while free cash flow (FCF) tracks operational efficiency of the Telecom Service Provider (CSP) organisation.

**Telecom Service Provider (CSP) relationship with other players in the ecosystem :**

Telecom Service Providers (CSPs) have a symbiotic relationship with other players in the ecosystem. When it comes to the retail consumer segment mainly there are two other entities which can affect a Telecom Service Provider's (CSP's) revenue. Handset manufactures (OEMs) and Over-the-top content providers (OTT).

OEMs bring in the device capabilities which drive the uptake of the data consumption and other CSP services, thereby positively impacting the CSP revenues.

OTTs drive end-user content consumption, which again get delivered via various connectivity services provided by the Telecom Service Provider (CSP), which helps in revenue improvement. Following diagram shows the direct relationship for the Telecom Service Providers (CSPs) revenue with OTT and OEM players.

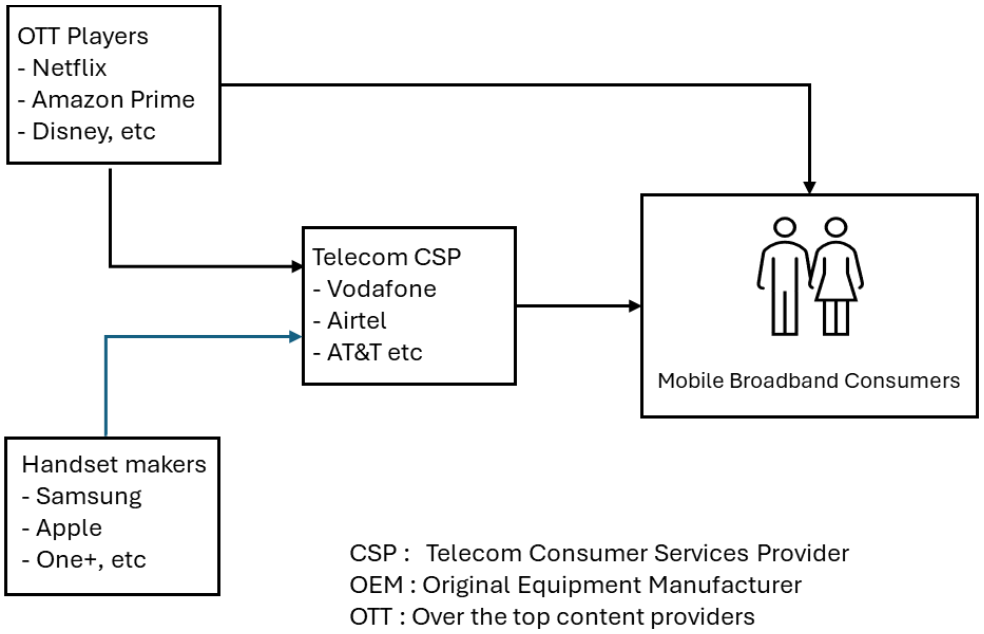



*Figure 7: Relationship Telecom Service Provider (CSP) and other players in the ecosystem*

Revenue of a Telecom Service Provider (CSP) is directly linked to the demand and consumption of its services by the consumers or subscribers in the everyday life. This demand is not entirely controlled by Telecom Service Provider (CSP) alone. There are multiple factors and role of other ecosystem players which can have a significant impact.

Handset OEMs like – Samsung, Apple, Google, One+ etc are continuously innovating and bringing new features and functionalities to the handsets thereby driving the data consumption. The OEM's are driving significant innovation and bringing in new capabilities in their models which are comeing in the market at a regular interval. For

example, Samsung's new S 24 series of handsets are coming with AI enabled search which is driving significant uptake of data services. Google Pixle has introduced new AI based features for professional grade photography. Through these innovative offerings the handset OEMs are able to secure significant revenue grown on a year on year basis for themselves, and at the same time increased data consumption through usage of these features also gives the Telecom Service Providers additional revenue for data services.

OTT players like – Netflix, Amazon Prime, Disney etc are also bringing in continuous innovation and bringing new content and targeted campaigns to drive user consumption, there by driving data consumption amongst the consumers. OTT players are significantly growing their year on year revenues and generating significant investor value. Key players like Netflix, Disney, Amazon are some of the most valuable companies for investors across the globe. Increased data consumption through OTT services also gives additional revenues to the Telecom Service Providers (CSPs) for data services.

Telecom Service Providers (CSPs) like – Vodafone, Airtel, Jio etc are significantly investing in the network capacity to deliver high speed data serviecs to consumers. Globally the average consumption of data per user has grown significantly, primarily due to the enhanced handset capebilities and content availability. However the Telecom Service Provider's (CSP) data revenues are not increasing in the same proportion as other players in the ecosystem like OEMs and OTT players. Understanding the functioning of the Telecom Service Provider's (CSP's) network operations and impact from various Handset OEMs, and OTT players on its revenue is important to determine the right approach for the research design.

**Understanding the revenue model of a Telecom Service Provder (CSP):**

Two key drivers for the Telecom Service Provider's (CSP's) revenue are the Average Return Per User, it is also referred as Average Revenue Per User (ARPU) by some analysts and the number of subscribers or the consumers of the telecom services offered by the Telecom Service Provider (CSP). The ARPU is calculated as the total revenue of the Telecom Service Provider (CSP) in a month divided by the total number of subscribers or consumers of telecom services on its network. E.g. If the over revenue of the Telecom Service Provider (CSP) in a moth is 10 mil USD and it has 1 mil subscribers on its network then the ARPU would be 10 mil (revenue) divided by 1 mil (subscribers), which will work out to 10 USD per subscriber per month. So the ARPU would be 10 USD. If the number of subscribers increase to 1.1 mil but the overall revenue remains same at 10 mil USD then the ARPU would drop to 10 mil USD (revenue) divided by 1.1 mil (subscribers), which will work out to 9.09 USD per user per month. On the other hand if the revenue increase to 11 mul USD but subscriber base remains same at 1 mil then the ARPU would be 11 mil (revenue) divided by 1 mil (subscribers) , which will work out to 11 USD per user per month. Higher ARPU indicates that the Telecom Service Provider (CSP) is able to sweat its assets better and which means it is delivering better returns to the investors.

The other important factor determining the overall revenue of a Telecom Service Provider (CSP) is the 'Ending Subscribers' The ending subscribers is calculated as sum of total number of subscribers at the start of a period (typically a month) plus the new subscribers added during the specific period under consideration (i.e. specific month) minus the number of subscribers which has left the Telecom Service Provider's (CSP's) network or stopped availing services from the Telecom Service Provider (CSP), in the same specific period (i.e. specific month). This gives an idea of the net new revenue generating subscribers or consumers of telecom services which got added to the Telecom Service

Provider's (CSP's) business. Following diagram gives a high level view of the Revenue matrix for a Telecom Service Provider (CSP).

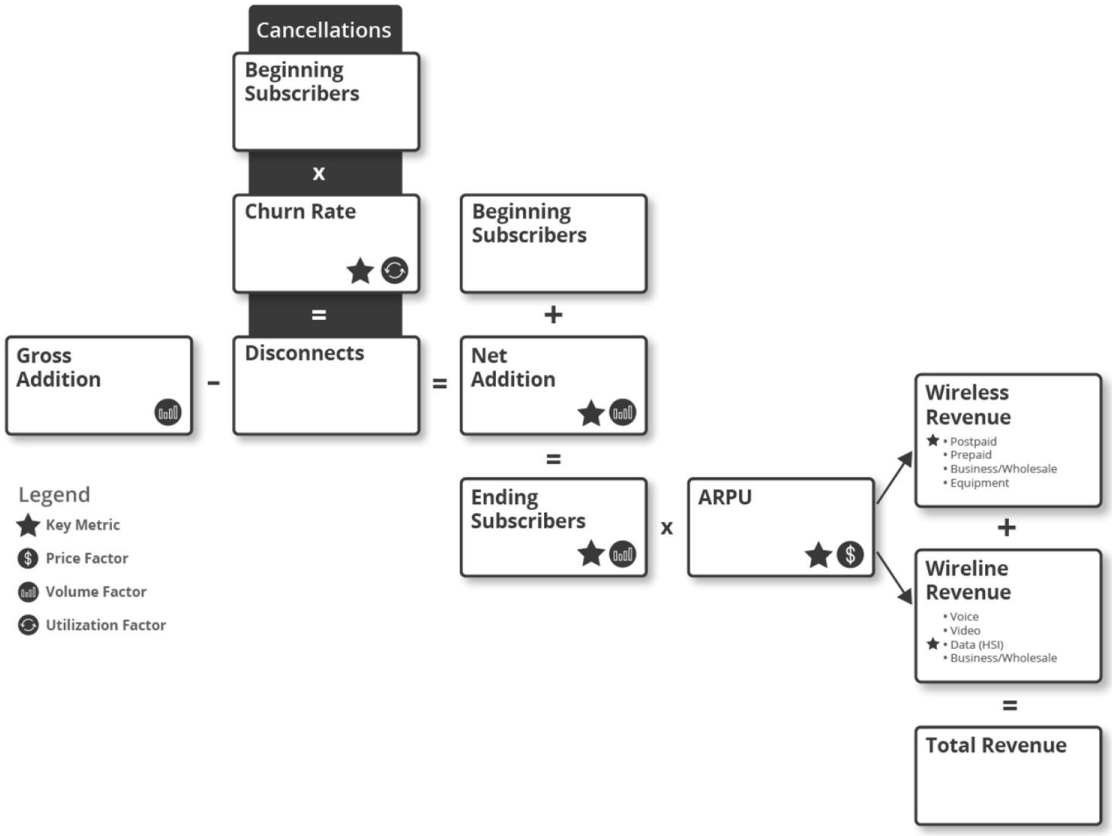



*Figure 8: Revenue Matrix of Telecom Service Provider (CSP)*

**Telecom Service Provider's (CSP's) organisational functions driving revenue :**

As discussed earlier, Telecom Service Providers (CSPs) operate in an ecosystem involving various entities over and above the Telecom Service Provider (CSP) it self, like handset OEMs, OTT content players etc. Each of these entities has an impact on the Telecom Service Provider's (CSP's) revenue. Besides this, the Telecom Service Provider (CSP) itself also has various internal functions which impacts the working of the Telecom Service Provider (CSP) and the reveue it is able to generate. It is also important to

understand this inter functional relationship for building right approach for the research design. Following are some of the key internal functions within Telecom Service Provider (CSP) and the inter-functional relationships, which has a direct impact on its revenue generating potential.

**Broadband Network Infrastructure :** The boradband network infrastructure is the the key functional building block which enables the Telecom Service Provider (CSP) to deliver its connectivity services. It comprises of following subcomponents.

- Access network – Radio and Fixed line
- Mobility & Fixed Core network
- Transmission – MW & IP backbone
- Passive – Fiber & other connectivity

Access network enables the last mile connectivity between the consumer and the core network elements which hosts the gateway towards external world like internet and other content services providers. For wireless or mobile broadband connectivity it is called the Radio Access Network (RAN) where as for the fixed line connectivity it is either legacy copper based wireline network or more recently the fiber to premises (FTTx) access network.

Core network also has both mobile and fixed core elements which enables connectivity to external world like the internet or OTT players. Fixed line networks also enable enterprise connectivity like wide area network also knowns as WANs.

Transmission is a key link between the access network and the core network, it enables connectivity between the two network functions and allows the data to flow from customer primises to the internet. Transmission networks are built using microwave and IP equipments. Passive fiber and associated elements are other key subfunction within the Transmission functional block.

One of the key KPIs which is delivered by Network Infrastrcutrure is the Network Reach, which determines how much addressable population is covered by a Telecom Service Provider (CSP).

**Newtwork Operations Center :** Network operations center also commonly known as NOC plays an important role in maintainance of the broadband network. The NoC has following key functions under its preview.

- Network operations management
- Network Incident management
- Network Fault management
- Network planning
- Network performance management

Network operations management is responsible for day to day functioning of the broadband network. This function is responsible for ensuring reactive as well as proactive maintenance of the broadband network.

Network incidence management is a key function which records an incidence and assist the field force in fault rectification in case of a service affecting fault.

Fault management deals with non critical network faults, however it is an important function to esnure that the small faults do not become critcal service affecting faults.

Network Planning takes care of the network coverage as well as capacity requirements. It is a key function which forecasts future demand and enables Telecom Service Provider (CSP) to plan its capex spend in the near and long term future.

Network performance management function esnures all critical service affecting KPIs like call drops, average data speed per subscriber, call success rate, latency etc are maintained.

**Operations support system** :

This is another key function which enables onboarding and supporting end consumers through their lifecycle. Also known as the OSS it has following subfunctions.

- Customer relationship management (CRM)
- Billing
- Business support system (BSS)

Customer relationship management ensures that end user subscription records are maintained and managed on a ongoing basis. It is a key element in customer management.

Billing is the revenue engine, it generates prepaid and post paid bills on monthly basis and ensures that all consumers are correctly charged as per usage.

Business support system, also knows as BSS is responsible for end consumer subscription and service fulfillment.

Network operations function is responsible for Delivering Network availability and managing CAPEX to Sales ratio which are some of the key KPIs for a Telecom Service Provider (CSP).

**Product Management :**

This function is responsible for driving product lifecycle of a Telecom Service Provider (CSP). It is responsible for desiging and launching various products such as - Post paid data plans, Prepaid data plans, Multimedia content, Gaming content, M-commerce, and also B2B Enterprise offerings such as - Corporate group plans, IoT, Data Center and Cloud offrings, Fiber leased lines.

**Product marketing :**

This is an external market facing function of Telecom Service Provider (CSP). It is responsible for Product design, creating targeted campaigns, brand positioning and demand generation, and competitor analysis.

Product Management and product marketing functions are responsible driving key KPIs like Customer Acquisition, Churn, ending customer number and also CAPEX to Sales radio.

**Digital channels for customer engagement :**

Contineous end consumer engagement is a critical in esuring customer centricity. Increasingly the digital channels are playing a key role in the consumer engagement. For a Telecom Service Provider (CSP) following channels are key to sustained consumer engament.

Mobile Application – This ensures quick and easy interface for end consumer to engage with the Telecom Service Provider (CSP) for subscription and service related matters. Web browser is also another similar channel for targetted consumer engagement.

Call centers play a key role in resolving complex consumer complaints which are not addressable via self service channels like interactive voice (IVR), mobile application or web channel.

Point of sale terminals, Retail Distributors and Direct Sales are some other channels which enables consumer centricity. These channels for end consumer engagment helps to drive critical Telecom Service Provider (CSP) KPIs such as Average Return Per User (ARPU) and Customer Satisfaction.

Following figure shows the inter functional relationships and its ultimate impact on the Telecom Service Provider's (CSP's) revenue and overall business heaalth.

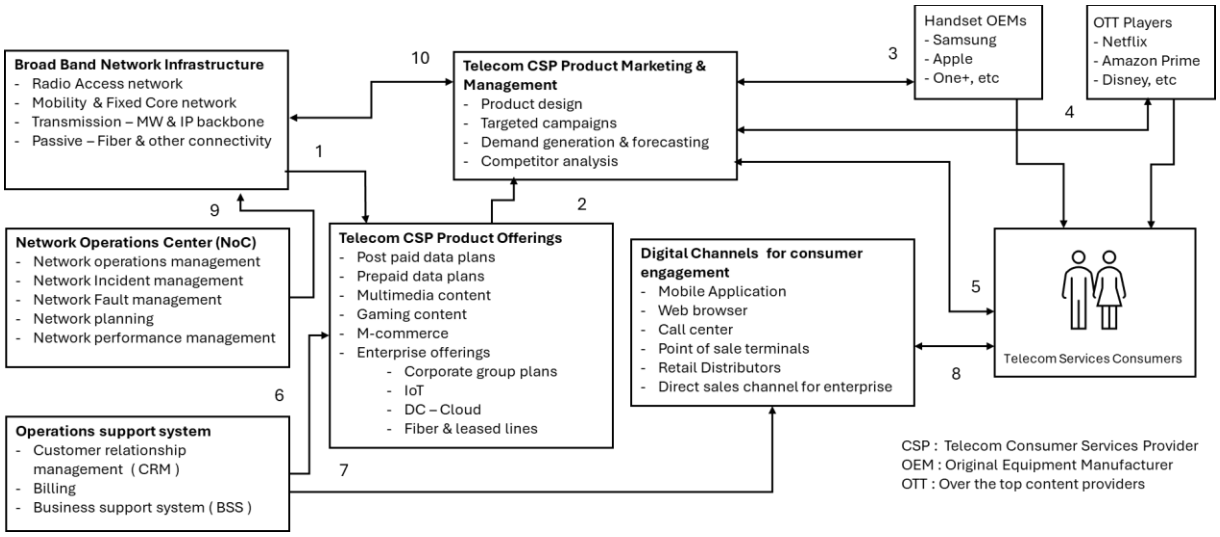



*Figure 9 : Relationships in Telecom Service Provider (CSP), Industry players and consumers*

The revenue or income that a Telecom Service Provider (CSP) generates is driven by intricate internal functional interactions as well as external players like handset OEMs and OTT players.

1. Network infrastructure enables delivery of connectivity, which is the primary input for for creating product offerings in the market. The product management function leverages the network connectivity to create market offerings for retail as as well as enterprise customers.
2. The product management function offers the desinged products such as data plans, roaming plans, value added services, content and gaming services etc to the product marketing management function. The product marketing is responsible for driving campaigns and launching products in the market.
3. The product marketing and product management functions work with handset OEMs to create combined plans with a fixed or variable monthly charge.

4. The product marketing and product management functions also work with various OTT players to create bundled plans. There are different types of prepaid and postpaid plans involving multiple combinations which can be seen in the market.
5. The marketing campaigns are targetted towards the end consumers which are exposed via multiple media channels, (print as well as electronic).
6. Operations support function plays a key role in onboarding the customers and servicing the users of telecom services through the lifecycle. Customer lifecycle management is an important area for Telecom Service Provider (CSP).
7. The operation support function is normally tightly integrated with the front end digital channels, which in the primary medium for consumer engagement. The digital front end enables consumers to interact with Telecom Service Provider (CSP) for their subscription related requests or any technical issues in availing the telecom services.
8. Telecom Service Providers (CSPs) strives to maintain close and regular connects with consumers of its services through digital channels. Mobile application is increasingly becoming a preferred channel for the consumer interaction. Many Telecom Service Providers (CSPs) are also offering value added services like M-commerce through their applications.
9. Network operations plays a keyt role in ensuring service quality. It contineously monitors network and service quality and recomends corrective as well as preventive actions to be taken in the network for maintaining service quality.
10. Product marketing also leverage network capebilities in terms of features and functions it can offer to end consumer, while desigining and driving campaigns. The product marketing is also responsible for bringing in out-side in view for assessing market competition and recommendations around featurs and

functionalities which needs to be enabled through broadband network infrastructure, in order to stay competative in the market.

Effective interworking of the internal as well as external functions is critical for the Telecom Service Provider (CSP) to drive its revene and KPIs which are monitored by investror analysts in determining market valuation.

**Market Forces in Telecom :**

Apart from understanding the functional elements within a Telecom Service Provider (CSP) and its interworking, it is equally important to understand expected market forces and its impact on Telecom Telecom Service Provider (CSP) on the relative position in the ecosystem. Most of the Telecom Service Providers (CSPs) operate in a well-regulated market environment, however the Porters 5 forces model is equally applicable to the telecom, just like any other industry. A quick view of the market forces can be visualised as follows.

**Entry Barriers** are likelt to be high, as it is not easy for a new entrant to secure a license and spectrum from the government agencies and set up a large telecom infrastructure which is already set up by the existing Telecom Service Providers (CSPs) with wide market reach.

**The Bargaining Power of suppliers** is expected to be relatively low as the Telecom Service Providers (CSP) infrastructure equipments are commoditized with standard interfaces.

**Substitution Threat** for the Telecom Service Provider (CSP) business should be relatively low given, that there are no major competing technologies as of now. Satellite broadband may be viewed as an alternative, but current deploymnet costs for this technology are very high.

**The bargaining Power of Customers** for a Telecom Service Provider (CSP) is expected to be high given it is easily possible for consumers to shift from one Telecom Service Provider (CSP) to another competotor with no costs involved for the consumer.

**Market Competition** for Telecom Service Providers (CSPs) should be moderate given the limited players in the market who has the license & spectrum from the government.

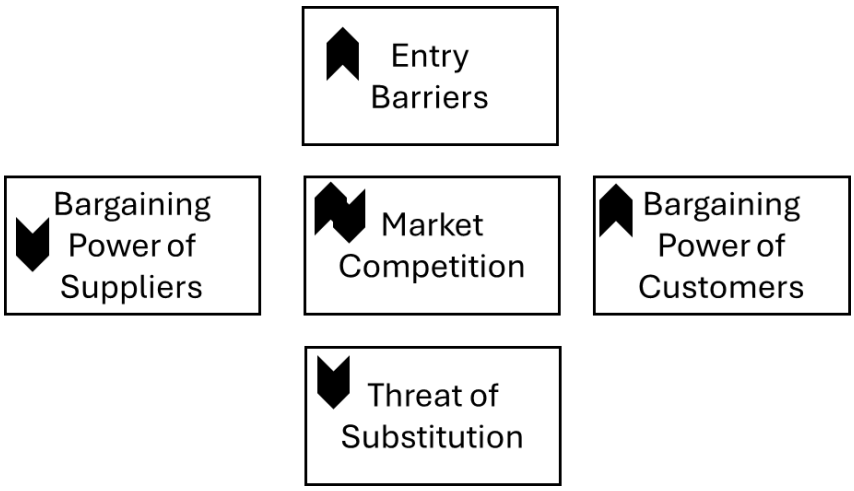



*Figure 10: Porters 5 forces model for Telecom Service Provider CSP*

We will revisit this after analysing the inputs from the market survey as a part of this research before arriving at the recommended approach for the Telecom Service Providers to follow to regain the profitable growth and market valuation.

### 3.2 Overview of the Research Problem

Most of the Telecom Service Providers (CSPs) world over are struggling with profitability. With retail telecom revenues only set to grow at about 3% for the next few years (Moodys, 2022), it has become imperative for the Telecom Service Providers (CSPs) to find new revenue sources which will not only bring in additional topline but will also contribute to bottom line, thereby enabling the Telecom Service Providers (CSPs) to regain their rightful position in the industry ecosystem.

Many research papers have suggested various ways and means for Telecom Service Providers (CSPs) to enable profitable growth, but all those ideas in isolation do not provide a clear and comprehensive outlook for Telecom Service Providers (CSPs) to consider in driving their business strategy. As a result, many Telecom Service Providers (CSPs) have tried in some shape or form to build new revenue sources with limited or moderate success, and to date, there is no clear and sustainable approach which has emerged, for Telecom Service Providers (CSPs) to consider, in their endeavor to rebuild profitable business going forward.

This research aims to build an approach for Telecom Service Providers (CSPs) to generate new and profitable revenue streams by leveraging the existing infrastructure and market reach. Therefore, the main research question is 'How can Telecom Service Providers (CSPs) generate new profitable revenue streams by leveraging the existing infrastructure and market reach.' The research will aim to bring in outside in and inside out perspectives on new revenue lines through a combination of quantitative and qualitative approach.

The quantitative approach will focus on building insights on the 'customer demands' by seeking inputs from retail as well as enterprise consumers of the telecom services, through market surveys. This will provide a ground-up view of what will be the market demand in the future and therefore where Telecom Service Providers (CSPs) could focus in terms of launching new services.

The qualitative approach will focus on two aspects, interviews of select leaders from leading Telecom Service Providers (CSPs) as well as other leaders associated with the telecom industry, to understand the current organizational capabilities, regulatory framework, and restrictions as well as their inputs around immediate opportunities where Telecom Service Providers (CSPs) can focus. This will be combined with qualitative

insights from various research papers and industry forums like TMFourm, on latest trends in technology and industry ecosystem developments. This will create a view on what are the areas that Telecom Service Providers (CSPs) can realistically target given their operating model, organizational capabilities, license regulations constraints.

By combining the two sets of datum, 1. Outside in perspective through market survey of consumers of telecom services and 2. Inside out perspective gathered through one on one interviews of select leaders of telecom industry and secondary research on publications, as well as insights from industry forums, the research will aim to build a comprehensive and realistic set of initiatives which Telecom Service Providers (CSPs) can consider to generate new revenue streams which will also drive profitable growth and help the Telecom Service Provider to regain its rightful position in the industry ecosystem.

### 3.3 Research Methodology

Given the objective of the research where inputs from two major sources are envisaged, we will have to adopt a mixed approach of Qualitative and Quantitative Research.

Qualitative research is a form of enquiry that analyzes information conveyed through language and behavior in natural settings. It is used to capture expressive information not conveyed in quantitative data about beliefs, values, feelings, and motivations that underline behaviors. Qualitative methods derive from a variety of disciplines and traditions (Michael Berkwits, 1998). Ethnography is a semi structured way of securing understanding about people's opinion and behavior.

With specific questions and aim to secure insights, the ethnographic researchers immerse themselves in an environment to understand behavioral trends and analyze reasons. Ethnographers' essential approach is to observe the respondents in their natural

settings and ask questions as they work with them in their day-to-day life. Gathering relevant data in qualitative research is extremely critical. Typically, there are three methods which are used, either standalone or in combination. In-depth, open-ended interviews. Interviews with open-ended questions are used to collect in-depth responses about people's opinion, and knowledge. Open-ended interviews are the most widespread knowledge producing technique in qualitative research.

Direct observation is a field work that involves collecting impressions of the world in a systematic and purposeful way by using looking and listening. Collected data are in the form of field notes that are rich and detailed descriptions.

Written documents contain data such as organizational records, memorandums and correspondence, social publications and reports, personal diaries, letters, and written responses to open-ended surveys. Besides this there are several secondary and supplemental methods such as focus groups, questionnaires and surveys, life histories and narrative inquiry (Tijana Dabic, 2014).

The other major research technique which will be leveraged is the Quantitative Research to secure understanding of the Telecom Service Provider's (CSP's) consumer's needs.

Quantitative research techniques are typically used to gather insights from wide sample sizes through empirical data. This kind of technique is popularly used by enterprises in retail and B2B segments for assessing their product affinity with the end consumers. Quantitative research is essentially the numerical representation and manipulation of observations for the purpose of describing and explaining the phenomena that those observations reflect. It is used in a wide variety of natural and social sciences, including physics, biology, psychology, sociology, and geology (Encyclopedia, 2005).

There are several types of quantitative research techniques. Broadly these are classified as 1) survey research, 2) correlational research, 3) experimental research and 4) causal-comparative research. Each type has its own typical characteristics.

Survey research is done through sampling and questionnaires to understand certain characteristics and trends within the population with statistical precision. It seeks to provide answers to such questions as "How many people feel a certain way?" and "How often do they do a certain behavior?" Survey research enables management to make comparisons between groups. It provides estimates from a sample that can be related to the entire population with a degree of certainty (e.g., 57% of the population +/- 3% will answer the question this way 95% of the time). Survey research requires that respondents be "randomly" sampled - that means that each person in the population has a known probability of being sampled. There are defined techniques, such as random digit dialing and sampling procedures to ensure a sufficient sample. In developing a survey, you would normally work with a statistician to build a statistically valid sampling plan, a researcher to develop a survey instrument and research objectives, and a reputable field service that has the capacity to conduct large scale interview projects (Sukamolson, 2007).

Correlational Research is used to establish prevalence and relationship between variables. Despite being quantitative driven approach, it requires intelligence and prudence while analyzing the data. Correlational research also provides some possibility to predict trends in the future. However, for this scope of the research it may not be relevant. There are many different methods you can use in correlational research. Most common data collection methods for this type of research include surveys, observations, and secondary data. Key point to consider while following correlational research is that researcher should not control or influence any of the variables (Bhandari., June 2023).

Experimental Research is the mainly used for developing and testing a theory. It is a tool that enables investigators to filter out the noise in order to draw logically valid inferences and conclusions (Frissen, 2024). Experimental research is conducted in an objective and controlled fashion so that precision is maximized, and specific conclusions can be drawn regarding a hypothesis statement. Generally, the purpose is to establish the effect that a factor or independent variable has on a dependent variable. The principles of experimental design play an important role in research that does not follow the strict tenets of hypothesis testing. Many researchers want to elicit and encourage experimental research, using experimental methods and may want to forge multidisciplinary partnerships to secure insights from wider data sets.

Casual comparative research is a method used to identify the cause–effect relationship between a dependent and independent variable. This relationship is usually a suggested relationship because we cannot control an independent variable completely. Unlike correlation research, this does not rely on relationships. In a causal-comparative research design, the researcher compares two groups to find out whether the independent variable affected the outcome or the dependent variable.

A causal-comparative method determines whether one variable has a direct influence on the other and why. It identifies the causes of certain occurrences (or non-occurrences). It makes a study descriptive rather than experimental by scrutinizing the relationships among different variables in which the independent variable has already occurred. Variables cannot be manipulated sometimes, but a link between dependent and independent variables is established and the implications of possible causes are used to draw conclusions (Anon., Sep 2021).

It is important to carefully choose and plan research methods to ensure the reliability and validity of results. A representative sample should be carefully selected so that the data reflects the right population of interest in it without creating research bias.

### 3.4 Mapping of research objective and research methods

The primary objective is to conceptualize the Strategy for Telecom Service Providers (CSPs) to generate new revenue strems by leveraging the existing infrastructure and market reach and return back to sustainable, profitable growth. From litrature review it becomes evident that while many Telecom Service Providers (CSPs) have tried in different ways to look at generating new revenue streams, but so far it has met with moderate to limited success. Hence this research will focus on building a compresensive approach by looking at inside out as well as outside in prespectives. The overall research objective will be broken in two main sections.

1. Secure insights from customers of Telecom Service Providers (CSPs) on their current expectations in terms of the kind of services they would like to consume, what is immidiate latent demand which Telecom Service Providers (CSPs) can address immidiately and what would be the demands in the future. This will be further subdivided in to two main category of customers a) Retail Users - which are people at large using mobile broadband and fixed broadband services, as well as value added services like video streaming, mobile money etc. b) Enterprise Users – These are mostly small, medium as well as some few large enterrpises which depend upon Telecom Service Providers (CSPs) for some of their business needs e.g. wide area networks (WAN), lease lines, broadband gateways, data center hosting services etc. This will help to bring in outside in

prespective in terms of what potential areas Telecom Service Providers (CSPs) can look to diversify in the immidiate to mid term future.

2. Secure insights from industry leaders especially in Telecom and associated industries to understand what are the areas, which a Telecom Service Provider (CSP) can explore for generating new and more importantly profitable revenue sources by leveraging existing investments in the infrastructure setup and market reach. A Telecom Service Provider (CSP) is highly complex organisation with multiple functions which has evolved over a long period of time. Hence in order to secure a 360 degree prespective, we will have to look at multiple functions within the Telecom Service Provider (CSP) organisation. Three main functions of interest would be a. Sales and Marketing, b. Technology and c. Human Resources. Sales and Marketing is an important function which is outward focused. Prespectives from head of enterprise and retail sales would be a key function to understand market forces and competition. Technology is at the epicenter of all services Telecom Service Provider (CSPs) can deliver now and also in the future. Head of technology functions would be able to bring out realities of current service deliveries and limitations there off, as well as what are realistic areas that a Telecom Service Provider (CSP) can target in the immidiate and mid term future. Human Resources is another important function to gauge organisational capebilities. This is critical to understand because while technologies and market demands may expose mutiple areas for a Telecom Service Provider (CSPs) to venture in to, however to be able to succeeed in the market, organisational capebilities is a key factor.

It is also important to note that Telecom Service Providers (CSPs) are supported by an ecosystem of multiple players, which includes various technology vendors like OEMs for network gear, software solutions, system integrators, consulting services, and platform players. All these players are critical part of the Telecom Service Provider (CSP) ecosystem and these players are also closely linked with Telecom Service Provider's (CSP's) abality to support as well as enable various services in the market. Leaders in these organisations have observed Telecom Service Providers's (CSP's) business model for long time and they can bring in valuable insights and hence select functions within these organisations would also be a valuable source to understand possibilities for Telcom Service Providers (CSPs) to expand its revenue lines and build inside out prespective for Telecom Service Provider (CSP) busines.

To build outside in prespective to gauge market demands, we will leverage the quantitative research and more specifically the survey method. Based on litrature review we have identified potential areas where Telecom Service Providers (CSPs) can look to diversify for new business. These will be used to build questionnaire for retail as well as enterprise customers to understand immidiate demands as well as future demands.

To build inside out prespective, we will look to gather possibilities of where the Telecom Service provider (CSP) can look for new revenue sources by leveraging their existing strengths, e.g. its current business investments, infrastructure and market reach, and also the organisational strengths. We will leverage the qualititative research and more specifically the ethnographic method for this purpose. Aim here would be to engage with key leaders in the Telecom Service Providers (CSPs) as well as in other ecosystem players

like network OEMs, system integration and consulting organisations, software and platform players etc, through a conversation broadly aligned to the identified potential new areas where Telecom Service Providers (CSPs) can diversify, through our litrature review. Focus will be  to engage via an open conversation route with CxOs and industry leaders in these organsiations in a day to day business environment and seek their views.

By securing understanding on Telecom Service Provider (CSP) executive's decision-making process and also how day-to-day operations are managed, one can look to gain understanding of the organizational capabilities & the regulatory as well as organizational constraints that a Telecom Service Provider (CSP) has to operate within, while making business plans and driving business operations. For this we will leverage Qualitative Research techniques.

By combining the insights from both these sources a common view can be established on what areas Telecom Service Providers (CSPs) can target to secure new revenue sources. Subsequently we will apply insights from leading industry forums e.g. TM Forum and also secondary market research on technology evolution to understand which areas can be best suited for Telecom Service Providers (CSPs) to focus upon and how to evolve its business to diversify in to new areas which will generate profitable revenues and more importantly elevate the position of Telecom Service Providers in the industry ecosystem. This will have a direct impact on the market and shareholder value.

Following table provides a high level view of the overall research journey. This includes research areas and the associated research method at each step.

| Research Area | Research Method |
|---|---|
| Identification of problem statement | Literature Review |
| Primary assessment for identification of new areas for Telecom Service Providers (CSPs) to diversify and generate new revenue sources. | Literature Review |
| Assessment of market demands in B2C retail and B2B enterprise segment | Quantitative Research – Online data collection via market survey |
| Assessment of Telecom Service Provider's (CSP's) internal capebilities and organisational readiness to diversify into new areas | Qualitative Research – data collection via personalised interations with Industry leaders and CxOs |
| Technology trends in the upcoming years | Qualitative Research – Online data collection and litrature review |

*Table 2 : Mapping of research steps to research methods*

There could be geographical aspects which may have an inpact on what a Telecom Service Provider (CSP) can do or can not do. E.g. in some countries Telecom Servive Providers (CSPs) can not offer mobile wallet services unless they have additional license for such kind of services. Also, with latest European GDPR laws there are limitations on what consumer data Telecom Service Providers (CSPs) can use to build focused or targetted offerings. Considering this varried geographic considerations, the outcome of

this research may need to be viewed in context of the geography and market specific conditions, in a given geography.

### 3.5 Research Design

As stated earlier the data for the research would be primarily collceted from two main sources A) Telecom consumers i.e. B2C and B2B customers who consume services of Telecom Service Providers (CSPs). And B) Industry leaders from Telecom industry. Part A will give us an indication on the market demand while part B will shead light on what is practically possible for Telecom Service Providers (CSPs), given the license conditions, technology and organisational capebilities.

For Part A we will follow quantitative research approach where a survey would be launched to understand market demand. There would be two types of surveys one for the retail consumers, which will include individal mobile and fixed broadband users and other for the enterprise broadband customers which will be focused on the small and medium enterprise customers.

Survey for the retail users will have 3 categories of questions. 1. To understand current level of customer satisfaction and what Telecom Service Providers (CSPs) can do immidiately to uplift revenue from existing services like mobile and fix broadband services. 2. What are the current demands of the consumers which the Telecom Service Provider (CSP) is not fiulfiling. This will target the immidiate demands that Telecom Service providers (CSPs) can address by providing incremental services on top of the existing offerings, which are already available in the market. 3. What are the expectations from retail consumers from Telecom Service Provider (CSP) in the future, which will help to gain insights into what types of services retail consumers will demand from Telecom Service Providers (CSPs) in the future.

Part B will be qualitative research, where we will leverage ethnographic method to engage in a conversation with senior industry experts. We will target to engage in 3 key functional areas in the Telecom Service Providers (CSPs) as well as some of the other Telecom ecosystem players which are closely associated with Telecom Service Providers (CSPs) for enabling the services which are consumed by the end consumers. These 3 functions are Sales and Marketing, Technology and Human Resources. Conversations will be customised for individual area, targetted to secure necessary insights from the specific function.

Sales and Marketing Conversation : Here we will focus the immidiate challengs that the execs working in this area face in uplifting the revenue for the existing services which are being offered by the Telecom Service Provider (CSP). Secondly what are the demands that are witnessing in the market which are not fulfilled by the Telecom Service Providers (CSPs) and which they believe should be possible to cater with incremental additions in the network infrastructure. Lastly what are some of the game changing ideas or areas where the Telecom Service Providers (CSPs) can look to diversify in the future which will give significant boost to the revenue, profitability and there by the market valuation.

Technology conversation : Here we will focus on the current technology capabilities of the Telecom Service Providers (CSPs), upcoming trends in the network technologies and also the regulatory aspects which the Telecom Service Providers (CSPs) will have to adhear to as part of its license commitment. We will use this input to build a view on new areas where Telecom Service Provider (CSP) can look to diversify.

Human Resouces Conversation : Here we will focus on the skill set and organisational capebilities of the Telecom Service Providers (CSPs). It is a key factor in

any organisation's future journey, and it will determine which potential areas a Telecom Service Provider (CSP) can look for diversification to generate new revenue streams.

### 3.6 Population Sampling and Data Collection Procedures

The population sample for this research will be comprised of two sets. First will be retail and enterprise users of the Telecom Service provider's (CSP's) services, and second will be the industry leaders working in Telecom industry and organisations in associated industries.

1. For the first set, the target audience would be retail and enterprise customers. Retail users are individuals in the society who use services of Telecom Service Provider (CSP) in day to day life such as mobile data, residential broadband and OTT contents etc. It should be noted here that the kind of services which the retail users would consume would be dependent upon their lifestyle. E.g. Young people like Students, millennials etc these type of consumers may have different needs for data and connectivity as compared to senior corporate executives who are contineously on the move. So a combination of users from different walks of life would be selected for the survey. Aim would be to target responses from at least one thousand users from retail space for the survey. Enterprise users sample would be derived with slightly different approach. Here the business needs of the enterprise will determine the kind of services which would be consumed by the enterprise customer. So objective here would be to carefully select industry sectors which are major consumers of direct services from Telecom Service Providers (CSPs). We will target to secure views from carefully selected enterprise customers from at least 3 sectors 1. Fintech like banks, insurance companies etc, 2. Logistics companies like fraight forwarders,

3. Energy and utilities players like local electricity and gas companies etc. We will target to secure openions from key executives from each these types of organisations, to undetsand their needs for the telecom services today as well as in the future. Random sampling method would be used for collecting data from retail and enterprise consumers.

2. The second set of data would come from key executives working with the Telecom Service Providers (CSPs) and associated industries. We will target 3 key functions 1. Sales and marketing 2. Technology and 3. Human Resources. Due to the potentially wide and diverse set of individuals, a purposive sampling technique is employed. This method allows for the intentional selection of participants who possess valuable insights and experiences related to the area of interest for the purpose of this research. The engagement would be through ethnographic conversation method which would enable us to understand verious considerations Telecom Service Provider's (CSP's) maanaagement need to take in to account while looking at diversification of the busienss.

### 3.7 Research Design Limitations

While this research is designed to provide a comprehensive view by taking in to consideration the end users as well as the service provider's views, it is essential to acknowledge certain limitations of this research.

**Generalizability:**

The findings of this research may not be fully generalizable to all markets as it is.

It is important to also consider other aspects such as regulatory conditions, and local market dynamics in order to derive what specific initiatives are permissible and possible for a Telecom Service Provider (CSP) operating in that market. The uniqueness of each organizational environment may also impact the extent to which the research recommendations can be applied.

**Self-Report Bias:**

The quantitative as well as qualitative phase of this research relies on self-reported data obtained through surveys and personal interviews. This introduces the potential for self-report bias, where participants may provide responses that align with accepted norms and practices in the Telecom industry.

**Cross-Sectional Nature:**

The research is capturing data at a specific point in time. There are multiple technology developments which are ongoing. While this research will cover the existing as well as new technoligies where the future roadmap is visible, however there could be a disruptive technology intervention which may create a game changing impact.

**Selection Bias:**

The purposive sampling strategy used in this research may introduce selection bias. Participants are intentionally chosen based on specific criteria of expertise, which may not represent the entire population. However efforts would be made to cover as much diverse audience as possible.

**Single-Method Data Collection:**

While the research employs both quantitative and qualitative data collection methods, it primarily relies on surveys and interviews. During interviews, participants may be inclined to present their experiences and mindset shifts in a favorable light, potentially influenced by organisation specific bias. Steps are taken to build rapport and encourage open sharing, but this bias remains a consideration.

Despite these limitations, the research design is carefully created to build grounds up view from demand as well as supply side in order to build a comprehensive picture for building new revenue sources for Telecom Servive Providers (CSPs) which will enable them to return to the path of profitable growth.

Appendix -B Part 1 shows Research Survey Questionnaire for Retail and Enterprise consumers of Telecom Services.

Appendix – B Part 2 shows Questions and Topics to be covered in conversation with Telecom Industry Leaders.

### 3.7 Conclusion

This research aims to provide a comprehensive framework for identification of new revenue sources over and above the legacy business of the Telecom Service Provider (CSP) and which are significantly more profitable as compared to the existing business. By combining quantitative and qualitative methods, this research aims to consider views from both sides i.e., the consumers of the Telecom Services as well as the providers of the Telecom services to create a comprehensive framework of recommendations for the Telecom Service Providers (CSPs).

The choice of surveys as an instrument allows for the systematic gathering of data from a sizable sample, enabling statistical analysis to identify patterns. Additionally, ethnographic engagement with executives in telecom space provides qualitative dimension,

offering participants the opportunity to share their narratives and experiences in their own words.

Document analysis and potential direct observations further enrich the data, offering insights into the documented history of agile transformations and the real-time manifestation of mindset behaviors in agile practices.

While these research methods are well-suited to address the research questions, it is important to acknowledge their limitations. Self-report and recall biases, inherent in survey and interview methods, must be considered during data analysis and interpretation. The cross-sectional nature of the study and purposive sampling strategy introduce constraints on generalizability. However, these limitations are acknowledged, and efforts are made to mitigate their impact.

In conclusion, the chosen research methodology is designed to provide a holistic exploration of the research questions while recognizing its constraints. The data collected through surveys and interviews, combined with the use of established parameters, offers a robust foundation for analyzing the relationship between market demands, mindset orientations and constraints within telecom industry and agile transformations outcomes.

# CHAPTER IV:

# SURVEY RESTULTS

## 4.1 Research Questionnaire for Retail Users

Research questionnaie for reatil users was created to capture existing demands as well as future demands that retail market segmant may generate. It also looks to capture latent demands from the retail sector. Aim here is to generate insights where the Telecom Service Providers (CSPs) can focus to enhance existing revenue streams as well generate new revenue streams, which will generate profitable growth. Appendix B part 1 covers the questionnaire designed for retail users of Telecom Services in India. The questionnaire covers retail users who are individuals in the society consuming the services from the Telecom Service Provider (CSP) in day to day life such as mobile data, residential broadband and OTT contents etc. The need of the telecom services depend upon the demographic profile as well as the age and location of the user. For example young people like students, millennials etc, these type of consumers may have different needs for data and connectivity as compared to senior corporate executives who are contineously on the move.

We have taken a combination of users from different walks of life to be considered for the survey. We carefully selected different geographic locations for gathering the responses. Some responses are from major cities like Delhi, Kolkata, while some responses are from category B i.e. smaller cities like Ahmadabad and Bangalore.

In order to ensure we cover users from different walks of life we covered users who are business owners or promoters, professionals, people in jobs or service working full time or part time, and also students

The target survey population was also segrigated by age, to analyse the different demands for telecom services from various users in different age group. Total of 5 age groups are considered 18 to 24 years, 24 to 34 years, 35 to 44 years, 45 to 54 years, and 55 to 65 years & beyond.

To understand the correlation of income gorup of the consumer of telecom services and type of telecomn services consumed the overall survey population was also segrigated by income group. Total of 5 income groups were considered.

No income – these are typically gen z who are attending university or pursuing colleague education for professonal degree.

0 to 500,000 INR ( 0 to 5 Lac Rupees ) – these could be small business owners or young workers who are just startring the professional career.

500,000 to 1500,000 INR ( 5 Lac to 15 Lac Rupees ) – these could be experience mid management workers or self employed professionals, typically coming from middleclass.

1500,000 to 30,00,000 INR ( 15 Lac to 30 Lac Rupees ) – these could be seasoned higher mid management or self employed professionals.

Greater than 30,00,000 INR ( 30 Lac Rupees ) – these are people from higher middle class or wealthy sections of the society who could be senior professionals in the industry or business owners.

In order to ensure that users or consumers from all Telecom Service Providers (CSPs) are covered, the sample set is selected such that it covers consumers of all top 4 Telecom Service Providers (CSPs) in India, these include Vodafone Idea, Reliance Jio, Bharti Airtel and the Government owned BSNL.

The survey for the retail consumers of telecom services in India was ran for nearly two months to gather as much sample data as possible.

During the survely mainly three approaches where used to collect the data from the consumers of telecom services in retail segment.

Online survey and launched it online via tools such as survey monkey.

Telephonic discussions to record user responses to the survey questionnaire.

Face to face discussions where possible to record user responses to the survey questionnaire.

In the end all data was combined at a common database for further analysis. It should be noted that for all of the 3 methods used to gather data, exactly same survey

questionnaire was used. Where required separate explainations were provided to survey respondants to to secure better understanding of the questions or to resolve any querries they may have to while respnsing to the questionnaire. These explainations were in written format where the respondant is responding to the online survey or in verbal discussion where the respondant is responding to the survey through telephonic discussion. Whereever the respondents were surveyed through inperson discussion, the necessary clarifications where provided in a face to face discussions. This was done in order to ensure that the respondant not only understood the meaning of the questioon but also at the same time reason why this information was being asked for.

During the two months when the survey was run for the retail segment, contiuneous updation and validation of the data was put in place in order to ensure that there is no duplication i.e. same user responding through two different channels. Data from 1500 respondants in retail sector is gathered and used for further anakysis.

After successful gathering of the data further analysis was created to get an understanding of the demands of the consumers of Telecom services in retail space on existing services as well as what new services they would like to see and avail from their telecom service provider. This will give a critical insights on where the Telecom Service Providers (CSPs) should focus to generate new revenue streams which are profitable and which would allow the Telecom Service Provider (CSP) to return to the path of profitable growth. The detailed analysis with graphical representation and description of inferrance from the data anaysis is given in the sction 4.4 survey analysis. The Survey analysis is done for the retail and enterprise segment separately in order to identify and analyse needs and demands from both segments as these tends to varry significantly.

### 4.2 Research Questionnaire for Enterprise Users

Research questionnaie for enterprise customers was created to capture existing demands as well as future demands that the enterprise market segmant may generate. It also looks to capture latent demands from the enterprise sector. Aim here is to generate insights where the Telecom Service Providers (CSPs) can focus to enhance existing

revenue streams as well generate new revenue streams, which will generate profitable growth. Appendix C covers the questionnaire designed for enterprise segment users of telecom services in India. The questionnaire covers key executives from small, medium and large enterprises who are responsible for making decision around availaing various telecom services from the Telecom Service Providers (CSPs) to run enterprise business operations. The need of the telecom services depend upon the type of business and size of the business for an enterprise and in which segment it is operating and doing business in the market.

We carefully selected different geographic locations for gathering the responses. Some responses are from major cities like Mumbai, Delhi, Kolkata, while some responses are from category B i.e. smaller cities like Ahmadabad and Bangalore. In order to ensure we cover enterprise customers from different types of enterprises, i.e. size, industry sector and products, we have taken a cross sector approach to arrive at the target population for the enterprise customer survey.

The target survey population was segrigated basis the annual turnover of the enterprises in order to analyse the demand for telecom services for small, medium and large enterprises. Following categories were considered.

Enterprises with annual trurnover less than 10000000 INR (less than 1 Cr INR). These enterprises are typically small enterprises mostly promoter driven. These enterprises tend to be very dynamic in the decision making when it comes to the telecom services and also their needs when it comes to consuming telecom services, are relatively simple. These kind of enterprises typically are single offices or home offices with smaller work force and customer base.

Enterprrises with annual turnover greater than 10000000 INR but less than 50000000 INR ( greater than 1 Cr INR but less than 5 Cr INR ). These are small and medium enterprises, typically registered private limited companies with multiple owners in their borad. These enterprises are also dynamic in the decision making when it comes to the telecom services but their needs are slightly complex with multiple offices and also larger workforce, suppliers as well as the customers.

Enterprrises with annual turnover greater than 50000000 INR but less than 100000000 INR ( greater than 5 Cr INR but less than 10 Cr INR ). These are medium and large enterprises, typically registered private limited companies or in some cases listed public limited companies with a well established board and backed by a strong corporate governance in place, CEO with management team that drives day to day activities. These enterprises tend to have well established procedures to identify the type of telecom services they need for running their business. These kind of enterprises also have structred way of shortlisting the Telecom Service Provider (CSP) with whom they will work through a standard RFP process. Their needs for telecom services are also complex. The decision making in such kind of organisaion is slightly sluggish but once they select any Telecom Service Provider, they tend to work with the same through comprehensive contract. The spend on Telecom Services for these enterprises is also significantly large.

Enterprises with turnover greater than 100000000 INR ( greater than 10 Cr INR ). These are large private limited companies or public listed companies, with a well established board and backed by a strong corporate governance in place. CEO with management team that drives day to day activities. These enterprises to have well established procedures to identify the type of telecom services they need for running their business. These kind of enterprises also have structred way of shortlisting the Telecom Service Provider (CSP) with whom they will work through a standard RFP process. Their needs for telecom services are also significantly more complex with multiple offices, internal business lines, large number of constomers as well as suppliers, and also internal compliance requirements. The decision making in such kind of organisaion is slow but once they select any Telecom Service Provider, they tend to work with the same through a structrued contracts. The spend on Telecom Services for these enterprises is also vary large.

In order to ensure that we get openions from enterprise customers of all major Telecom Service Providers (CSPs) in India, the survey sample covered users of all major Telecom Service Providers (CSPs) in India which includes Reliance Jio, Bharti Airtel, Vodafone Idea, BSNL etc. While it was not possible to secure equal number of responses

for all Telecom Service Providers (CSPs), however, it was ensured that sufficient sample size for each of the Telecom Service Provider (CSP) is taken in to account.

Duration of relationship with any Telecom Service Provider, in enterprise segment, is an important consideraion since it indicates how well the Telecom Service Provider (CSP) is able to cater to the needs of enterprise customer. This parameter was considered in 3 steps .

Enterprise consuming the serivices of a given Telecom Service Provider (CSP) for last 3 years ( i.e. 0 to 3 years )

Enterprise consuming the serivices of a given Telecom Service Provider (CSP) for last 3 years to 5 years ( i.e. 3 to 5 years )

Enterprise consuming the serivices of a given Telecom Service Provider (CSP) for longer than last 5 years ( i.e. more than last 5 years )

Type of Telecom services consumed is another important fact that one needs to consider since it is an indicator of the market demand for various kinds of services.

While gathering the data for the survey, questions aroud consumption of following new types of services were also considered along with legacy connectivity services and inputs are recorded to understand the ternd of the market demand for telecom services.

- IT & network security solutions
- Managed Services for network & network related applications ( e.g. managed wifi & SD Wan )
- Managed IoT platforms
- Managed Cloud Services ( CPaaS and SaaS )
- AI led automation for business processes
- Work Place Collabration - digitial attendance, Video Conferencing, IP Centrix etc

This is bseides the legacy services which the Telecom Service Providers have been providing like leased lines, fiber and closed user group corporate mobile subscriptions.

Data from 150 enterprises in various industries was gathered for further analysis.

### 4.3 Opinion from select executives in Telecom Industry

Telecom industry is highly regulated with clear boundries where a Telecom Service Provider (CSP) needs to operate within. Thare are also compliance requirements where the Telecom Service Provider (CSP) needs to adhear to. Technology capabilities is also another important factor for the Telecom Service Provider (CSP) since it has to consider all these factors before designing its product portfolio.

In order to ensure that the views from Telecom Service Providers (CSPs) on the regulatory compliance, technology and skills are also taken into account, the inputs from select senior professsionals who are active in this field for long time are seucured. Since the target audience was senior executives from the telecom industry, insights from a limited senior executives in the Telecom Space are gathered however these are high quality qualitative inputs gathered through ethnographic method.

Subsequent sections will show the findings from the survey by analysing the data collected and processing the insights around various parameters with an aim to understand how Telecom Service Providers (CSPs) can enhance their revenues and return to the path of profitable growth.

### 4.4 Survey Analysis for Retail Segment

Analysis of retail users data collected from the survey: Druring the survey conducted for the retail users of telecom services data for over 1500 users was collected. This data is categorized in various tranches to analyse and derive inferrances.

Following are the categories under which the analysis is conducted.

- Age group and city wide distribution of users of telecom services
- Profession of users of telecom services
- Income of users of telecom services
- Service providers catering the users from various income brackets
- Service providers careting the users from various age groups
- Telecom users distribuion between various service providers
- Different kind of legacy telecom services consumed by the users from Telecom Service Providers (CSPs)
- Different kinds of telecom services consumed by users with respect to their age group
- Different types of telecom services consumed by users with respect to their income group
- Retail user satisfaction for the telecom services delivered by respetive service providers
- Retail user consumption of new age telecom services for various Telecom Service Providers (CSPs)
- Expected uptake of new age telecom services by age group of retail users
- Expected uptake of new age telecom services by income group of retail users
- Expected uptake of new telecom services to be delivered by latest technologies by age and income group

Age group and city wide distribution of users of telecom services:

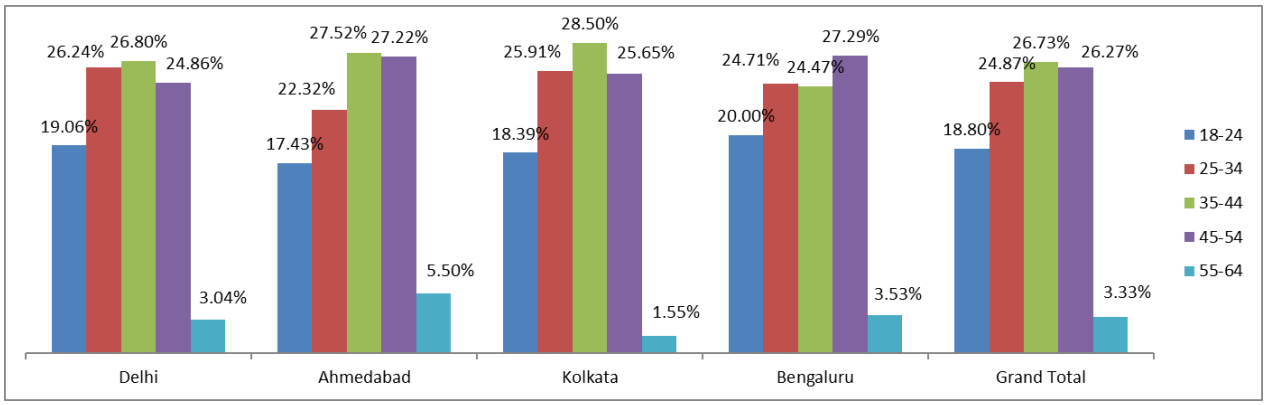



*Figure 11: Age group and city-wide distribution of users of telecom services*

Out of the total retails consumers surveyed, 18.8% were in the age group of 18 to 24 years old, 24.87% were in the age group of 25 to 34 years old, 26.73% were in the age group of 35 to 44 years old, 26.27% were in the age group of 45 to 54 years old and 3.33% were in the age gorup above the age of 55 years old.

Survey respondants can also be categorised between various cities mainly Delhi, Ahmadabad, Kolkata, Bangaluru. The survey sample was selected from randum population. Highest percentage of users of telecom services are in the bracket of 25 to 34 years, 35 to 44 years, and 45 to 54 years. This also indicates that major revenue for telecom services in retail consumer market will come from this age group. Telecom Service Providers (CSPs) therefore must focus on this age group for increasing their revenue from various telecom services offer in the market.

Age and profession of users of telecom services in retail market :

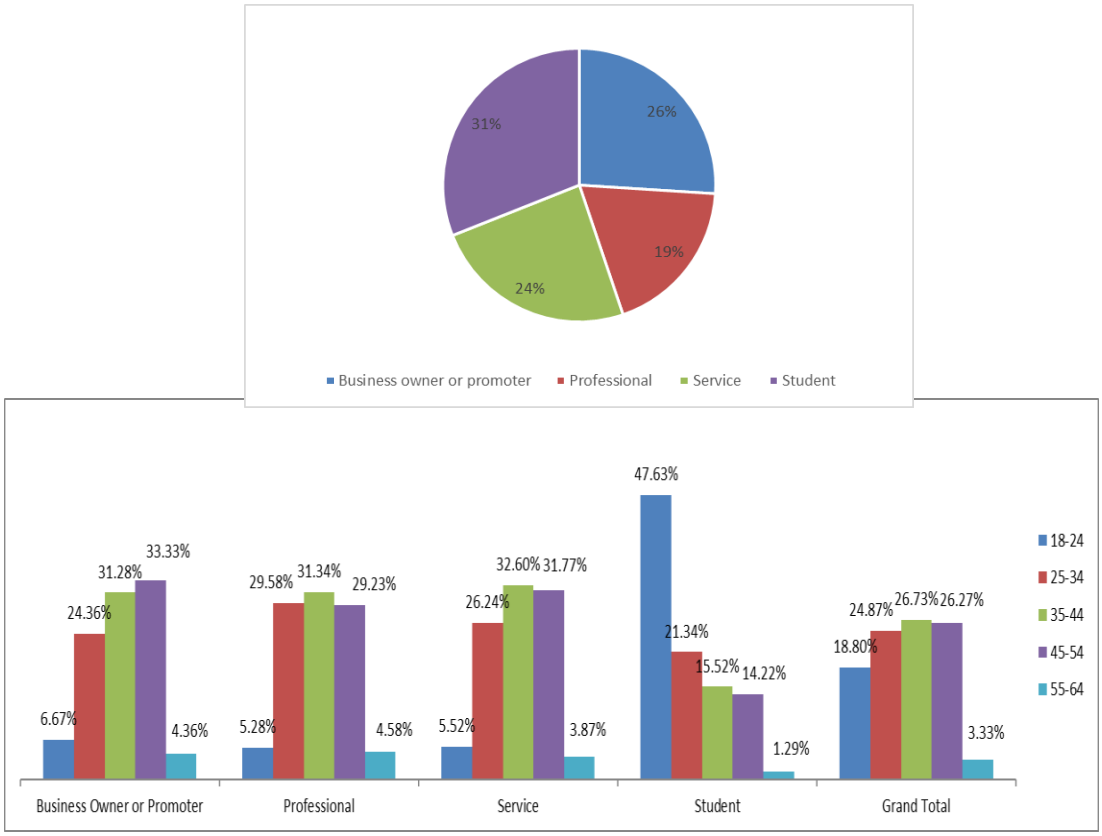



*Figure 12: Age group and profession of users of telecom services*

Out of the total retail consumers surveyed, 26% were independent business owners or promotors, 19% were working professionals, 24% were in service i.e. in fulltime jobs and 31% were students.

Out of the 26% independent business owners 6.67% were very young in the the age group of 18 to 24 years old, 24.36% were in the age group of 25 to 34 years 31.28% were in the age group of 35 to 44 years, 33.33% were in the age group of 45 to 54 and 4.36% were in the age group exceeding 55 years.

Out of the 19% independent working professional 5.28% were very young in the the age group of 18 to 24 years old, 29.58% were in the age group of 25 to 34 years 31.34% were in the age group of 35 to 44 years and 4.58% were in the age group exceeding 55 years.

Out of the 24% of service professionals 5.52% were very young in the the age group of 18 to 24 years old, 26.24% were in the age group of 25 to 34 years, 32.60% were in the age group of 35 to 44 years, 31.70% were in the age group of 45 to 54 years and 3.87% were in the age group exceeding 55 years.

Out of the 31% of users who were students 47.63% were in the the age group of 18 to 24 years old, 21.34% were in the age group of 25 to 34 years, 15.52% were in the age group of 35 to 44 years, 14.22% were in the age group of 45 to 54 years and 1.29% were in the age group exceeding 55 years.

The above categorisation indicates that major consumtion of telecom services in retail space is coming from young population consisting of students, young working professionals, people in fulltime service and business owners or promoters. Telecom Service Providers (CSPs) therefore must focus on young population covering students, working professionals and fulltime employees as well as promotors or business owners. This age group is likely to give highest revenue potential from various telecom services offered in the market.

Age group and income of users of telecom services :

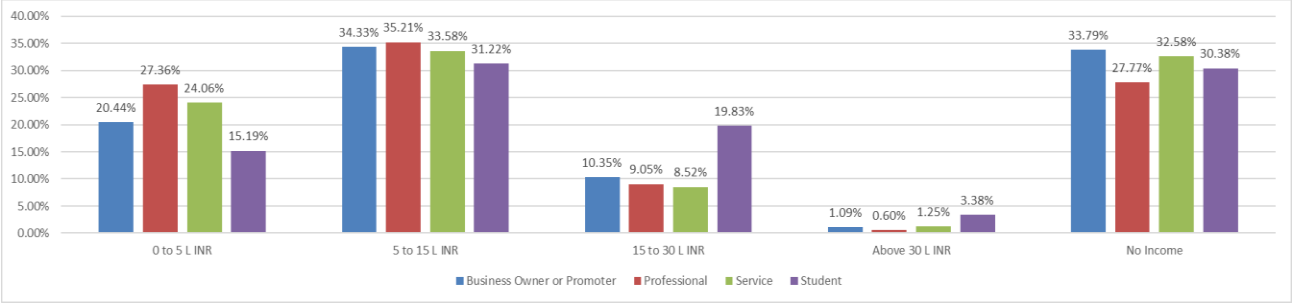



*Figure 13: Age group and income of users of telecom services*

Out of the ramdomly selected sample of users of Telecom services from retail market segment majority of the consumers are in the middle income bracket of 5 to 15 Lac INR, there is also significant population with consumers having no income, these are those respondants who are either students with no income or those who choose not to disclose their income. If one leaves this no income category as abaration given the user hasn't declared the income and only consider the data from those users who have declared the

income bracket then it becomes clear that majority of the users of the telecom services are from the middle income bracket. This means that the Telecom Service Providers (CSPs) need to look in to the lifestyles of such users and develop products and services to generate incremental revenue.

Service providers catering the users from various income brackets :

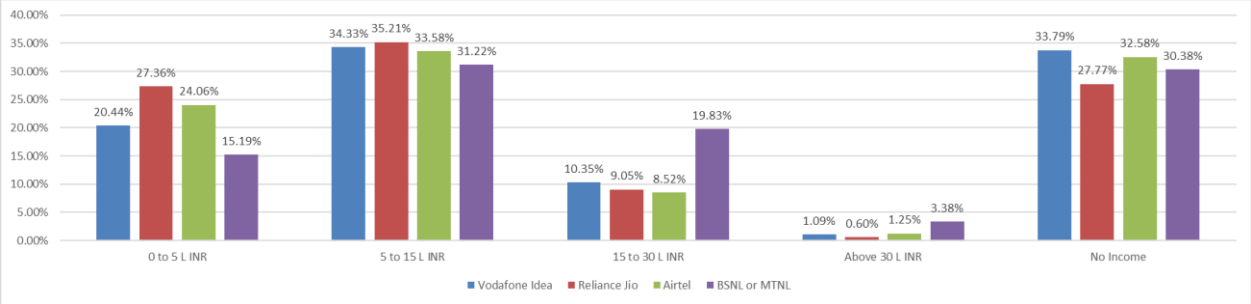



*Figure 14: Income group and telecom services providers*

Above data suggests, that out of the ramdomly selected sample of users of telecom services from retail market segment, majority of the consumers in the lower and middle income group are evenly distrubuted across all major Telecom Service Providers (CSPs) – Vodafone Idea, Reliance Jio, Airtel, and BSNL or MTNL. There is also significant population with consumers having no income, these are those respondants who are either students with no income or those who choose not to disclose their income. For this no income group the trend seen is simillar which is that these users are also evenly distributed between all service providers. There is one interesting observation which is that in the higher income bracket BSNL or MTNL has slightly higher number of users, but not a significant difference as compared to other Telecom Service Providers (CSPs). On a overall basis the indication is that there is no significant correlation to the income of the users or consumers of telecom services with respect to the selection of Telecom Service Provider (CSP) which they select. This also means that there is little service or brand differentiation in the market when it comes to Telecom Service Providers (CSPs). By creating a strong brand, the Telecom Service Providers (CSPs) may be able to attract high end users thereby increasing the revenue from existing as well as new services that can be launched in the

market. Strong brand may also reduce chrun in the long run thereby protecting the revenues coming from the existing consumer base.

Service providers catering the users from various age groups :

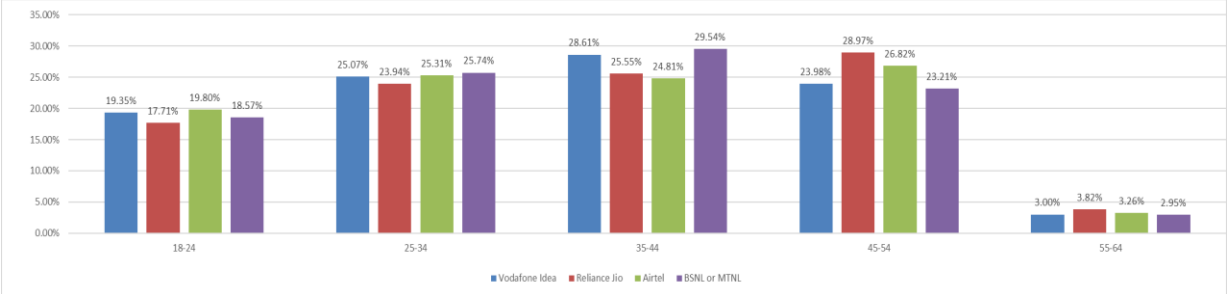



*Figure 15: Age group and telecom services providers*

Another dimension to look at was to see if there is any correlation between the age group and the service provider, that the retail users prefer. Above data suggests, that out of the ramdomly selected sample of users of telecom services from retail market segment, majority of the consumers across all age groups are evenly distrubuted across all major Telecom Service Providers (CSPs) – Vodafone Idea, Reliance Jio, Airtel, and BSNL or MTNL. There is also no significant preferrance in any of the age group, when it comes to the selection of service provider. The user population is almost evenly distributed between all service providers. One observation to note is that in the age bracket of 45 to 54 years, there is a slight inclination towards BSNL or MTNL with almost 30% of the respondants selecting the service provider, BSNL and MTNL are state owned ( or Government controlled ) service providers, the preference in the higher age group could be because of the fixed line subscriptions which are serviced by BSNL and MTNL over the last 4 to 5 decades, users of fixed line services tend to stay long with the selected Telecom Service Provider, unlike mobile broadband users who can easily switch the service provider.

However, on a overall basis the indication is that there is no significant correlation to the age group of the users or consumers of telecom services with respect to the selection of Telecom Service Provider (CSP) which they select. This also again reaitrates that there

is little service or brand differentiation in the market when it comes to Telecom Service Providers (CSPs). By creating a strong brand, and differensiated offerings suitable for lifestyles of various age groups, the Telecom Service Providers (CSPs) may be able to attract high end users thereby increasing the revenue from existing as well as new targetted services that can be launched in the market. Strong brand may also reduce chrun in the long run thereby protecting the revenues coming from the existing consumer base.

Different types of services offered and consumed by the users in retail sector :

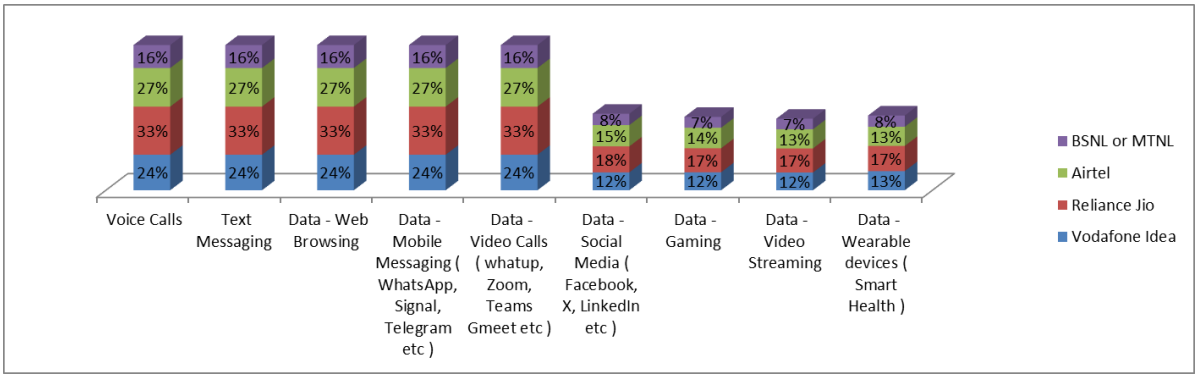



*Figure 16: Telecom services offered and consumed by users in retail sector*

Over the years the Telecom Service Providers (CSPs) have evolved their offerings, extending from plan voice to sms, mms, mobile data browising, video calls, social media bundles, gaming, multimedia content streaming, etc. If one looks at the services offered by various Telecom Service Providers (CSPs) and compare that with the adoption or usage amongst the users in retail sector, then the data suggests that Reliance Jio clearly leads the way when it comes to its retail user consumption of data led value added services like mobile data browsing 33%, instant messaging platforms 33% & social media platforms 18% , video calls 33%, content streaming 17%, gaming as well as the e health services each at 17%. This is closely followed by Bharti Airtel where the usage pattern is slighly less with mobile data browsing 27%, instant messaging platforms 27% & social media platforms 15% , video calls 27%, content streaming 17%, gaming as well as the e health services each at 17%. Bharti Airtel is closely followed by Vodafone Idea where the mobile

data browsing 24%, instant messaging platforms 14% & social media platforms 12% , video calls 12%, content streaming 12%, gaming as well as the e health services each at 12%. State owned BSNL and MTNL shows lowest adoption of data led value added services.

Reliance Jio has a sister company called Jio platform which is acquiring and delivering local multimedial content as well as promoting various initiatives through my Jio app which seems to have resulted in the higher usage of the value added services. Bharti Airtel has also followed the suit through its Airtel Extereme program which has resulted in uptake of the value added services with mobile data. Vodafone Idea and BSNL-MTNL are significantly behind when it comes to adoption of value added services amongst its user base.

The data suggets that it is possible to to generate incremental revenues by offering data based value added services to the users of teleocm services in retail market segement. The Telecom Service Provider (CSP) may consider evaluating ideas on new value added services for retail consumers for generating profitable revenue streams.

Service utilisation with respect to age group :

If we look at the various services being provided by the Telecom Service Providers (CSPs) and categorise the utilisation by age group of the users or consumers in the retail secor then it indicates that users in the middle age brackets of 25 yto 34, 35 to 44 and 45 to 54 are more likely to use services like video calls, instant messaging etc. Users in the age bracket exceeding 55 years are less likely to use the data and value added services. Users in the age group of 18 to 24 years also show significant usage of the data and value added services like instant messaging, social media and video streaming.

By profiling users from different age groups Telecom Service Providers (CSPs) may be able to offer right type of services, aligned with the consumer preferrance, thereby increasing revenues.

If we look at the various services being provided by the Telecom Service Providers (CSPs) and categorise the utilisation by age group of the users or consumers in the retail

secor then it indicates that users in the middle age brackets of 25 yto 34, 35 to 44 and 45 to 54 are more likely to use services like video calls, instant messaging etc. Users in the age bracket exceeding 55 years are less likely to use the data and value added services. Users in the age group of 18 to 24 years also show significant usage of the data and value added services like instant messaging, social media and video streaming.

By profiling users from different age groups Telecom Service Providers (CSPs) may be able to offer right type of services, aligned with the consumer preferrance, thereby increasing revenues.

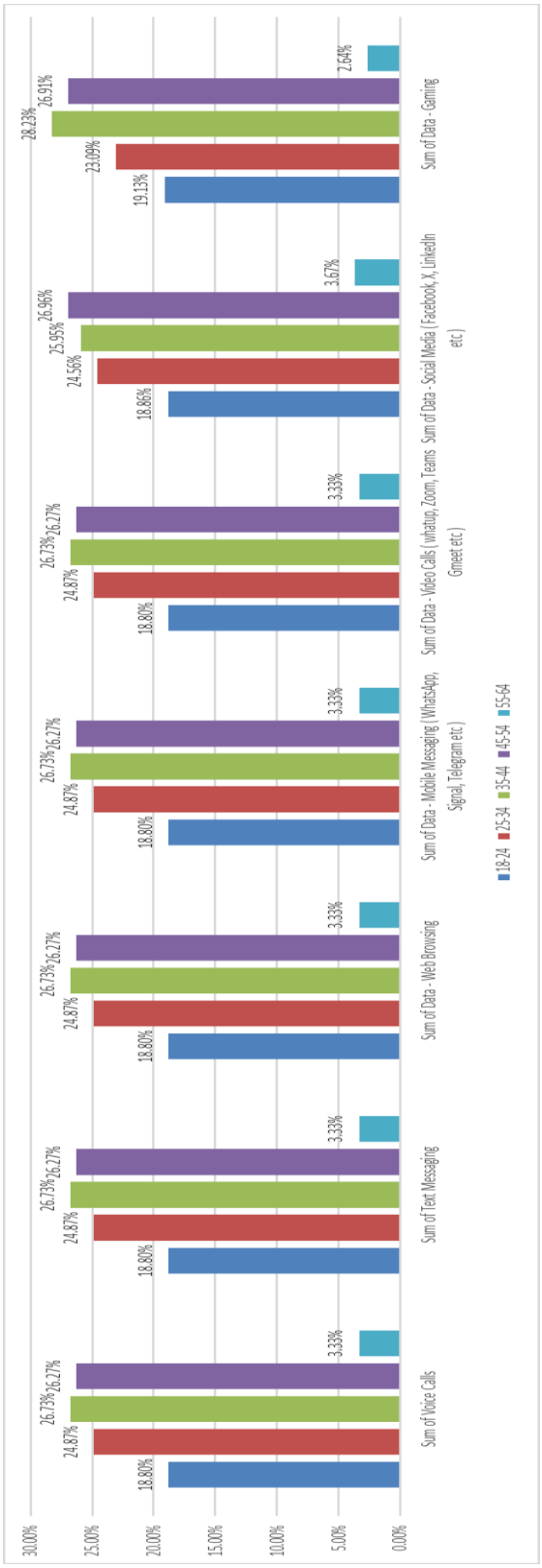



*Figure 17: Telecom services consumed by users in retail sector in different age group*

Service utilisation with respect to income group :

If we look at the data from another prespective on the type of service preferrance against the age group of the consumers or users of telecom services in retail sector, we can see view as shown in figure 19. When it come to consumption of data and value added services the lower income and middle income group show significantly more usage as compared to the higher income group. If one correlates this to the age group, then shows a trend on the usage across all sections, it indicates that students, young professionals, and working population is the heaviest user of data and value added services. Higher income group which also tends to be in the age group of 55 years and above are relatively lower users of the data and value added services.

Telecom Service Providers (CSPs) have the capacity and data to do the customer profiling. Which means that simillar to the survey results shown here, the Telecom Service Provider (CSP) can also do an analysis by understanding the user's demographic profile, estimated income which can be derived from the type of handset and mobility patterns and the data as well as the services consumed.

If Telecom Service Providers (CSPs) can look at the income as well as age profile of the user and workout a customised bundle package aligned with the lifestyle of the user then it will enable the Telecom Service Provider (CSP) to build close proximity to the consumer there by improving the loyalty of the consumer which may have a direct impact on the overall revenue profile of the user.

Through custiomised service offerings the Telecom Service Providers (CSPs) can also improve customer loyalty which has a direct correlation to churn. Reduced churn will mean better reveue per user.

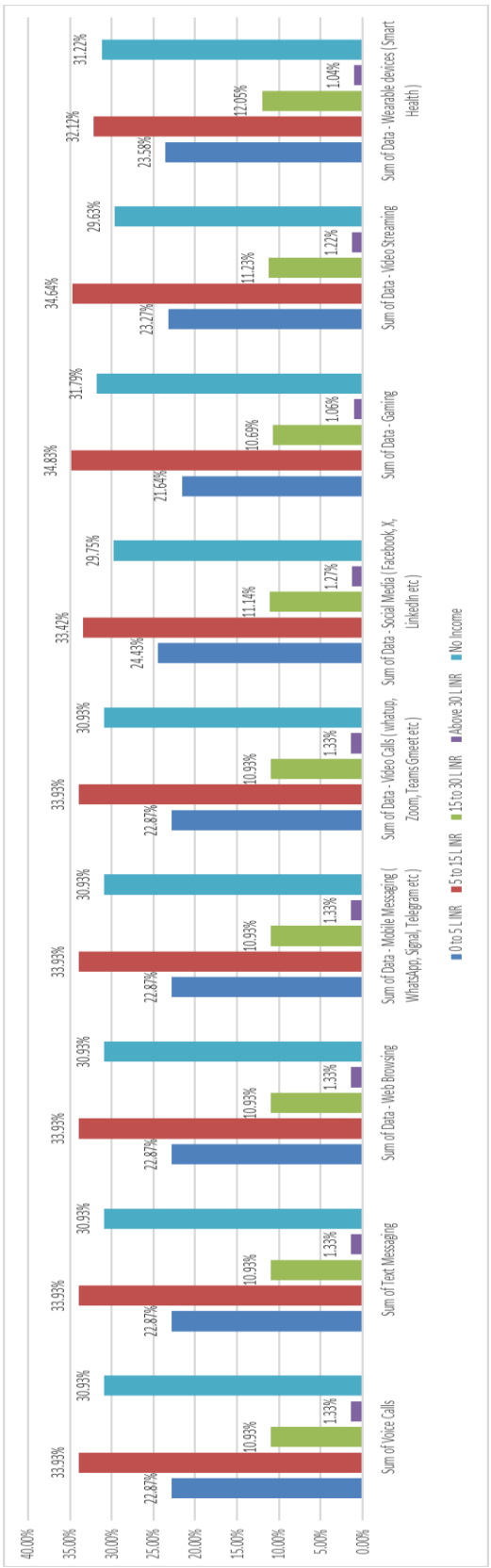



*Figure 18: Telecom services consumed by users in retail sector in different income group*

Consumer or User Satisfaction for different types of services offered by Telecom Service Providers (CSPs) :

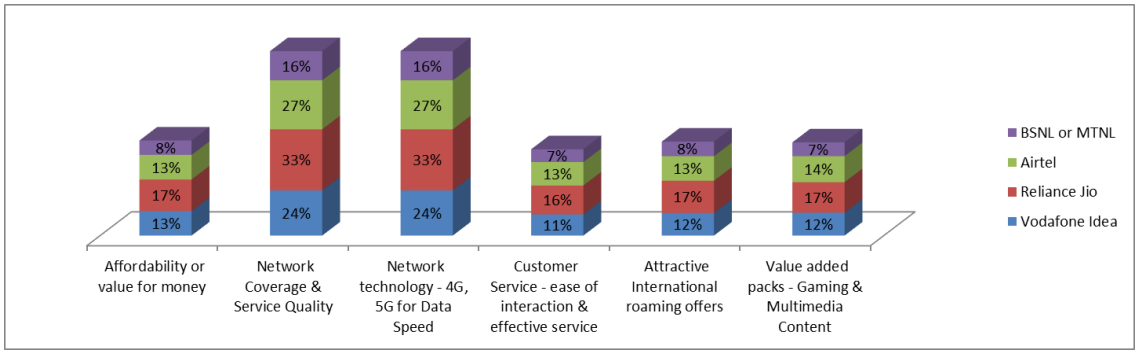



*Figure 19: Telecom services offered and user satisfaction by Telecom Service Providers (CSPs)*

During the survey we also collected data on the customer satisfaction from the users or consumers of Telecom Services in retail sector. Data above suggests that Network Quality, Service Quality, Network Technology are main drivers for customer satisfaction which is a given, since without a good quality network no value added services on data can be offered. The second and the third most important areas are affordability, value for money and value added services. If one looks at the data from different Telecom Service Providers (CSPs) then the trend shows similar priorities. Reliance Jio users give maximum importance to the network coverage, quality and experience at 33% and followed by affordability and value added services at 17% each. Bharti Airtel is close second and Vodafone Idea and BSNL are 3rd and 4th respectively.

This data shows that consumers in retail space tend to give more importance to the service experience, be it from the usage of the network or the interaction for billing, customer care etc. The value added services offered is also another key driver of user or consumer satisfaction.

Consumption of new age services by users or consumers retail sector

So far we have looked at the services offered and consumption patters of some of the ongoing or legacy services which are being offered by the Telecom Service Providers (CSPs) on 4G and 5G networks. With rapid growth of cloud, AI and IoT technologies etc, it is now possible for Telecom Servicce Providers (CSPs) to also leverage these technologies to offer completely new set of services to the users or consumers in retail sector.

Through the data gathered from the consumers during the survey, following four types of services were mentioned by majority of respondants, so these can be prime set of new services which may be adopted by the users or consumers in retail sector for Telecom Service Providers (CSPs).

- Cloud Computing Services
- Internet of Things or IoT services
- M Commerce or Financial Services
- Health support and preventive healthcare services
- Localised multimedia content delivery

Cloud Computing **:** Telecom Service Providers (CSPs) already have large numbers of data centers spread across the geography in the contry. Currently these data centers are being used for hosting network workloads. The same data centers can also be expanded to host enterprise IT workload. This will give new revenue opportunities to the Telecom Service Providers (CSPs).

Internet of Things **:** Internet of Things also known as IoT is another area where the Telecom Service Providers (CSPs) can look to expand their offerings. The telecom networks are available everywhere which should allow the Telecom Service Providers (CSPs) to offer connectivity services required for IoT and also offer the IoT platform as a service hosted from their network data centers.

M Commerce or Financial Services **:** All Telecom Service Providers (CSPs) have reach to millions of customers in retail as well as in enterprise markets. This reach can be

leveraged by the telecom service prividers to launch offerings in M commerce and financial services.

Health and preventive healthcare services **:** Wearable heath monitoring devices are gaining accptance and costs points are also coming down significantly which is making it very popular. These devices gather host of data on the key health parameters which can be exteremly helpful for healtcare professionals in providing healthcare services. The data can also be leveraged for preventive healthcare advice in case of lifestyle related issues. Here again Telecom Service Providers (CSPs) can leverage their market reach to provide platfrom play for healthcare services.

Localised multimedia content delivery**:** In a large country like India, where there are diverse languages and cultures, the localised content distribuition becomes a niche business opportunity. Telecom Service Providers (CSPs) can leverage their market reach and network assets to deliver localised content to their customers.

Survey data shows following pattern for adoption of above mentioned services.

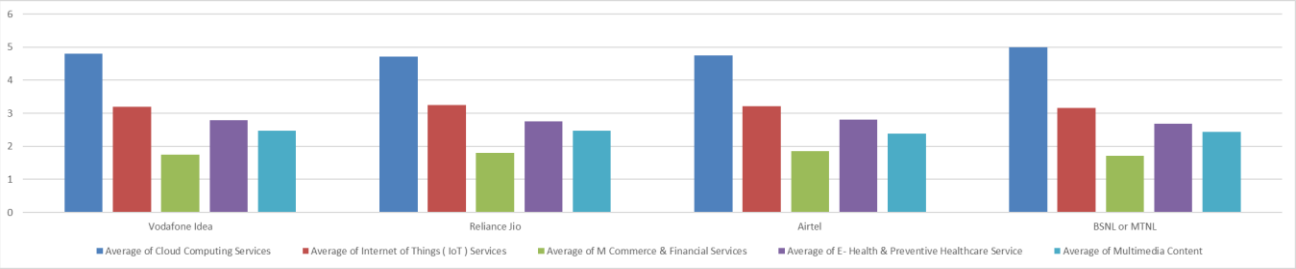



*Figure 20: Data on new services adoption*

The data trends are similar across consumers of all Telecom Service Providers (CSPs). Majority of users or consumers in retail markets indicate that cloud services will have fastest uptake. The retail consumers may use the cloud services for storing personal data and also for quick share with other users.

The second most likely service is related to IoT or internet of things. Small office or home automation can generate fast uptake. Telecom Service Provieders (CSPs) are ideally placed to benefit from such kind of services.

E- healthcare, comes in third, with penetration of wearable medical and smart devices growing by the day, the E-healthcare could be a good opportunity for Telecom Service Provider.

Multimedia content delivery, and Mcommerce are the other two areas which are also indicated by the users or consumers in retail space. Some of the Telecom Service Providers (CSPs) already offer these services in some shape or form, however an ecosystem play involving local content creators for generating multimedia content and fintech players for Mcommerce services could generate significant business opportunities for Telecom Service Providers (CSPs).

Survey data shows that users or consumers from retail sector have indicated that new services in the domains of Cloud computing, Internet of things, M Commerce or financial services, Healthcare and preventive healthcare services, and Multimedia content delivery, are likely to see fast uptake. If we further analyse the data by age group and the income gorup, it shows almost equal uptake across all user groups as can be seen in figure 22.


*Figure 21: New services adoption by age and income*

Additional inputs from respondants on new services :

During the survey we also asked the users or consumers of Telecom Services in Retail sector about what other services would they like to see from their Telecom Service Provider (CSP) in the future. Since it was an open ended question, there were many responses. Following tables show main caterories where the users or consumers in retail segment have indicated their interest. Which means that if Telecom Service Providers (CSPs) launch new services in these areas then the users or consumers would be willing to pay for such kinds of services.

Following are some of the key areas for introduction of new services as indicated by the users or consumers in the retail market sector.

Ultra high speed data with 6G networks

Artificial intelligence use cases

Edge Cloud Technology and Services

Cyber security threat detection and protection

Data management offerings – managing personal data

Data Privaacy protection – Identity management

Duel Sims – Multiple devices with same number

Sim Storage & function – for better protection

International SIM cards – one sim everywhere (this is already possible through roaming however many users still prefer to buy local sims when they travel aborad)

Seamless connectivity – This is likey to be related to better network coverage for 5G, since 5G is still not prelavent eveywhere in the country

Customer care – there was a general observation on automated customer care not working and instances of IVR jail is quite prelavent. While this is not a new service but it is something that the Telecom Service Providers (CSPs) can and should address on priority as it has a direct impact on customer satisfaction and eventually the revenue

Virtual reality – with deployment of 5G sufficient data bandwith should be available to support virtual reality based applications. Telecom Service Providers (CSPs)

can consider launching AR and VR as a service to small and medium enterprises to promote the products for the users or consumers of telecom services in retail segment.

The data trend also shows that the interest levels for these services are almost simillar from all age groups as well as income groups.

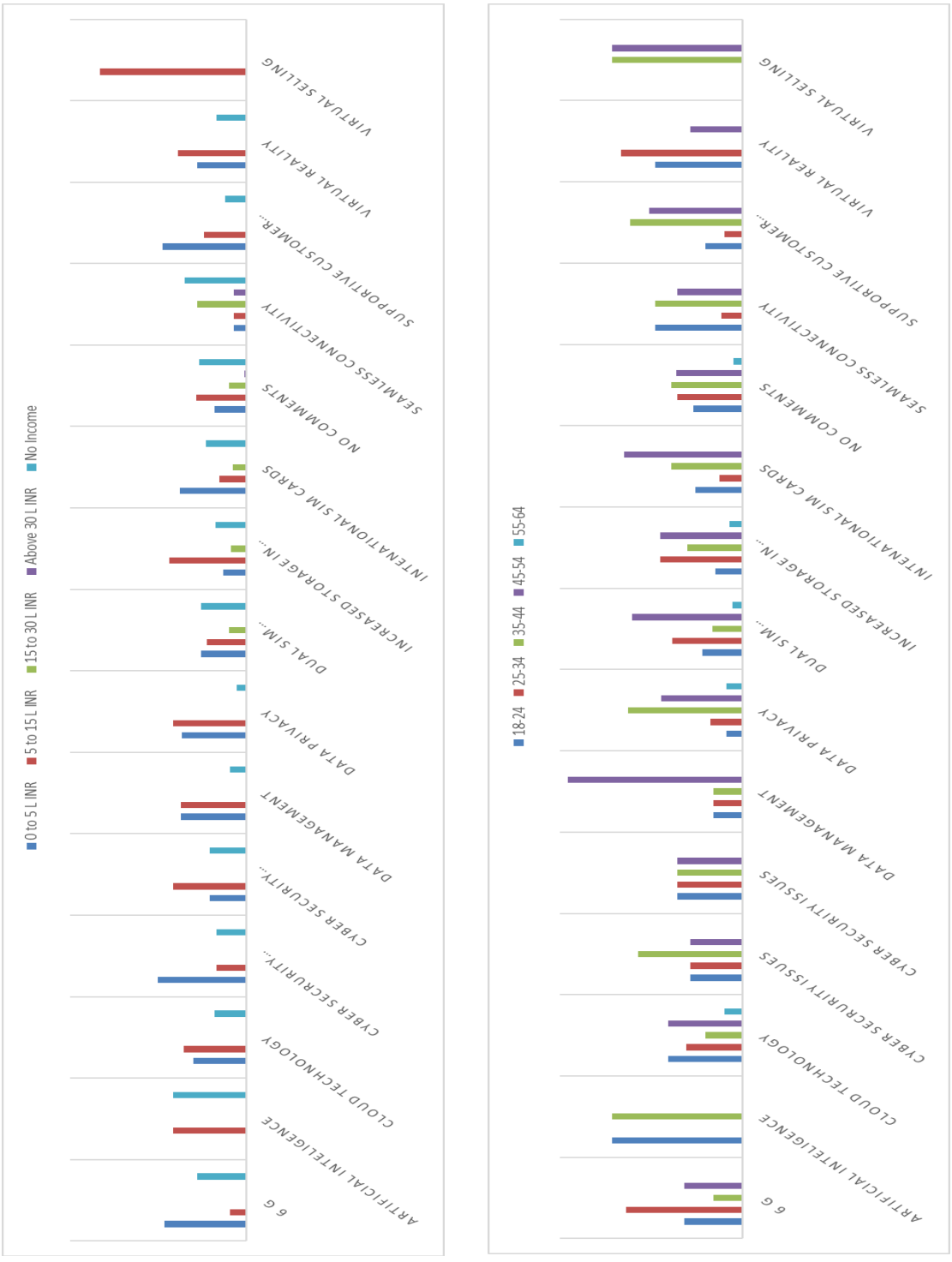



*Figure 22: Additional New services suggested by users and its adoption by age and income*

### 4.5 Survey Analysis for the customers from Enterprise Segment

Second part of the survey was for the enterprise customers. These kinds of customers are different from the consumers from retail sector. Instead of personal communication needs which is the primary focus for retail users the enterprise customers are driven by the needs of their businesses when it comes to telecom services. Data was collected from 150 plus enterprise customers of different sizes to gain insights on the needs and preferences for the telecom services. Aim here is to generate insights where the Telecom Service Providers (CSPs) can focus to enhance existing revenue streams as well generate new revenue streams, which will generate profitable growth. Appendix C covers the questionnaire designed for enterprise users of Telecom Services in India. This data is categorized in various tranches to analyse and derive inferences.

- Turnover and size of enterprises and the choice of Telecom Service Providers (CSPs)
- Time or duration since the enterprise has been the consumer of telecom services from a particular Telecom Service Provider
- Telecom services availed by various size enterprise customers.
- Customer satisfaction of enterprise customers of different size and scale with major service providers like Reliance Jio, Bharti Airtel, Vodafone Idea, BSNL or MTNL.
- Quality of services delivered by major Telecom Services providers as perceived by enterprise customers of different size and scale.
- Type of services provided by Telecom Service Providers (CSPs) which are popularly consumed by the enterprise customers of different size and scale.
- Critical considerations for enterprise customers while selecting Telecom Service Provider (CSP) for their business operations.
- Additional services that enterprise customers can avail provided those are made available by the Telecom Service Providers (CSPs)

Suggestions for new services and improvements in existing telecom services from enterprise customers representing different industries and operations scale.

Turnover and Size of Enterprise Customers and their Choice of Telecom Service Providers (CSPs) :

In order to establish preferences of the Enterprise customers from different size and sectors, when it comes to selection and consumption of telecom services, we looked at the data from different prespectives. Following two tables helps to the relationship betten the preferred Telecom Service Provider (CSP)and the Type or Size of the enterprise customer.

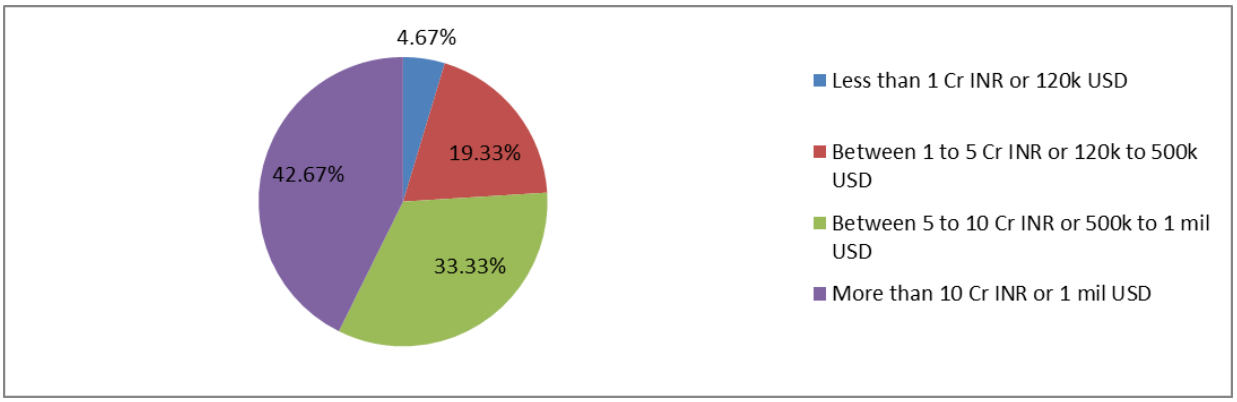



*Figure 23: Enterprise Customer Sample distribution by Size*

Out of the total survey sample nearly 42% of the respondents were large enterprise customers with annunal trunover in excess of 100,000,000 INR ( 10 Cr INR ). About 33% were medium size entterprises with annual trurnover of 50,000,000 INR to 100,000,000 INR ( 5 Cr INR to 10 Cr INR ). Nearly 20% of the respondants were medium to small size enterprises with annual turnover of 10,000,000 INR to 50,000,000 INR ( 1 Cr INR to 5 Cr INR ) and about 5% were very small enterprises with annual turnover of less than 10,000,000 INR ( less than 1 Cr INR ).

If one looks at the preferred services provider when it comes to consumption of Telecom Services, following view can be seen. Important point to note is that state owned BSNL and MTNL does not figure in the Enterprise segment because they are not that active in this space. The market is predominantly taken by 3 service providers which is Bhari Airtel, Reliance Jio and Vodafone Idea.

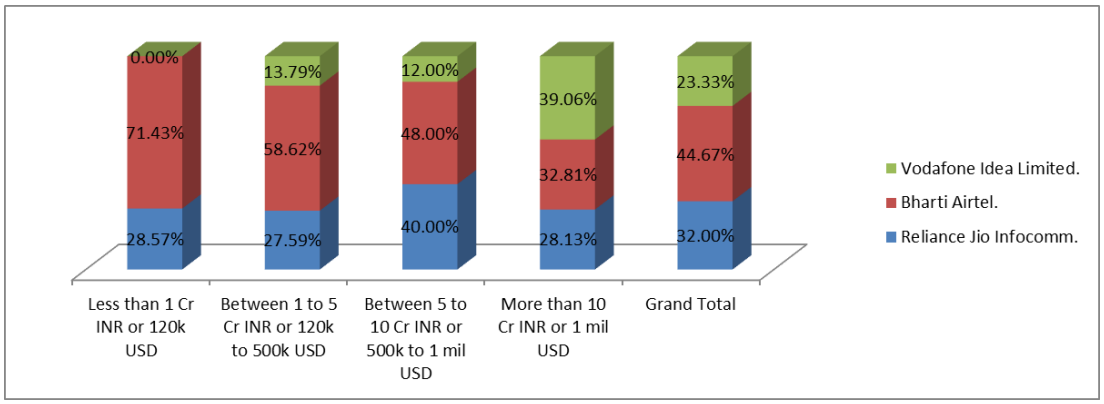



*Figure 245: Enterprise Customer preference for selecting the Telecom Service Provider (CSP)*

Majority of the small enterprise with annual turnover less than 10,000,000 INR ( 1 Cr INR) prefer Bharti Airtel as their service provider for all of their Telecom Services. This is a overwhelming mejority of nearly 71%, Reliance Jio is a distinct second with 28.57% and Vodafone Idea is neglible.

The view is almost simillar for medium and small enterprises with annual turnover between 10,000,000 INR ( 1 Cr INR) to 50,000,000 INR ( 5 Cr INR ), the preference is for Bharti Airtel as their service provider for all of their Telecom Services. Nearly 58% prefer Bharti Airtel, Reliance Jio is second with 23.59% and Vodafone Idea is preferred by 14%.

View for medium size enterrpises with annual turonver between 50,000,000 INR ( 5 Cr INR) to 100,000,000 INR (10 Cr INR), is somewhat even with the preference. Bharti Airtel is preferred by 48% of the enterprise customers and Reliance Jio is second with 40% of the customer preference and Vodafone Idea is preferred by about 12% of the customers.

One can notice significant change when it comes to large enterprises with annual turnover in excess of 100,000,000 INR ( 10 Cr INR ). Vodafone Idea leads this segment with 39% of the enterprise customer showing the preference, Bharti Airtel is at 32% and Reliance Jio has 28% of the enterprise customers showing them as preferred Telecom Service Providers (CSPs).

The overaall observation is uthat Bharti Airtel is doing much better when it comes to engagement with the enterprise customers. Other Telecom Service Provider (CSP)can consider doing a indepth analysis of the products and offerings to attract more enterprise customers. This fact may be applicable to ther Telecom Services providers world wide. If Telecom Service Providers (CSPs) undertake an indepth analysis of needs of enterprise customers and come up with customised products and solutions for enterprises, then they may be able to retain the customers for longer period thereby increasing high quality revenue.

Time or duration since the enterprise has been the consumer of telecom services from a particular Telecom Service Provider :

Duration of the service that an enterprise customer is engaged with the Telecom Service Provider (CSP) indicates how well the Telecom Service Provider (CSP) is able to cater to the business needs of the enterprise. Hence this is an important point to consider for the Telecom Service Providers (CSPs). Data shows that smaller enterprises tend to stay longer with the Telecom Service Providers (CSPs).

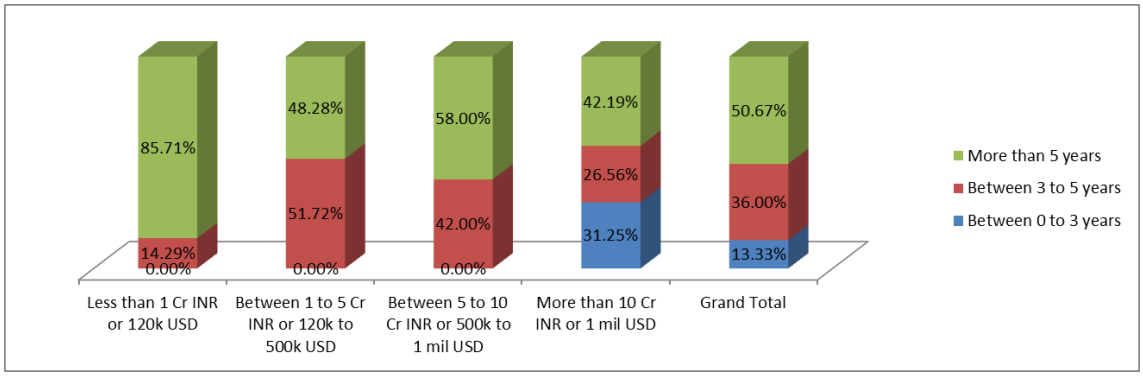



*Figure 25: Enterprise Customer time with the Telecom Service Provider (CSP)*

The enterprise customers with annual turnover of less than 10,000,000 INR ( 1Cr INR ) tend to stay more than 5 years with the selected Telecom Service Provider. Data shows in excess of 85% of the small enterprises are with the same Telecom Service Provider (CSP)for more than 5 years.

For small and medium enterprises with annual turnover of more than 10,000,000 INR ( 1 Cr INR ) but less than 50,000,000 INR ( 5 Cr INR ) 48 % of the enterprises stays with same Telecom Service Provider (CSP)for more than 5 years, and nearly 52 % stays for up to 3 years with the same Telecom Service Provider.

Data shows similar trend for medium size enterprises with annual turnover of more than 50,000,000 INR ( 5 Cr INR ) but less than 100,000,000 INR ( 10 Cr INR ) with nearly 58% staying with the same Telecom Service Provider (CSP)for more than 5 years and 48% staying with the same Telecom Service Provider (CSP)for up to 3 years.

For large enterprises with annual turnover in excess of 100,000,000 INR ( 10 Cr INR ), the trend is different. Data shows that only 42% stays with the same Telecom Service Provider (CSP)for more than 5 years and 27% stays between 3 to 5 years with the same Telecom Service Providers (CSPs), interestingly 31% change their Telecom Service Provider (CSP)every 3 years.

These large enterprises are major high quality revenue sources for the Telecom Service Providers (CSPs). The data indicates that Telecom Service Providers (CSPs) need to understand business needs for medium and large enterprises in detail and offer customized offerings to these customers to generate profitable revenues.

Telecom services availed by the enterprises of different scale :

Understanding the consumption of different type of services by the enterprises is a key aspect as it will enable the Telecom Service Providers (CSPs) to focus on right areas to improve their revenue for this sector.

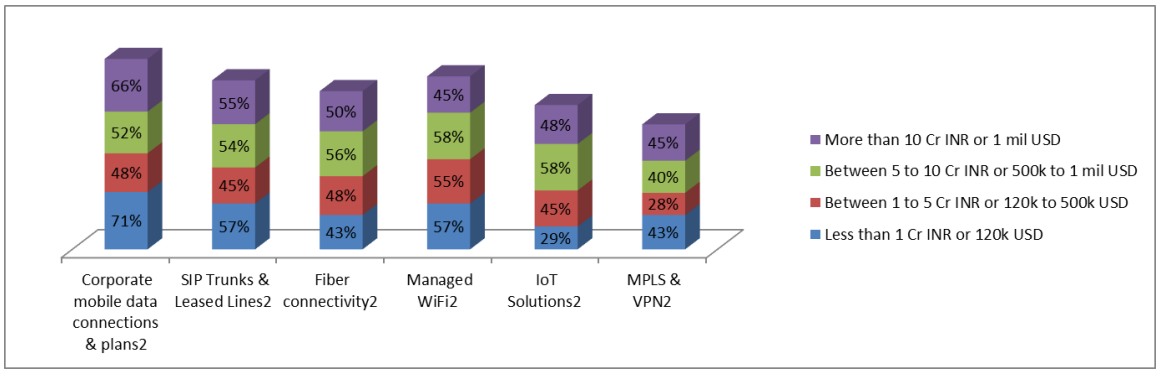



*Figure 26: Services Consumed by enterprise customers of different scale*

Data shows that enterprise customers use broadly 6 types of existing services from the Telecom Service Providers (CSPs) as of now. These includes corporate mobile data plans, SIP trunks and leased line services, Fiber connectivity services, managed WiFi services, IoT solutions, MPLS and VPN services.

For small enterprises with annual turnover less than 10,000,000 INR ( 1 Cr INR ) majority of the services are corporate data plans with almost 71% of the enterprises using these predominantly. This is followed by SIP or leased line services with 57 % of the enterprises using these services and this is followed by fiber, managed WiFi, IoT and MPLS/VPN types of services each ranging in the 30 to 40% range.

For small and medium enterprises with annual turnover between 10,000,000 ( 1 Cr INR ) and 50,000,000 ( 5 Cr INR ) the proportion of usage of almost all services i.e. corporate data plans, SIP or lease lines, fiber, managed WiFi, IoT, is almost similar in the range of 45 to 55 %, only exception is and MPLS/VPN which is about 28%.

Data shows similar trend for medium size enterprises with annual turnover of more than 50,000,000 INR ( 5 Cr INR ) but less than 100,000,000 INR ( 10 Cr INR ) with almost all services i.e. corporate data plans, SIP or lease lines, fiber, managed WiFi, IoT is almost similar in the range of 52 to 58 %, only exception is and MPLS/VPN which is about 40%.

For large enterprises with annual turnover of more than 100,000,000 INR ( 10 Cr INR ) the corporate data plans are major consumption with 66%, followed by SIP or lease lines at 54%, fiber at 50%, managed WiFi at 45%, IoT 48% and MPLS/VPN is about 48%.

Data suggests that Telecom Service Providers (CSPs) are mostly engaging with traditional telecom services like mobile corporate data plans, lease lines, SIP trunks, fiber connectivity, which forms large part of the enterprise revenue. Relatively new kind of services like managed - WiFi, IoT, MPLS and VPN, which are mostly offered in as a service model also has potential and good uptake, but these kinds of services are still not generating enough revenues as compared to the traditional telecom services. Telecom Service Providers (CSPs) may like to look into the aspects of generating revenue from new services offered under 'as a service model' (XaaS) that generates annuity-based revenues which are highly profitable.

**Customer Satisfaction Index for enterprise customers**

Unlike the retail sector where also the customer satisfaction is necessary, but in the enterprise segment it is absolutely critical. The enterprises are bulk consumers of telecom services and loss of just one enterprise on account of bad customer satisfaction can be a significant revenue loss to the enterprise customer. It can make a significant dent to the annual revenue numbers. Hence all Telecom Service Providers (CSPs) look at the customer satisfaction index for enterprise customers much more closely as compared to the retail consumers. Data gathered during the survey suggests that enterprise customers are by and large satisfied with all 3 major Telecom Service Providers (CSPs).

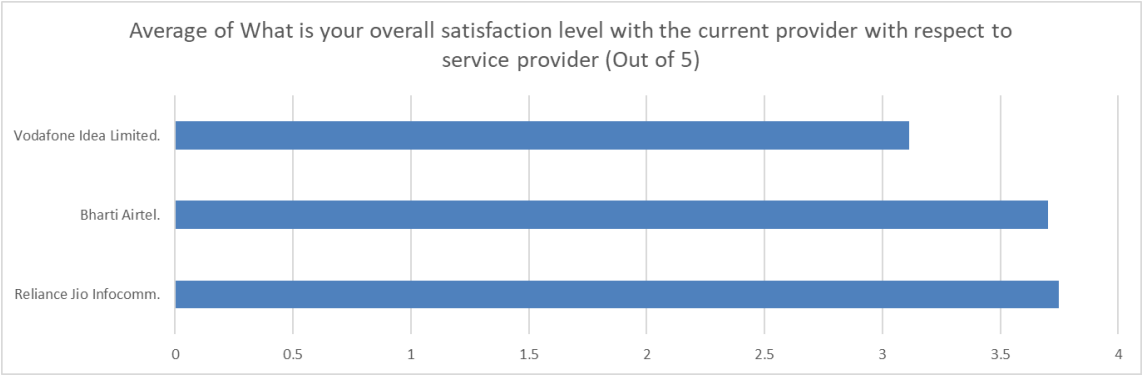



*Figure 27: Customer satisfaction index for different Telecom Service Providers (CSPs)*

As can be seen Bharti Airtel and Reliance jio enjoys best customer satisfaction scope and Vodafone Idea is not too far either.

If we look at the customer satisfaction index by size of the enterprise customers, then the picture is slightly different. Data shows that smaller size enterprises are slightly more satisfied as compared to the larger size enterprises. Very large-scale enterprises show the lowest scores for the customer satisfaction index.

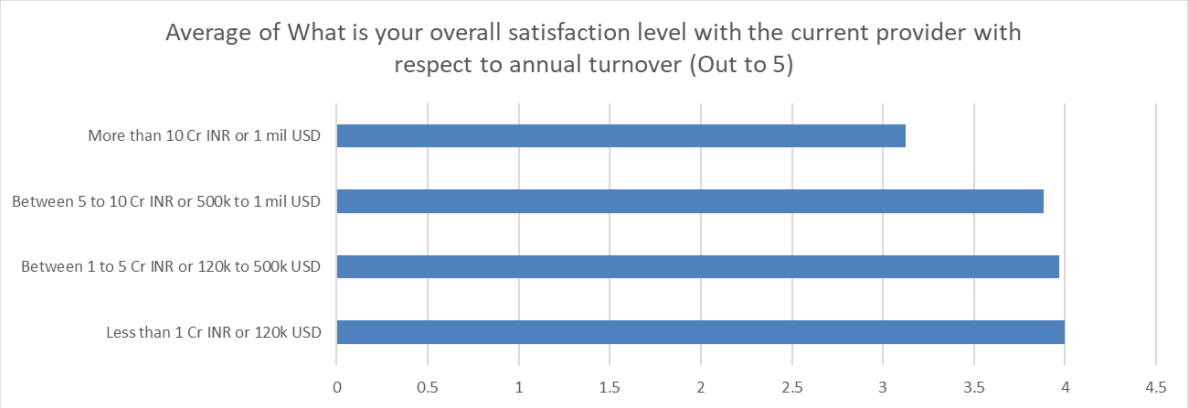



*Figure 28: Customer satisfaction index for Telecom Service Providers (CSPs) by enterprises*

Quality of service perception of the enterprise customers :

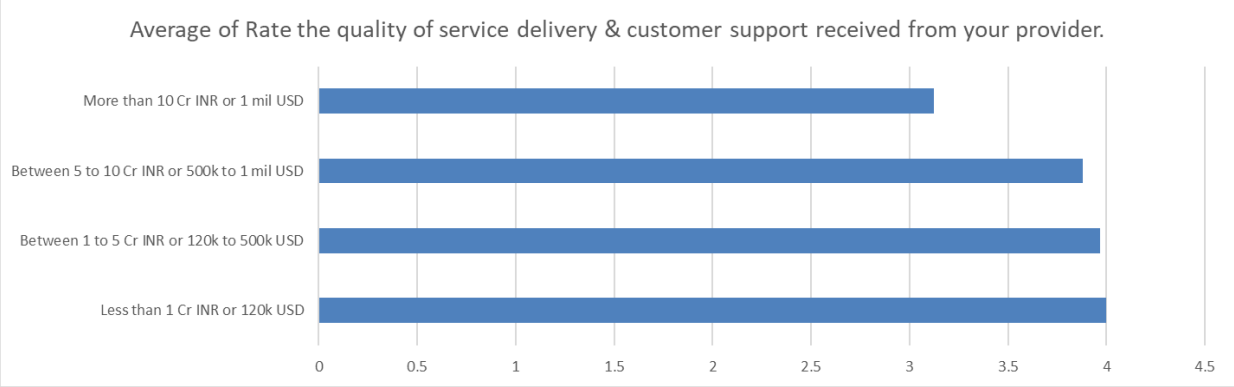



*Figure 29: Quality of service delivery by Telecom Service Providers (CSPs)*

While customer satisfaction index is an overall impression on how well a Telecom Services Provider is able to service the enterprise customers business needs, another important factor to consider is the quality of services for the existing services being

delivered by the Telecom Services Provider (CSP) as it has a direct impact on the enterprise business. Data shows that larger size enterprises are less happy with the quality of services being delivered by their respective Telecom Services Providers.

Critical aspects considered by the enterprise customers while availing the telecom services :

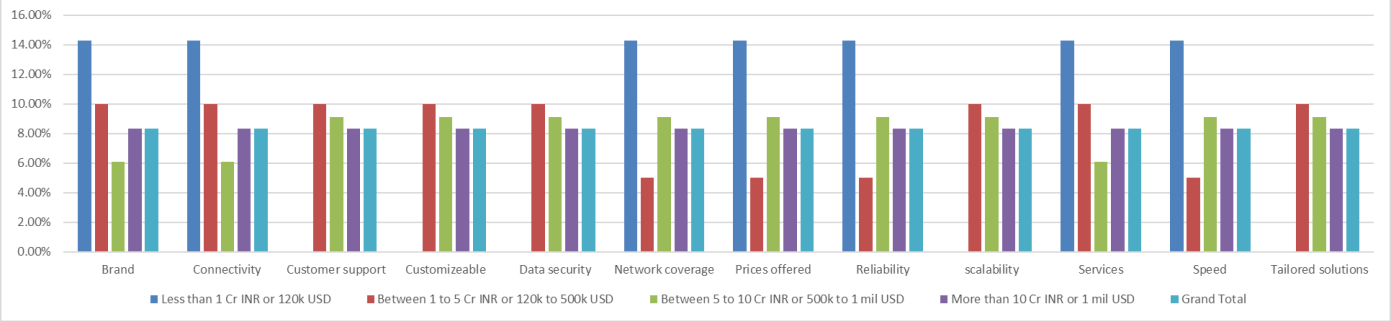



*Figure 30: critical aspects while selecting a telecom service and service provider by enterprises*

In order to attract and retain enterprise customers, it is important to understand the key criterion or aspects that are considered by the enterprise customers of all scales while looking to select right telecom service and the right Telecom Service Provider.

Brand is an important consideration, given all enterprises are also selling their respective products and services in the market. They need to ensure that quality of their offerings and their brand association is not jeopardized so selecting right brand for any kind of supplier is key.

Connectivity here means the ability of the enterprise customer to reach the Telecom Service Provider (CSP) to avail the services. Many times, the service provider is not active in a specific area which means that the enterprise cannot consume its services.

Customer Support plays an important role given the enterprise customer is going to use the services for running its own operations so if there is any gap or issue in the service delivery then customer support must be handy to resolve the issue.

Customizable offerings are another critical consideration since needs of every enterprise customer is not the same. So, the enterprises like to avail the services which are

aligned to their business needs and that is why they like to customize the offering as per their requirements.

Data security is utmost important since many enterprises deal with the data of their customers. Any loss or leakage of data can mean significant reputational risks and also legal obligations. Any malware attach on the business network can also mean loss of revenue.

Network coverage quality is important, since just mere availability of the network in the area where the enterprise customer is active is not enough, it needs to have certain quality in order to ensure that the enterprise is able to leverage the connectivity and other telecom services.

Price points need to be competitive since all enterprise customers need to compete and stay profitable for their respective businesses, so their costs also need to be market competitive. Telecom services are a cost item for the enterprises which is essential to run their business and hence enterprises look at the price points of the telecom services very carefully before deciding to avail or not to avail the same.

Reliability not only for the services offered but also the Telecom Service Provider (CSP)is a key factor. Once the enterprises avail the telecom services from a particular service provider, they are dependent upon the Telecom Service Provider (CSP) for running their day-to-day operations. So, aspects like how reliable – financially, technically and reputationally the Telecom Service Provider (CSP) is an important consideration.

Services offered; enterprise customers like to keep all services with one player so that it not only reduces their administrative workload but at the same time it also ensures smoother day to day operations. In case of outages, it is easier to work with one vendor to resolve the problem rather than looking at multiple parties. So, a comprehensive suite of services covering all needs of enterprises when it comes to telecom service can attract more enterprise customers.

Speed of response is critical at the time of selling the service and also while delivering the service. At the time of selling the faster the response by the Telecom Service Provider (CSP) the more likely it is that the sale will be realised. During the delivery if there is any problem then the resolution speed will be critical consideration for the enterprise customers and may impact future contract extensions and sales of new services.

Tailored solutions by bringing different ecosystem partners are now becoming a necessity because there are so many technological developments that just one entity is unlikely to bring whole solution together so ability of the Telecom Service Provider (CSP) to collaborate with other industry players to build ecosystem plays on platforms is a key consideration for the enterprise customers.

Data shows that smaller enterprises with annual turnover of less than 10,000,000 INR ( 1 Cr INR ) give significantly more importance to Connectivity, Network Coverage, price point, reliability, comprehensive services and speed of delivery.

Small and medium enterprises with annual turnover of 10,000,000 INR ( 1 Cr INR ) to 50,000,000 INR ( 5 Cr INR ) give more importance to the aspects like Brand, Connectivity, Customizable offerings, Data security, and comprehensive services portfolio.

Medium size enterprises with annual turnover of 50,000,000 INR ( 5 Cr INR ) to 100,000,000 INR ( 10 Cr INR ) also give importance to the aspects like brand, connectivity, customer support, customizable offering, data security, NW coverage, prices offered, reliability, scalability, comprehensive services offerings, speed of engagement and tailored solutions.

Large enterprises with annual turnover in excess of 100,000,000 INR ( 10 Cr INR ) give more importance similar to medium size enterprises to the aspects like brand, connectivity, customer support, customizable offering, data security, NW coverage, prices offered, reliability, scalability, comprehensive services offerings, speed of engagement and tailored solutions.

This observation shows that Telecom Services Providers need to focus on building customer centricity by understanding their enterprise customers better, build the services which are aligned with the business needs and also create ecosystem partnerships to build tailored solutions.

Additional services that enterprise customers would like to see from the Telecom Service Providers (CSPs) :

In order to understand if there is any latent demand that Telecom Service Providers (CSPs) can look to service and thereby build new revenue streams, the survey also focused on gathering data on this aspect. Figure 32 summarises the findings from the survey. There were many examples sighted by the enterprise customers on the kind of new services that they would like to see from their respective Telecom Service Providers. The table 32 shows some of the common threads which emerged through survey inputs received from the enterprise customers of telecom service of various size and operations scale.

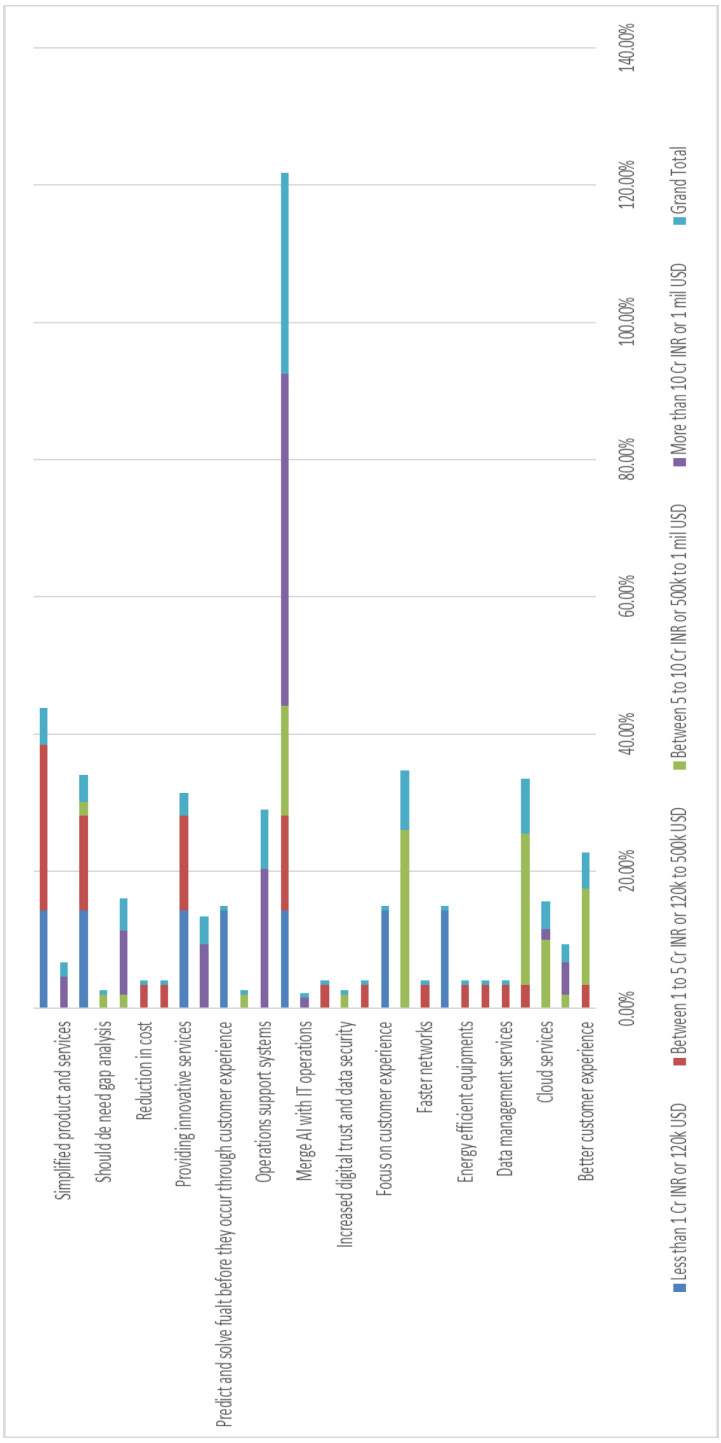



*Figure 31: Feedback from Enterprise Customers for the Telecom Service Providers (CSPs)*

Through open ended questions we tried to understand if the enterprise customers have certain demands or focus area which Telecom Service Providers (CSPs) can focus on for creating new offerings or improving existing offerings thereby creating new revenue streams.

Following were key observations :

Simplify product offerings some enterprises probably felt that when it comes to the Telecom Service Provider's offerings for the enterprise sector, it is very complex with lot of interlinkages, SLA, KPIs and onboarding challenges so one of the feedback points was to have simplified offerings.

Telecom Service Providers (CSPs) need to do gap analysis this is another aspect which came up which clearly shows that the customers in enterprise segment are willing to engage with the Telecom Service Providers (CSPs) to help them understand the business requirement and enable them to do the gap assessment and come up with right set of services aligned to meeting enterprise customers business and operational requirements today and in future.

Cost optimization is another area where the enterprise customers are focused increasingly given the hyper competition in the market in all industries so offering the services on pay as you use model may enable cost optimisation for the customers.

Innovation in the services offered this is an area where small and large enterprises alike are asking Telecom Service Providers (CSPs) similar thing, which is to offer new innovative services, there were some specific examples suggested as well. This input clearly calls for Telecom Service Providers (CSPs) to work more closely with the enterprise customers to design innovative offerings. This may open up significant new revenue lines for the Telecom Service Providers (CSPs).

Predict service fault before it occurs, with many AI and gen AI tools now available in the market, the expectation from enterprise customers is that the Telecom Service

Providers (CSPs) should be able to assess service outages in advance and take remedial action, thereby improving the service uptime.

Improve operations support system, this was by far the most common feedback by all enterprise customers. This goes to show that enterprise customers find it difficult to onboard and consume the services offered by the Telecom Service Providers (CSPs). Simplification of OSS and BSS system itself could bring in significant revenue improvement, as it will make smoother onboarding and consumption of the Telecom Services Provided by the Telecom Service Providers (CSPs).

AI in operations is another aspect where some of the enterprise customers expressed emphasis. This view may be from two perspectives first is to have AI led customer engagement which will improve the experience of enterprise customers while interaction with the Telecom Service Providers (CSPs). This includes billing related settlements, resolving operational issues etc. The second aspect could be better network experience where AI can proactively monitor network service quality and take corrective actions. Both of this could mean significant improvement in customer satisfaction for the enterprise customers and thereby improvements in revenue.

Focus on Digital Trust and Security, cybersecurity and data protection compliance has become an essential aspect for running business operations for all enterprise customers so this is naturally something that they will expect from their Telecom Service Provider. Apart from providing traditional network connectivity services, Telecom Service Providers (CSPs) may also look in to providing services related to cybersecurity compliance and data protection compliance in line with local regulatory requirements from time to time. This will also generate additional revenue streams for the Telecom Service Providers (CSPs).

Focus on customer experience, is also one of the aspects suggested by many enterprise customers this could be an indicator that Telecom Service Providers (CSPs) offer same Telecom services and also the same customer support experience to all enterprise customers. There could be a possibility to categorize enterprise customers and those enterprise customers which are loyal may be offered customized customer care experience.

This may also enable the Telecom Service Provider (CSP) to price services at premium for the select customers who are willing to pay more for the better customer experience.

Faster networks, many enterprise customers are asking for better network quality and faster data speeds by leveraging latest technologies. Better connectivity has a direct impact on the enterprise customers business operations.

Energy Efficiency focus is essential for many enterprise customers this is not only from environmental compliance requirements, but also the cost savings it brings by the reduced energy consumption.

Data management services, some of the enterprise customers have expressed interest in availing data management services from the Telecom Service Providers (CSPs). This is a natural extension of the existing services being offered by the Telecom Service Providers (CSPs). This observation again goes to show that if the Telecom Service Providers (CSPs) work closely with their customers in enterprise segment, then they may be able to generate additional revenues through supplementary services like data management, data security, data privacy etc.

Cloud Services, many enterprises users have also expressed the desire to take cloud services from the Telecom Service Providers (CSPs). Telecom Service Providers (CSPs) have the market reach in all geographies. Telecom Networks also have data centers which are distributed in all areas. This market reach combined with the network asset can be leveraged to offer cloud-based services in the market.

Improved customer experience, feedback from many enterprise customers is that there is room for improvement in the customer experience being offered by the Telecom Service Providers (CSPs). Improved customer experience may also open up additional discussions or engagements and consumption of Telecom Services which can have the potential to generate additional revenue sources for the Telecom Service Providers (CSPs).

### 4.6 Inputs from Senior Executives from the Telecom Industry

Inputs from the senior executives working telecom industry is also critical to understand the environment in which a Telecom Service Provider (CSP) Operates in. This feedback was taken through individual one on one conversation and also using ethnographic method by interacting with some of the telecom executives in their day to day working life.

Following are the key points which came up as common viewpoints from most of the senior executives working in the telecom industry.

Senior executives in Telecom Industry indicated that the Telecom Service Providers (CSPs) focus on two main categories of customers first is the retail users which is population at large using data connectivity services in their daily lives and enterprises which use data connectivity for the business operations. Main Offerings from almost all Telecom Service Providers (CSPs) are focused on providing connectivity services to the retail and enterprise customers. The main business focus is on retail sector where consumers are using the telecom services for data connectivity and voice calls. With 4G and 5G coverage becoming available everywhere, the retail consumes are using data services increasingly. Applications like whatsup are now the main enablers of personal connectivity. Enterprise customers on the other hand are using the data services for their enterprise connectivity requirements. Online collaboration tools like zoom, MS teams, Webex have gained uptake in all enterprise businesses.

During the discussion around current major sources of revenue for a Telecom Service Provider, a common view was noticed which was that nearly 80% of the revenue is coming from retail consumers and 20% is from enterprise customers. Most of the senior executives in the telecom industry were of the view that this revenue mix is set to change significantly in the future. View was that in about 8 to 10 years' time nearly 80% of the revenue for a Telecom Service Provider (CSP) will come from enterprise customers and only 20% will come from retail consumers. This expected revenue shift is an important observation.

Another common viewpoint was that, as of now, mobile and fixed broadband data services is the major revenue driver for almost all Telecom Service Providers (CSPs). Some of the senior executives also expressed the view that value added services like mobile content streaming and online gaming revenues are also gaining significant traction, however as of now the revenue share of these value-added services is limited when compared with revenues from legacy services like mobile and fixed broadband services.

During the discussion with Senior executives in Telecom Industry on main profit drivers, it came out that value added services are generating highest profits in percentage terms. However, given the overall revenue base of value-added services is still limited, hence in terms of the absolute profits generated, the legacy services like mobile and fixed broadband are the leaders.

Almost all senior executives in the telecom industry agree that profitability of the Telecom Service Providers (CSPs) has taken a severe beating in the last 10 to 15 years. Many view that we have almost reached at the bottom of the curve and the only way out now is the upwards. Which indicates that most of the Senior executives in the telecom industry are upbeat about the sector in the future. However, looking at the financial performance of most of the Telecom Service Providers (CSPs) in the last 3 years, the executives in the telecom industry expressed the view that the industry is under stress when it comes to profitability. Many expressed the need for a radical comprehensive transformation of business model to revive the profitability in the coming years.

During the discussion on the point of what are the key challenges that the Telecom Service Providers (CSPs) are facing today, one common viewpoint that came up was the fact that revenues are stagnated. So, while the data usage is increasing significantly however the revenues are not increasing in the same proportion. As a result, the Telecom Service Providers (CSPs) are delivering more for the same i.e. more data consumption and speed but the price for the data services is more or less the same. Off late there are small increments being made in the monthly charges by the Telecom Service Providers (CSPs) which is likely to improve the profitability but not by much in terms of absolute profits given these small increments would not yield a significant additional revenue in near term.

Most of the senior executives expressed a view that there are limited avenues for improving profitability from the existing revenue sources. So, unless the Telecom Service Providers (CSPs) do not look for completely new set of revenue lines which are significantly more profitable, it is unlikely that there would be noticeable shift in the profitability of the Telecom Service Providers (CSPs).

Diversification areas for Telecom Service Providers (CSPs) to consider :

One of the key differentiators that a Telecom Service Provider (CSP) has is the Network Assets and the Market Reach. This was an overwhelming view that came out during the discussions with senior executives from the telecom industry. It also became apparent that the Telecom Service Providers (CSPs) are using these assets only to provide traditional legacy connectivity services. The common view was that the Telecom Service Providers (CSPs) should actively explore what more can be done with the assets that of the Telecom Service Provider (CSP)to generate new streams of revenue. Some executives in the telecom industry indicated Data Centre business as one potential opportunity. Other ideas that came out included Private Network Deployments in enterprise premises e.g. mines, oil rigs, factories etc and offer IoT as a service, secure SD wan connectivity, SLA based enterprise services through NW slicing. During the discussion with senior telecom executives there were also some ideas for the retail market segment which were expressed by many of the executives working in the Telecom sector for a long time. Common ones include, Identity management services, Gaming data bundles, Local content delivery, M commerce services, Payment wallets, Microlending, E Health and Lifestyle management services, EV charging solutions, Vehicle insurance settlement services, smart meters and home automation services. It is noticeable that all of these solutions are already available in the market and are being sold through different channels, however the executives in the Telecom Services Providers were unanimous that the Telecom Service Provider (CSP) can play a significant role in taking these services to mass market and extend the uptake significantly. Most of the executives expressed the view that the market reach that Telecom Service Provider (CSP) enjoys is a great asset which can be leveraged to enable new

services in retail market space. In summary there is a general consensus amongst the senior executives in the telecom industry that the Telecom Services Provider industry as a whole need to re-look at the revenue model and explore new revenue streams generating profitable revenues as compared to the current revenue lines. Many ideas come out like leveraging the network infrastructure and market reach to offer new enterprise services based on IoT, blockchain technologies. Consideration of leveraging the assets for data centers and collaborate with hyperscalers like GCP, AWS, Azure etc to build enterprise offerings which will generate new revenue lines.

Constraints for Telecom Operators :

While it may be coming out from the executives in telecom industry that the Telecom Service Providers (CSPs) should look at the incremental revenue sources through the new services, examples specified in the earlier sections, however one needs to keep in mind that the Telecoms is a heavily regulated industry which means that there are certain license conditions which a Telecom Service Provider (CSP) must adhere to. Telecom is considered a critical national industry which also means that the government regulator is constantly keeping a watch on what Telecom Service Providers (CSPs) are doing. It is therefore imperative to understand the limitations or the constraints that a Telecom Service Provider (CSP) operates with. During the discussion with executives working in the Telecom industry this point was also raised and discussed to record their views. Some observations were also noted through the decisions that the senior executives in Telecom Service Providers (CSPs) took in their day-to-day operations. Following observations were noted as the broad considerations for the Telecom Service Providers (CSPs) while launching services in the market.

There are license conditions which the Telecom Service Providers (CSPs) need to adhere to. When it comes to launching of new services the major constraint is the data privacy and data protection of the end consumer, also known as DPDP. The Telecom Service Providers (CSPs) are required to abide by the provisions of DPDP regulation.

The data localisation is another area where the Telecom Service Providers (CSPs) need to comply to, under this condition, key subscriber and network data cannot go outside the geographic boundary of the country and the Telecom Service Provider (CSP) must ensure that the critical data stays within the country. The DPDP and data localisation requirements may create some restrictions for the Telecom Service Providers (CSPs) when it comes to the launching of new services in the market.

Compliance with environmental and social governance (ESG) is another area to consider where the Telecom Service Providers (CSPs) are required to work on the carbon footprint and also the governance policies. This may not restrict Telecom Service Providers (CSPs) to launch new services as such however while launching new services a consideration to the ESG norms is a must.

Authorised Services as per license terms, the telecom regulatory authorities across the globe have specified certain conditions and type of services that the Telecom Service Providers (CSPs) need to adhere to. There are variations from country to country, as an example in India there are broadly 4 categories of telecom licenses 1. Unified License - All Public networks irrespective of media and technology capable of offering voice and/or non-voice (data services) including Internet Telephony, Cable Television (TV), Direct To Home (DTH), TV & Radio Broadcasting shall be covered under this category. 2. Class License - All services including satellite services, which do not have both way connectivity with Public Network, shall be covered under Class license. 3. Licensing through Authorisation - This category covers the services for provision of passive infrastructure and bandwidth services to service provider(s), Radio Paging, PMRTS, Voice Mail, Audio text, Video Conferencing, Videotex, E-mail service, Unified Messaging Services, Tele-banking, Tele-medicine, Tele-education, Tele-trading, E-commerce, Other Service Providers, as mentioned in NTP'99 and Internet Services including existing restricted Internet Telephony (Personal Computers (PC) to PC; within or outside India. 4. Standalone Broadcasting and Cable TV licence – This category shall cover those service providers who wish to offer only broadcasting and/or cable services.

These were the observations noted however these may not be the exclusive ones, various service providers in the world may be required to look at the type of license they hold and therefor consider limitations if any that may have for them to launch new services in the market. Most of the senior executives working in the Telecom Industry expressed the view that the license conditions and restrictions creates some limitations on what the Telecom Service Provider (CSP) can or cannot offer in the market and sometime also gives unfair advantage to the OTT players. One of the executives gave the example of whatsup, this messaging service does not need to adhere to any compliance when it comes to text and voice or video calls. Whereas the same service offered by Telecom Service Provider (CSP) is subject to minimum service levels as per the regulatory policies.

Limitations in terms of skills, organizational capabilities of a Telecom Service Provider (CSP) :

This was another important consideration which came out during the discussion with various senior executives working in the Telecom Industry. Telecom Service Providers (CSPs) are evolving in their organisational capabilities as new technologies are getting rolled out. In 2000s most of the focus used to be on prepaid and post-paid voice services based on 2G GSM network, whereas now the focus in on driving high speed low latency data services with 4G and 5G networks. Having said this, most of the senior executives working in the Telecom Industry voiced a common concern on the organisational capabilities of the Telecom Service Provider (CSP) as an organisation. The view that came out was that the Telecom Service Providers (CSPs) haven't kept pace with technology when compared to tech giants like Facebook, Google, etc. Most of the skills in Telecom Service Providers (CSPs) are related to management of the networks and not really on creating new services. So, the services that the Telecom Service Providers (CSPs) offer have remained more or less the same across the globe with small variations. This fact primarily indicates that the skills in the Telecom Service Providers (CSPs) as of now are one dimensional, which is network focused. If we look at the tech giants the skills are spread across multiple domains, and the main focus is the end user service. So, tech giants

like Meta are able to visualise the latent user demands and work out a solution to cater for the same. This is driving a culture of innovation this culture of innovation is not that prevalent in the Telecom Service Provider (CSP) organisations. Most of the Telecom Industry executives as well as experts agree that the Telecom Service Providers (CSPs) need to focus in bringing this culture of innovation into the organisation in order to create innovative offerings which will generate new sources of revenues which are highly profitable for the Telecom Service Providers (CSPs).

Experts and senior executives in the telecom industry also expressed the concerned on the product substitution threats for the current Telecom Service Providers (CSPs). The view expressed was that the telecom industry model as remained unchanged for the past 3 to 4 decades, where a Telecom Service Provider (CSP) secures a license and radio spectrum and deploys radio base station sites to provide mobile voice and broadband data connectivity. The revenues come from prepaid and post-paid data plans which are charged to the consumer on the monthly basis, either in advance or at the end of the month. According to some senior executives working in the Telecom Industry this model is likely to face a substitutional threat. The view was that there are multiple technologies which are becoming prevalent when it comes to providing data connectivity. At home as well as in the offices most of the users ( retail and enterprise ) use WiFi as the preferred mode for connectivity. Whereas in the remote areas satellite broadband is becoming more prevalent with the cost of low orbit satellites coming down significantly, we see many new entrants in this space. So, the legacy Telecom Service Providers (CSPs) model of building lot of ground-based cell sites to offer data and connectivity services is coming under threat of being replaced by either ubiquitous WiFi or then satellite broadband services. Add to that is the fact that handset manufactures are also launching new models which are capable of using multimode connectivity and intelligently switching between the multiple channels as appropriate – e.g. Samsung recently announced that its new processors in exynos series in the mobile phone will have capability to connect to satellites, WiFi as well as the existing 4G, 5G and even upcoming 6G networks.

New Technologies which can help Telecom Service Providers (CSPs) :

Which new technologies can enable to create and build new offerings was one of the most critical points which came up during the conversation with senior executives from Telecom Industry. Most of the senior executives in Telecom Industry agree that with advancement of technology there are significant opportunities which are opening up in the market. It is for Telecom Service Providers (CSPs) to look into their existing portfolio and identify opportunities to build new offerings by leveraging latest technologies. Following were the views expressed by most of the executives in the Telecom Industry.

Blockchain technology hold the potential to enable Telecom Service Providers (CSPs) to offer new services. One such example sighted was the 'Identity management Service'. Given the fact that Telecom Service Provider (CSP) has authentic KYC data it can offer the authentication of the user on various parameters such as name, sex, age, address etc as a service. This can be offered through the mobile device as an application. Such service could be useful while authenticating retail users in availing various daily services such as train ticket bookings, access to premises where age bar is enforced e.g. pubs and clubs, airport identity checks and flight bookings, banking transactions etc.

Internet of things (IOT) is another example sighted by executives from the Telecom industry, most of them indicated the fact that IoT as a technology can be leveraged by the Telecom Service Providers (CSPs) to offer lifestyle improvement offerings to the retail consumers for example e-health services, home automation, vehicle management services etc. Also, in the enterprise segment IoT technologies can also play a significant role in industrial automation. The view expressed from the executives in the Telecom Industry was that the Telecom Service Providers (CSPs) already play a vital role of establishing connectivity, if the Telecom Service Providers (CSPs) can also build IoT platform capabilities then that will enable them to offer IoT as new services portfolio which may generate highly profitable revenues.

Cloud technology also offers a significant opportunity for the Telecom Service Providers (CSPs) according to the executives from Telecom Industry, All the hyperscalers are expending rapidly given the IT workloads getting migrated to cloud. These hyperscalers

need to build geo redundant cloud setup and also in order to save the transmission costs the hyperscalers are working on the concept of edge clouds where the cloud instance goes closer to the place where the data and application workload us getting generated. This could be a significant opportunity for the Telecom Service Provider (CSP) given it already has a large number of small data centres which it has built to run the mobile and fixed broad band networks, these micro data centres could be ideal asset to build edge cloud instance for hyperscalers. The Telecom Service Provider (CSP) may consider working with an hyperscaler to build and offer edge cloud services.

AI and Digital technologies came up as another example which was indicated by most of the executives from Telecom Industry. The view here was that the Telecom Service Providers (CSPs) can offer AI use cases to its enterprise customers and help them to build organisational efficiencies in various areas of operations. One such example sighted was of the AI led visual inspection of precision engineering products. These are products which requires highly precise dimensional accuracy as well as a high-quality finishing, A high resolution camera can take pictures of the object from multiple angles and fed it to an AI algorithm which is trained with high quality image database from previously collected data samples. The AI algorithm can precisely calculate and arrive at a conclusion if the product is of desired quality (dimension and finish ) or not. The Telecom Service Provider (CSP) can help to setup this use case by leveraging its 5G networks which provides high capacity and low latency connection to transport the image data to the centralised cloud instance where a trained AI algorithm can determine if the product meets the desired quality standard.

Industry partnerships :

Industry partnerships play that a Telecom Service Provider (CSP) can participate in, was another aspect which came up during the discussion with executives from the Telecom Industry. The view expressed here was that in order to generate new sources of highly profitable revenues, the Telecom Service Providers (CSPs) must look at the collaboration with other technology players. Some examples sighted were Microsoft 365,

google suit for small medium enterprises. The idea indicated here was that the Telecom Service Providers (CSPs) can form a strategic alliance with these players ( i.e. Microsoft and google etc ) and offer the licenses of products such as Microsoft 365 or google workplace to its enterprise customers along with the connectivity and other telecom services which it provides. This will generate new sources of revenue for the Telecom Service Providers (CSPs).

Understanding of future demands :

This was an area where there was almost a unanimous view from all executives in the Telecom Industry. Almost of all of them expressed the view that the Telecom Service Providers (CSPs) do not put sufficient focus and efforts to understand what the needs would be and demands of its customers 3 to 5 years in the future. Most of the Telecom Service Providers (CSPs) rely on 3rd party market research reports from agencies like Gartner to get an understanding of the future of the industry as a whole, however these insights are generic and not specific to a Telecom Service Providers (CSPs) own customer base. The Telecom Service Provider (CSP) itself has a direct access to millions of subscribers, it would be beneficial if the Telecom Service Provider (CSP) start to engage with its customer base to understand their demands in the future and prepare for solution to cater for the same. This is one critical aspect which is missing in most of the Telecom Service Providers (CSPs). If one looks at the Technology companies like Uber, it clearly shows how value can be created by understanding the latent demand of the consumers. Telecom Service Providers (CSPs) may consider looking at this aspect and build innovative offerings specifically targeted to meet future and latent demands of own customer base. This will help to develop culture of continuous innovation in the Telecom Industry that will have a direct impact on generating the new and profitable revenue streams.

Understanding demands of the retail and enterprise customers in the future was a topic which was of keen interest for the research, and it also generated significant conversations when discussed with the executives working in the Telecom industry. There were two distinctly different views that came out during the discussion. One was from those working in the Telecom Service Providers (CSPs) and the other was from those who

are working with the supplier side who are delivering the products and services to the Telecom Service Providers (CSPs) to enable their networks and services. Those executives who were working with the Telecom Service Providers (CSPs) were mostly indicating future demands as the extension of the existing telecom services in the future, for example some suggested combining mobile and fixed broadband plans into a single pack and then offer value added services as bolt on bundles like content streaming, gaming, sports pack etc, enabling one stop shop for all services for the retail customers. Some also suggested adding m-commerce play. Similarly for the enterprise customers the suggestions for the expected future demands, from those executives working with the Telecom Service Providers (CSPs) were also on similar lines. Most of them indicated bundling FttX ( fiber to office ), MPLS, SDWAN, Leased line services into a bundled offering there by creating a one stop shop approach for the enterprise customers. More radical suggestions on the expected customer demands in retail and enterprise segment came from those executives who were working for various vendors and suppliers who were engaged in providing technical products, solutions and services to the Telecom Service Providers (CSPs) to run the operations and provide services to the end consumers. Following were the main themes.
1. Ecosystem play – most of the executives working outside the Telecom Services Providers emphasised the need for the Telecom Service Providers (CSPs) to create or participate in the ecosystem plays. One example sighted was the game developer ecosystem. Idea was that Telecom Service Providers (CSPs) can play a role to get audiences for game developers to test out some of their new ideas. Game developers can leverage cloud to create prototypes which can be tested in the market without having to invest in the heavy hardware costs upfront. If the game gains popularity, then the Telecom Service Provider (CSP) gains part of the revenue earned by the game developer as a royalty. So in a way it's a three-party play, the game developer who gains revenue through the offerings, the cloud service provider who gains the revenue through increased usage of the cloud infrastructure and the Telecom Service Provider (CSP) who gain the royalty from the game developer as well as the additional revenue by offering games as a bundled package on top of the existing telecom services offerings being offered to the consumers.

There were few other examples of ecosystem play which were suggested by some executives like e-health, telemedicine, micro lending etc. In the enterprise space also, a similar approach was suggested where rather than providing just the connectivity services the idea was to collaborate with the enterprise customers to help them grow the revenues and then share a part of that revenue. One such possible example given was the EV charging where Telecom Service Providers (CSPs) can leverage their cell site infrastructure especially the ground-based sites on highways to allow EV charging companies to setup charging stations and build a revenue share model for the EV charging business.

Although different examples were sighted by people working within the Telecom Service Providers (CSPs) and in the suppliers or vendors in the Telecom Industry, one common theme that came out is the importance of creating ecosystem plays to build new revenue streams. Most of the executives working in the Telecom Industry were unanimous in their view that just focusing on the existing revenue stream will not be sufficient for survival and that new revenue streams must be created to generate profitable business in the future.

Building Ecosystem play was one of the prominent thoughts that came out during the discussion so follow on discussions were taken to explore possibilities in ecosystem play for the Telecom Service Providers (CSPs). Following are the main themes which were indicated by the executives working in the telecom industry.

1. Cloud Ecosystem play – It was indicated as perhaps the easiest extension for the Telecom Service Providers (CSPs). The data centers that the Telecom Service Providers (CSPs) has across the geographies are ideal assets where edge clouds can be hosted. The Telecom Service Providers (CSPs) can enter into a collaborative engagement with hyperscalers such as AWS, GCP, Azure etc to host their cloud offerings on the data centers owned by the Telecom Service Providers (CSPs) under a revenue sharing arrangement.

2. Startup Ecosystem Play – Some executives indicated partnering with some of the startups offering fintech services like micro lending, payment wallets etc. The Telecom Service Providers (CSPs) can enable the startups to reach to the millions of retail

customers. The revenue gained by availing services offered by startup can be shared with Telecom Service Providers (CSPs) partially in proportion to the value added by the Telecom Service Providers (CSPs) to onboard the customers.

3. IoT or internet of things platform play – this was indicated by some of the executives working in the enterprise business space. The IoT as a platform can be enabled by the Telecom Service Providers (CSPs) by providing cloud and connectivity services. For hosting IoT platform the Telecom Service Providers (CSPs) can enable through building the data center assets on the existing infra or partner with a hyperscaler. The Telecom Service Providers (CSPs) can also enable the connectivity with the IoT devices in host of places such as mining, industrial locations, retail locations, logistics etc. The revenue gained through the IoT services may be shared between IoT service providers, Telecom Service Provider (CSP) and Hyperscalers as appropriate.

There were many other examples of specific businesses which can be enabled by the Telecom Service Providers (CSPs) though building partnerships with other industry players and create new revenue streams for the Telecom Service Providers (CSPs), most of them were in one or the other categories mentioned above. It is therefore clear that there is a lot of interest amongst the executives in the Telecom Industry to enter into ecosystem plays going in the future. However, most of the executives in the Telecom sector is of the view that the action as of now hasn't began and that is where the focus needs to be taken keeping in view the regulatory environment to explore what is the art of the possible.

# CHAPTER V:

# DISCUSSION

## 5.1 Outside in view : Survey Analysis Retail and Enterprise users

The data was collected from three distinct sources to create a comprehensive understanding of 1. what are the demands from users of telecom services in retail sector, 2. what are the demands from enterprise customers who are consuming telecom services and, 3. what are the constraints under which the Telecom Service Providers (CSPs) operate. Objective was to puttogether the views from all stakeholders and couple it with the secondary research data from litrature review to gain a comprehensive understanding on what can be done by the Telecom Service Providers (CSPs) to create new revenue streams which are highly profitable, enabling the return to the path of profitable growth.

**Analysis of the surevy results from the data collected from Retail Sector Users of Telecom Services shows following key insights.**

- **Consumption of Telecom Services are majorly driven by young population** student and yong working population. This age group is likely to give highest revenue potential from various telecom services offered in the market. Telecom Service Providers (CSPs) should therefore look into the lifestyles of this segment and workout offerings which will help users in this segment in their day to day life. This will not only ensure a sustaained revenue flow but at the same time it will also create loyalty thereby reducing the churn. Reduced churn has a direct impact on the EBITDA of the Telecom Service Provider (CSP)and hence this is an important consideration.

- **Middle class income segment is generating maximum usage** of the Telecom Services and revenue. Therefore the Telecom Service Providers (CSPs) therefore should also look in to the needs of this user gorup and see how to maximise or ulift the revenue from this segment. The survey data shows that this segment is the highest usage and revenue contributor for the Telecom Service Provider.

- **There is no brand differentiation in the retail segment market** – there is no preferrance or no correlation to the income group or age vs the brand of the Telecom Service Providers (CSPs) people prefer. This can be a clear indication on why the Telecom Services provider are struggling for the profitable growth. While the consumption of the data is going up but that is not getting translated in to equaatable revenues for the Telecom Service Providers (CSPs). There is no premium play for the Telecom Service Providers (CSPs) as survery data indicates. So one area to look into for the Telecom Service Providers (CSPs) is to create service quality and brand differensiation which will enable to attract and retain high paying consumers. Higher revenue per user directly contributes to the overall quality of the revenue realised.

**- It is possible to generate incremental revenues by offering targeted value added services.** Survey data also indicates that if Telecom Services Provider can build right set of value added services focused to support the lifestyles of the users, then it is possible for the Telecom Service Provider (CSP)to generate incremental profitable reveue which will enable growth for the Telecom Service Providers (CSPs). Telecom Service Providers (CSPs) has a lot of data on its users, especially the retail consumers about their lifestyles, what is needed is to leverage this insight to offer customised offers.

- **User profiling is key** to offer targeted services to suite lifestyles of different age and income group can allow differentiated services offerings. This observation from the survey data goes further to indicate that there is also willingnesss amongst the users in the retail space to pay additional premium for differentiated services, provided the services are designed in a way that supports enhancements in daily lifestyle.

**- Importance of Service Experience** - Customers in retail space give maximum importance to service experience on network services as well as customer care interaction. This input from the survey indicates the importance of maintaining and managing the service quality of the mobile networks is important. What is also equally important is the experience with customer care and support mechanisms which the Telecom Service Provider (CSP)has to support consumers if something is not working. E.g. wrong billing,

customer querries on subscription, service activation issues etc. Quite often the Telecom Service Provider (CSP)suffer unnecessary revenue losses because subscribers decide to move to another service provider, because they get fusstrated with the lack of network service quality or the customer support when they need help.

**- Focus on new services -** Consumers in retail sector would like to see new services introduced from the Telecom Services Provider the survey data indicates some of the existing services as well as new services that the Telecom Service Providers (CSPs) can launch in the market for enhanced revenues. Some of the examples sighted by consumers are as follows:

Following are some of the existing services being offered by the Telecom Service Providers (CSPs) where the retail users indicated significant upside potential if these offerings are pushed by the Telecom Service Providers (CSPs) in a conserted and focused manner. - Cloud Computing Services; Internet of Things or IoT services; M Commerce or Financial Services; Health support and preventive healthcare services; Localised multimedia content delivery etc.

In the near and mid term future, the consumers in the retail sector also indicated willingness to take following new types of services. Ultra high speed data with 6G networks, Artificial intelligence use cases, Edge Cloud Technology and Services Cyber security threat detection and protection, Data management offerings – managing personal data, Data Privaacy protection – Identity management. Other services indicated included multi sim and sim storage, AR and VR services.

**Analysis of the surevy results from the data collected from Enterprise Customers of Telecom Services shows following key insights.**

Unlike in retail sector, the enterprise sector data shows that one perticular Telecom Service Provider (CSP)has done exceedingly well in attracting and retaining the customers in the enterprise space. The reason could be differentiated product offering with clear focus on the target segment of the enterrpise market.

- **Customer Loyalty** : Smaller and medium size enterprises tends to stay longer with the Telecom Service Providers (CSPs), where as larger enterprises with annual turnover in exxcess of 10 Cr INR ( circa 1 million USD ) tends to chance their Telecom Service Provider (CSP) atleast once in 5 years.

**- Types of services consumed :** There are 5 types of services which are normally used by the enterprise customers, these include - mobile data plans, SIP trunks and leased line services, Fiber connectivity services, managed WiFi services, IoT solutions, MPLS and VPN services. Data shows that small and medium enterprises use legacy telecom services like mobile data plans, SIP trunks leased lines, whereas the large enterprises also use advance services like VPN, managed WiFi, IOT solutions, MPLS and VPN.

Relatively new type of services like managed - WiFi, IoT, MPLS and VPN, which are mostly offered in as a service model has sufficient uptake, but these kinds of services are still not generating enough revenues as compared to the traditional telecom services.

- **Customer satisfaction** index is an important parameter to monitor customer loyalty. Survey results shows that smaller size enterprises are slightly more satisfied as compared to the larger size enterprises. Very large-scale enterprises show the lowest scores for the customer satisfaction index.

-**Quality of service** is another important consideration for the Telecom Service Providers (CSPs). Survey results indicate larger size enterprises are less happy with the quality of services being delivered by their respective Telecom Services Providers.

Surevy results show Brand, connectivity or network reach & quality, service reliability, quality of customer support, customized offerings, data security, price points, range of services offered, speed of response, and ability to create tailored solutions by working with different industry players are key considerations for the enterprise customers while selecting their preferred Telecom Service Provider (CSP)to avail Telecom Services for their business operations.

Further analysis of the Survey data show that smaller enterprises give significantly more importance to Brand, Connectivity, Network Coverage, Price point, Reliability, Comprehensive services and Speed of delivery. Whereas Medium size and large enterprises give importance to the aspects like Brand, Connectivity, Customer support, Customizable offering, Data security, NW coverage, Prices offered, Service reliability, Scalability, Comprehensive suit of services, Speed of engagement and Tailored solutions.

Analysis on specific demands of the enterprise customers which haven't been addressed effectively shows following key observations.

**- Product Simplification** – feedback was that enterprise offerings are very complex with lot of interlinkages, SLA, KPIs and onboarding challenges so one of the feedback points was to have simplified offerings.

**- Gap analysis** - Enterprise segment customers are willing to engage with the Telecom Service Providers (CSPs) to help them understand the business requirement and enable them to do the gap assessment and come up with right set of services aligned to meeting business demands for today and in future.

**- Cost optimization** – Key consideration for the Enterprises given the increasingly hyper competition in the market. Offering the services on pay as you use model etc will be attractive to enterprise customers.

**- Product Innovation :** Innovation in the services offered is an area where small and large enterprises alike are asking Telecom Service Providers (CSPs) similar things, which is to offer new innovative services, there were some specific examples suggested as well.

- **Predictive Maintenance :** Predict service fault before it occurs, with AI and gen AI tools is another demand from the enterprise customers expectation from enterprise customers is that the Telecom Service Providers (CSPs) should be able to assess service outages in advance and take remedial action, thereby improving the service uptime.

**- Improve operations support systems**, this was by far the most common feedback by all enterprise customers. Enterprise customers find it difficult to onboard and consume the

services offered by the Telecom Service Providers (CSPs). Simplification of -OSS and BSS system itself could bring in significant revenue improvement.

AI in operations is another aspect where some of the enterprise customers expressed emphasis. AI led customer engagement and better network experience where AI can proactively monitor network service quality and take corrective actions.

- **Digital Trust and Security**, cybersecurity and data protection compliance has become an essential aspect for running business operations for all enterprise customers, compliance to this aspect is expected from Telecom Service Providers (CSPs) by all enterprise customers.

**- Customer experience** is an important aspect for enterprise customers since the telecom services directly impacts their business operations.

**- Faster networks,** better network quality Energy Efficiency are focus areas for many enterprise customers.

**- Data management services**, some of the enterprise customers expressed interest in availing data management services from the Telecom Service Providers (CSPs). This is a natural extension of the existing services being offered by the Telecom Service Providers (CSPs).

- **Cloud Services**, many enterprise users have also expressed the desire to take cloud services from the Telecom Service Providers (CSPs). Telecom Service Providers (CSPs) can create edge cloud services as a bundle on top of the connectivity services.

### 5.2 Inside out view : Analysis of insights from Telecom Executives

**- Change in revenue mix** : A common view which came out from the executives in the Telecom industry was that nearly 80% of the revenue is coming from retail consumers and 20% is from enterprise customers. This revenue mix is set to change significantly in the future. In about 10 years' time, nearly 80% of the revenue for a Telecom Service Provider

(CSP)will come from enterprise customers and only 20% will come from retail consumers. This expected revenue shift is an important consideration for the Telecom Service Providers (CSPs) to re-look at their offerings and build network as well as organisational capabilities to maximise the revenue potential from the enterprise customers in the future.

**- Importance of value-added services** : As of now mobile and fixed broadband data services is the major revenue driver for almost all Telecom Service Providers (CSPs), however value-added services like mobile content streaming and online gaming revenues are also gaining significant traction. The Telecom Service Providers (CSPs) must therefore look to build a comprehensive set of offerings in value added services to maximise revenues. These value-added services would be the main profit drivers for the Telecom Service Providers (CSPs) in the future.

**- The Telecom Sector needs to focus on profitability :** Almost all senior executives in the telecom industry agree that profitability of the Telecom Service Providers (CSPs) has taken a severe beating in the last 10 years. Common viewpoint was that revenues from legacy sources are stagnated. Most of the senior executives expressed a view that there are limited avenues for improving profitability from the existing revenue sources. The Telecom Service Providers (CSPs) most build new set of revenue lines through new offerings and industry partnerships and ecosystem plays which are significantly more profitable.

**- Areas where the Telecom Service Providers (CSPs) can diversify** : Network Assets and the Market Reach are key assets for the Telecom Service Providers (CSPs). By leveraging these assets, the Telecom Service Providers (CSPs) can consider diversifying their business into new but adjacent areas. Some examples discussed include : 1. Data Centre business 2. Private Network Deployments in mines, oil rigs, factories etc and offer IoT as a service, 3. Secure SD WAN connectivity, 4. SLA based enterprise services through NW slicing. 5. Identity management services, 6. Gaming data bundles, 7. Local content delivery, 8. M commerce, 9. Payment wallets, 10. Microlending, 11. E Health and Lifestyle management services, 12. EV charging solutions, 13. Vehicle insurance settlement services, 14. Smart meters and home automation services. 15. Network assets for data

centers and collaborate with hyperscalers like GCP, AWS, Azure etc to build enterprise offerings which will generate new revenue lines.

**- Constraints for Telecom Operators** : 1. Regulatory Compliance : Telecom is a heavily regulated industry there are certain license conditions which a Telecom Service Provider (CSP) must adhere to. It is also considered a critical national industry. 2. Data privacy and data protection : The Telecom Service Providers (CSPs) are required to abide by the provisions of DPDP regulation. 3. The data localisation - under the license condition, key subscriber and network data cannot go outside the geographic boundary of the country. 4. Compliance with environmental and social governance (ESG) - Telecom Service Providers (CSPs) are required to work on the carbon footprint and also the governance policies. 5. Authorised Services as per license terms - The Telecom regulatory authorities across the globe have specified certain conditions and type of services that the Telecom Service Providers (CSPs) need to adhere to. In India there are broadly 4 categories of telecom licenses a. Unified License – for offering voice and/or non-voice (data services) including Internet Telephony, Cable Television (TV), Direct To Home (DTH), TV & Radio Broadcasting. b. Class License - All services including satellite services, which do not have both way connectivity with Public Network. 3. Licensing through Authorisation - Services for provision of passive infrastructure and bandwidth services e.g. Radio Paging, PMRTS, Voice Mail, Audio to text, Video Conferencing, Videotex, E-mail service, Unified Messaging Services, Tele-banking, Tele-medicine, Tele-education, Tele-trading, E-commerce, etc. 4. Standalone Broadcasting and Cable TV licence – for offering only broadcasting and/or cable services. Executives working in the Telecom Industry expressed the view that the license conditions and restrictions creates some limitations on what the Telecom Service Provider (CSP)can or cannot offer in the market and sometime also gives unfair advantage to the OTT players.

**- Limitations in terms of skills, organizational capabilities** : Senior executives working in the Telecom Industry voiced a common concern on the organisational capabilities of the Telecom Service Provider. Telecom Service Providers (CSPs) haven't kept pace with technology when compared to tech giants like Facebook, Google, etc. Most of the skills in

Telecom Service Providers (CSPs) are related to management of the networks and not really on creating new services. The skills in the Telecom Service Providers (CSPs) as of now are one dimensional, which is network focused. If we look at the tech giants the skills are spread across multiple domains, and the main focus is the end user service. The tech giants like Meta are able to visualise the latent user demands and workout a solution to cater for the same. Culture of innovation is not that prevalent in the Telecom Service Provider (CSP) organisations. Most of the Telecom Industry executives as well as experts agree that the Telecom Service Providers (CSPs) need to focus in bringing this culture.

**- Threat of product substitution** : Product substitution is a real threat for the current Telecom Service Providers (CSPs). The telecom industry model has remained unchanged for the past 3 to 4 decades, The view from executives in telecom industry was that there are multiple technologies which are becoming prevalent e.g. WiFi7, satellite broadband, improvements in handset capabilities. These new technologies can create a product substitution threat to the legacy services being offered by the telecom industry.

**- Opportunities through leveraging latest technologies :** Senior executives in Telecom Industry agree that with advancement of technology there are significant opportunities which are opening up in the market for Telecom Service Providers (CSPs). Blockchain for 'Identity management Service'. Internet of things (IOT) for lifestyle improvement offerings like e-health services, home automation, vehicle management services etc. In the enterprise segment IoT technologies would enable industrial automation. Cloud technology offers a significant opportunity for edge cloud services.

AI and Digital technologies Telecom Service Providers (CSPs) can offer AI use cases to its enterprise customers and help them to build organisational efficiencies e.g. AI led visual inspection of precision engineering products. Industry partnerships can generate new revenue lines for the Telecom Service Providers (CSPs). E.g. offering Microsoft 365, google suit for small medium enterprises along with the connectivity services.

**- Understanding of future demands** – view form the executives in Telecom Industry is that the Telecom Service Providers (CSPs) do not put sufficient focus and efforts to

understand what would be the needs and demands of its customers 3 to 5 years in the future. They rely on 3rd party market research reports from agencies like Gartner. The Telecom Service Provider (CSP)itself has a direct access to millions of subscribers, it would be beneficial if the Telecom Service Provider (CSP)start to engage with its customer base directly to understand their demands in the future and prepare for solution to cater for the same. The executives working in the telecom industry gave few views from their own experiences on what could be the potential demands of the retail and enterprise customers in the future. Some examples sighted are bundling mobile and fixed broadband plans, bolt on bundles like content streaming, gaming, sports pack etc, enabling one stop shop for all services for the retail customers, m-commerce play etc. For the enterprise customers the suggestions are bundling FttX ( fiber to office ), MPLS, SDWAN, Leased line services into a bundled offering there by creating a one stop shop approach for the enterprise customers. Building industry partnerships e.g. gaming industry, e-health, telemedicine, micro lending, EV charging etc. Building Ecosystem - Main themes indicated were. 1. Cloud Ecosystem play, 2.Startup Ecosystem Play 3. IoT or internet of things platform play, 4. AI led digital offerings e.g. health and fitness alerts, location-based identity verification etc.

### 5.3 Summary of the Insights from Survey and feedback from Executives

It is important to take a holistic view from the insights collected through surveys to understand opportunities for diversification for the Telecom Service Providers (CSPs), as well as the constraints withing which it needs to operate.

As stated earlier we had three sources from where the inputs and opinions were secured

1. Inputs from the retail segment users of the telecom services
2. Inputs from enterprise segment customers of the telecom services
3. Inputs from senior executives associated with the telecom industry

Figure below shows the approach taken to combine the inputs from the 3 sources to build a 360 degree view of the business environment of the Telecom Service providers.

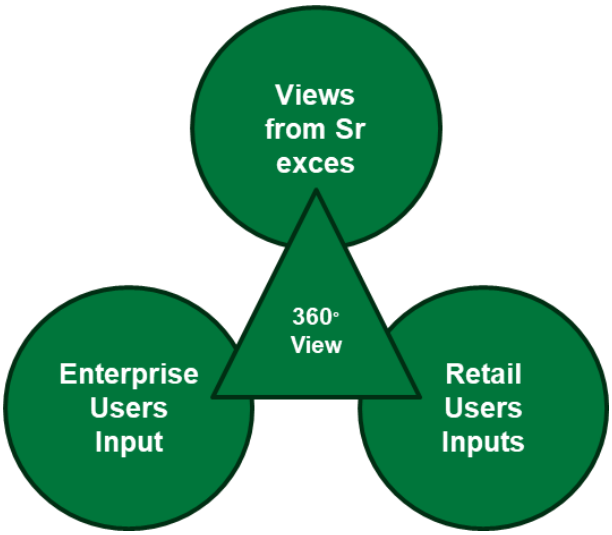



*Figure 32: Combining the Feedback from surveys*

Following is a summary of the combined view from the 3 sources. There are 20 key observations which are key to note and these also give directional suggestions on what are the areas of transformation on which the Telecom Service Providers should focus upon in the near-term, mid-term and long-term, to regain the path of profitable growth.

**Key Insights from retail users survey :**

1. Consumption of Telecom Services : Majorly driven by **young population** in age group of 25 to 35 years
2. **Middle class income** segment is generating maximum usage and revenue
3. There is **no brand differentiation** in the retail market segment
4. It is possible to generate incremental revenues by offering targeted **digital value-added services**
5. **User profiling** is key to offer targeted services to suite lifestyles of different ages
6. CSPs need to understand importance of **Service Experience**

7. Retail consumers would like to see **new digital services** from CSPs like M commence, preventive healthcare, local media content, cybersecurity, Identity management, AI in lifestyles

**Key Insights from enterprise customers survey :**

8. **Customer Loyalty is low** : Smaller and medium size enterprises tends to stay longer with a CSP as compared to larger enterprises
9. **Slow uptake for new services** : At present 5 types of services are popular - mobile data plans, SIP trunks, leased lines, Fiber (FttX), New services like managed WiFi, IoT, MPLS and VPN has slow uptake.
10. **Customer satisfaction needs focus** : Small and medium size enterprises are more satisfied as compared to larger enterprises who demand new innovative services from CSP
11. Enterprises demand high focus on **quality of service**. Larger enterprises are less satisfied with the QoS as compared to small and medium enterprises.
12. **Product simplification** : Enterprise customers want simplified offerings which can be availed through self service portal.
13. **Focus on innovation** : Enterprise customers demand new innovative services in areas like digital trust, data management, cloud and AI.

**Key insights through discussion with senior executives in Telecom Industry:**

14. **Change in revenue mix is expected** : currently 80% retail and 20% enterprise in 8 to 10 years it would be 20% retail & 80% enterprise
15. **Value added services are important** source of highly profitable revenues, & need more focus

16. **Profits are under severe pressure and mitigation is only possible by new innovative services**. Existing services are unlikely to improve revenue and profitability, ecosystem, plays are key

17. **Potential areas for diversification** : Data Centers, Pvt NW, IoT as a service, secure SD-WAN, NW slicing, Identity management, games, localised content, Ecommerce, E health, EV charging, insurance settlement services, smart meters & home automation

18. **Constraints for CSPs** to be kept in mind while diversification: Regulatory & license conditions, data privacy, localisation, ESG,

19. Organisational capabilities : **Re-skilling of workforce** is required for developing and managing new offerings is important.

20. There are some substitutional **threats but also new opportunities** through leveraging the latest technologies.

It is clear that not everything from above insights can be acted upon simultaneously by any of the Telecom Service Provider and in fact the users also gave inputs around which are immediate focus areas, and which are mid-term, and which are long-term. This gives us an idea on what initiatives can be taken immediately by the Telecom Service Providers and how progressive steps can be structured to secure the new and profitable revenue sources.

### 5.4 Focus areas in near-term, mid-term, long-term for Telecom Service Providers

In the figure below summarises the focus areas for the Telecom Service Providers (CSPs) in the near-term, mid-term and long-term future. The key areas identified are directly based on the combination of the feedback and insights received from the retail users, enterprise customers and the senior executives associated with the industry.

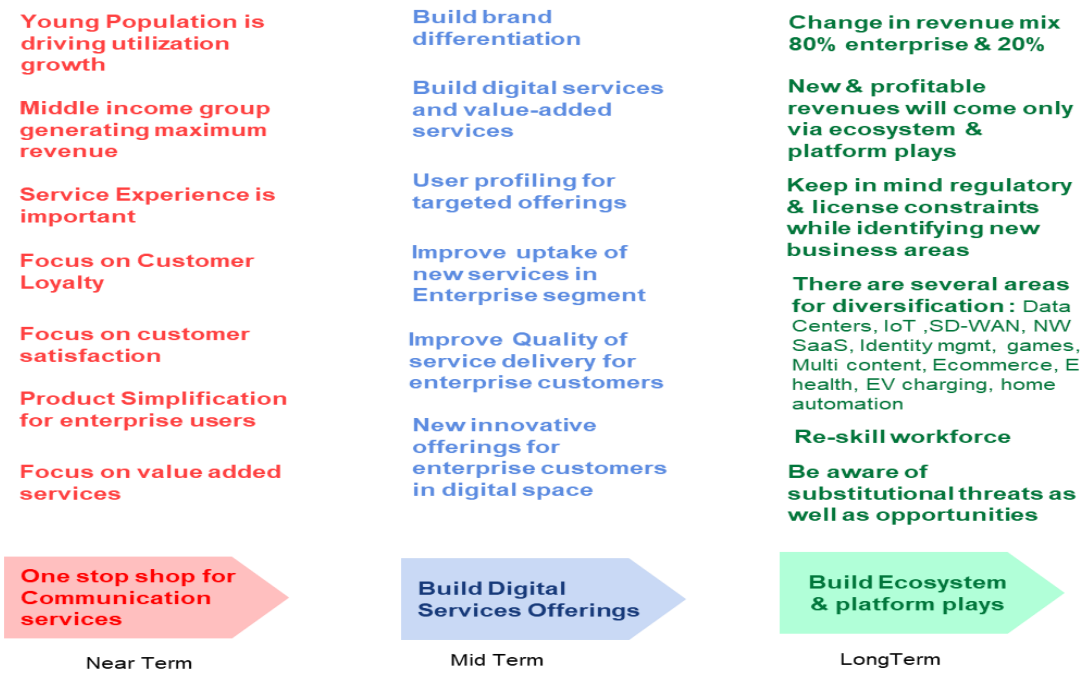



*Figure 33: Combining the Feedback from surveys*

The red marked areas are the suggestions from the insights drawn, from the surveys of the retail users, enterprise customers and inputs from executives associated with the Telecom industry, where the Telecom Service Providers (CSPs) can focus immediately, i.e. in the coming 1 to 2 years . These are incremental improvements in the existing business lines to improve the revenues in near future. However, just focusing on these areas, will not improve the business valuation for the Telecom Service Providers in the long run. These immediate focus areas may help to stabilise the operations and maintain quarter on quarter modest revenue growth through better positioning of the existing services as well as through intelligent bundling, help the Telecom Service Providers to become a one stop shop for all the communication needs of the end consumers.

The blue marked areas are the suggestions from the insights drawn, from the surveys of the retail users, enterprise customers and inputs from executives associated with the Telecom industry, where the Telecom Service Providers (CSPs) can focus in mid-term i.e. in the 2 to 3 year timeframe. Here, the suggested way forward is to bring new services

in the digital domains to create new revenue streams and build new lines of businesses which are highly profitable going forward. This, coupled with the suggestions in stage 1 will enable the Telecom Service Providers (CSPs) to bring back revenue as well as profitable growth. However, at this stage, while the revenue and profitability may show upward curve, however the market valuation will only go up to a certain extent in proportion to the profitability growth and the amount of dividend that the Telecom Service Providers (CSPs) are able to shell out to the shareholders. The market will still continue to value Telecom Service Providers (CSPs) in line with traditional utility industries. For the inorganic growth in the market valuation and to regain the position in the overall ecosystem, the Telecom Service Providers (CSPs) will have to demonstrate the value through the innovation in their business model.

The blue marked areas are the suggestions from the insights drawn, from the surveys of the retail users, enterprise customers and inputs from executives associated with the Telecom industry, where the Telecom Service Providers (CSPs) can focus in long-term i.e. in the 3 to 5 year timeframe. Here, the suggested way forward is to get into a platform play, where an ecosystem of industry players can come together to create a unique value to tap into latent demand through innovative services which did not exist in the past. There are several areas proposed for diversification where the collaboration with other industry players can generate new and highly profitable annuity based predictable revenue streams. Some of the suggestions include : Data Centers, IoT ,SD-WAN, NW SaaS, Identity mgmt, games, Multi content, Ecommerce, E health, EV charging, home automation etc.

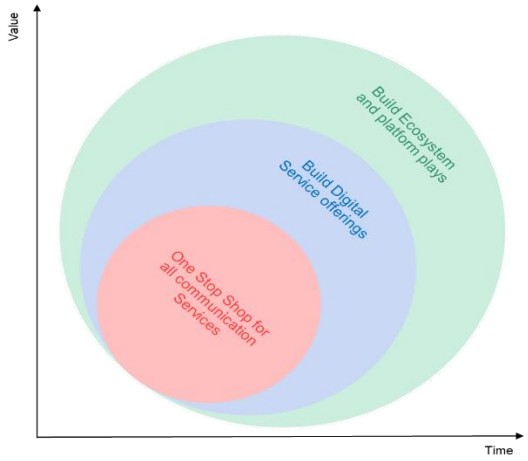



*Figure 34: Near-Term, Mid-Term and Long-Term focus areas*

# CHAPTER VI:

# RECOMMENDATIONS AND CONCLUSION

## 6.1 Summary

In the chapter V we discussed on the key findings from the surveys conducted for retail and enterprise users of the telecom consumers, as well as the views gathered from the senior executives associated with the Telecom Induutry. The objective behind taking this three proned approach was to gather a comprtehensive view of the current state of the industry and build a view on the best possible way forwrad for the Telecom Service Providers (CSPs) to regain the path of profitable growth and improve shareholder value.

Survey data from the retail users of the teleccom services showed that in the current state, the consumers in retail sector view telecom services as a mere utility given there is no brand or service differensiation being provided by the existing Telecom Services providers operating in the market. The survey results also showed that there is willingness to consume new innovative services and the users of these services are also willing to pay a premium for the consumption of the service, provided they see value that the service will deliver, either to enhance their day to day life or provide lifestyle comfort.

Survey data from enterprise customers of the telecom services showed a slightly different view. Here we saw that there is some differentiation being supported by the Telecom Service Providers (CSPs) in service delivery, packaged offerings as well as building brand loyalty through differentiation in the service delivery. The feedback from the enterprise customers also showed that there is significant room for improvements when it comes to providing customised services especially in large enterprise customers. The view from the enterpise customers also emphasised upon making the services offerings simple to consume through a self service model. Like retail users, enterprise customers also

indicated willingness to pay a premium for a service which will help them to enhance their business operation and improve overall efficiency.

Senior executives associated with the industry indicated their views on the current state of the industry, the substational threats, as well as new opportunities that the Telecom Service Providers (CSPs) can capture by leveraging latest technologis. They also indicated the ideas on new services that the Telecom Service Providers (CSPs) can offer to retail as well as enterprise users. Most importantly the experts in the industry also indicated ideas on industry partnerships and ecosystem plays.

### 6.2 Recommendations for the Telecom Service Providers (CSPs)

In chapter 3 we briefly discussed the porters 5 forces model for the telecom Industry and expected balance of the forces. Now with the insights from the survey and interaction with senior executives in the Telecom Industry it will be appropriate to re-apply porters 5 forces model based in the groundup data, before making our recommendation to the Telecom Service Provieders.

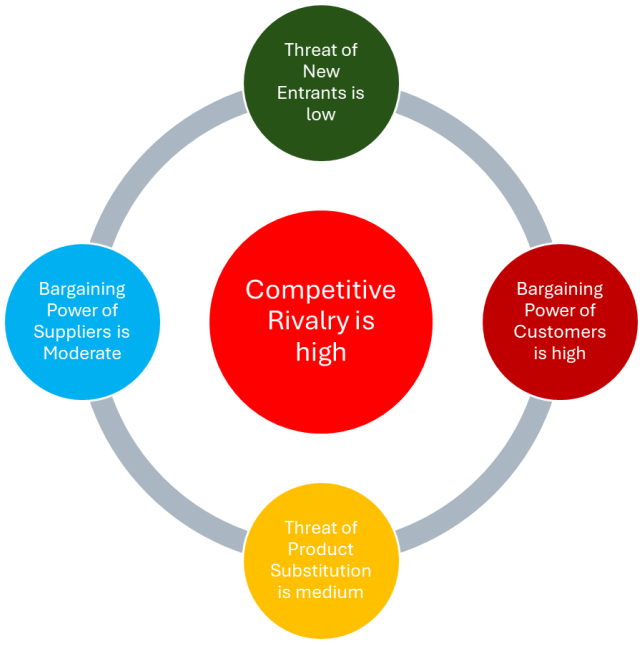



*Figure 35: Michael Porters 5 forces model to understand market dynamics*

**Threat of new entrants :** Telecom Services is highly regulated industry. All the Telecom Service Providers (CSPs) in the market must have a license to operate and also radio spectrum to operate mobile broadband networks. This provides natural entry barrier to new entrants in the market. So threat of new entrants in the market offering same services is relatively low.

**Threat of product substitution :** Many senior executives working or assocaited with Telecom industry has indicated that there are new technologies like satellite broadband and private networks and WiFi 7 etc which could proviide threats to the business model of Telecom Service Providers (CSPs) for mobile broadband networks. Threat of product substitution for Telecom Service Providers (CSPs) is medium.

**Bargaining power customers :** Retail as well as Enterprise customers indicated during the survey, the importance of the competative pricing. In todays market the telecom services are being viewed as utility commodity by the consumers. The consumers can shift between the Telecom Service Providers (CSPs) easily, hence the bargaining power of the customers is very high.

**Bargaining power of the suppliers :** Multinationals like Nokia, Ericsson, Huawel etc are main suppliers to most of the Telecom Service Providers (CSPs). There has been a lot of consolidation amongst the suplliers of telecom network equiments in the recent past, however the bargaining power of these telecom equipment suppliers remain moderate.

**Rivalry amongst market players :** Even though there are limited players in the market when it comes to the Telecom Services Providers which are licensed to operate in the country, the competition amongst the players remains very high. The telecom services market is exteremly price sensetive since there is no brand or product differensiation which was the observation from the survey.

Considering the insights from the survey and analysis of the inputs from the consurmes as well as senior professionals associated with the telecom industry following recommendations may be considered for building new and profitable revenue streams for

the Telecom Service Providers (CSPs) which will enable them to return to the path of profitable growth.

**The Telecom Services Providers need to evolve their businesses from just merely being a communications service provider to digital services enabler and eventually become a digital service enaber.**

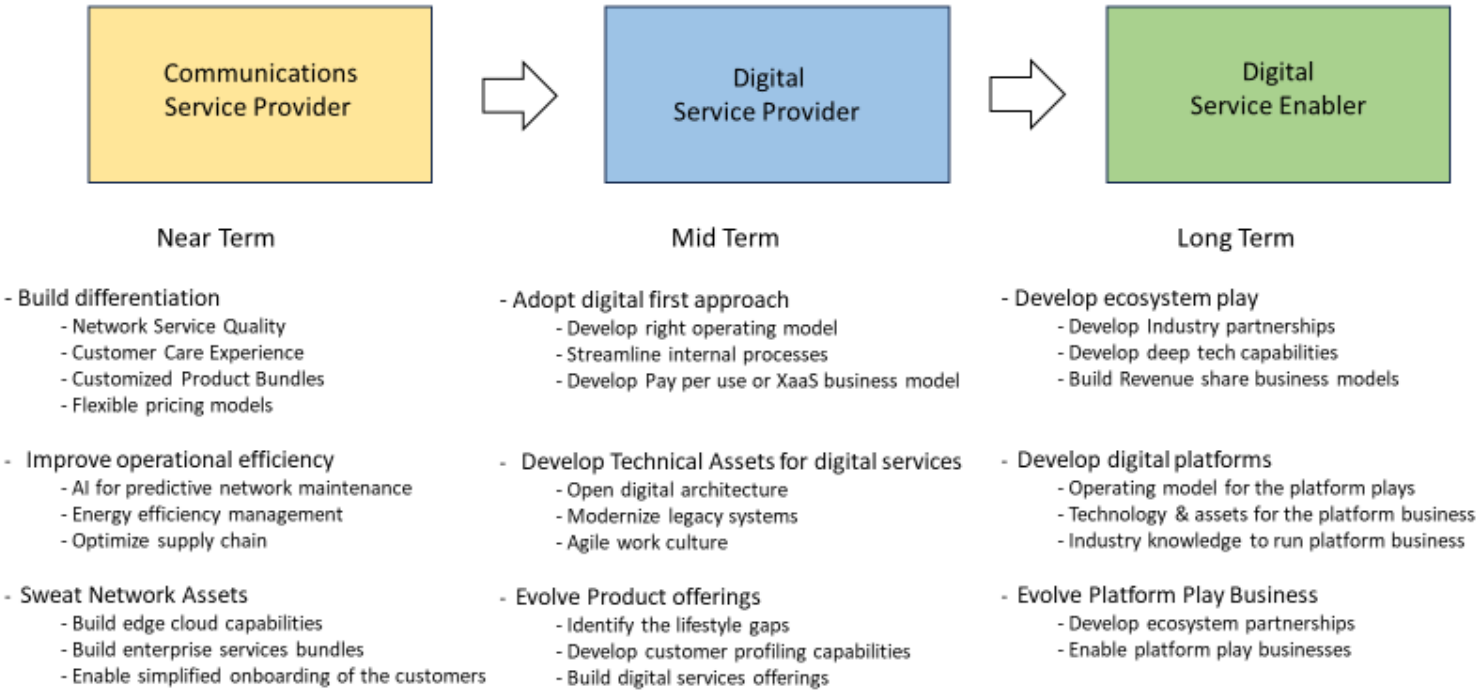



*Figure 36: Recommended path for evolution of Telecom Service Provider*

**Communications service provider :** In the near term i.e. in the coming 1 to 2 years, the Telecom Service Providers (CSPs) need to look at undertaking tactical initiatives to improve profitability and evolve towards becoming a **complete communication service provider**. This may not bring in substantial shift in the profitability however it should certainly help the Telecom Service Providers (CSPs) to reduce leverage and free up cash to inject in to business to build transformative initiatives to evolve in to new business model

which is significantly more profitable and more valuable to the industry analysts and investors. In the near term the Telecom Service Providers (CSPs) can focus on three main initiatives to improve profitability.

1. **Build differensiation** : Consistent feedback from the users of telecom services as well as the senior executives associated with the telecom industry is that there is no differensiation amongst the Telecom Service Providers (CSPs) thereby it has just boiled down to pricing to attract and retain users. Industry analysts and investors also view Telecom Service Providers (CSPs) as mere utility players. This has resulted in exteremly price sensetive market which is generating pressure on the profitability of the Telecom Service Providers (CSPs). Hence it is in interest of the Telecom Service Providers (CSPs) to build a market differensiation to be able to charge premium on some of the services. To do that some of the suggestions on way forward could be as follows. **a. Network Service Quality** : Telecom Service Providers (CSPs) can build differensiation through improvised network experience. There are AI led tools to predict and prevent network outages and improve network service quality. Self organising network ( SON ) is widely recognised for its abality to improve and manage network resources in an intelligent mannor. Latest offerings from network equipment vendors like Nokia and Ericsson has artificial intelligence features built in to the SON solution which can help to improve network service quality significantly. Adopting digital channels for field work force management can significantly improve the effictiveness of filed force to tackle and resolve network faults faster and bettter and also reduce the travel time and cost. **b, Customer care experience :** There is little or no innovation or any effort to improve customer experience in the call centers that has happened in Telecom Service Providers (CSPs) in the past few years. Most of the customer engamennt in the Telecom call center is reactive in nature. Survey results from enterprise customers show the importance of self care and proactive care which can help Telecom Service Providers (CSPs) to buid substantial market differensiation. Telecom Service Providers (CSPs) can take learnings from fintech industries like insurance service providers, banks and ecommerce players who proactively reach out

to the customers which ensures loyalty and extended spend. **c. Customised product offerings** : The feedback from retail as well as enterprise users of the telecom services has given feeback about getting customised product offerings to suit their lifestyle and business needs. Telecom Service Providers (CSPs) can get lot of insights on their customers by analysing the bill patterns, movements, terminals being used by the subscribers as well as other lifestyle trends like visits to shopping centers, holidays, international trips etc. All these insights can be used to build customised offerings for the customers. These customised offerings aligned to the lifestyle of the users will create market differensiation and help with improved customer loyalty. **d. Flexible pricing models** : This is especially relavent for the enterprise customers where there is a clear feedback that one standard pricing model may not work with all customers. While the large enterprise customers may prtefer one bundle with everything included ( i.e. all you can eat pricing ) but medium and smaller size enterprises may be more cost conscious and would like to have flexibility to pay what they use. So flexible pricing is another way to create market differensiation and focus on certain market segmenyt to grow profitable revenues.

2. **Improve operational efficiency** : operational expenditure (Opex) required to run network and business operation is a cost major for any Telecom Service Provider (CSP)and hence it is important to understand and manage operational activities which are major cost drivers. **a. Network maintenance** : One of the major operational cost is the cost of network maintenance. Telecom networks are spread across every corner of the country, managing such a large network infrastructure requires significant cost. Latest AI based tools can help to reduce network operations cost by doing proactive network maintenance rather than reactive network maintenenace which is the present practice. **b. Improved energy efficiency** : Energy cost is another major area to look into. Telecom Service Providers (CSPs) take electric supply from the national grid and in some cases they also have DG sets to run the network. Optisation of this energy costs for network operations is possible by intelligent use of network resources, which is possible with the latest solutions from network equipment vendors. The Telecom

Service Providers (CSPs) should also consider use of renewable energy sources like wind and solar electricity to optimise network operations realated costs. **c. Optimising supply chain :** Supply chain is also nother area to look into. The Telecom Service Providers (CSPs) engage with multiple vendors to procure network equipments. Optimisation of contracts through standardised contract terms could help the Telecom Service Providers (CSPs) to imrove profitability.

3. **Sweat network assets :** Telecom Service Providers (CSPs) have a vast network which is an asset that allows the delivery of various services across the country. This asset can also be leveraged to deliver additional services besides just being used for providing connectivity services. **a. Edge Cloud Services** : Feedback from the survey shows that the Telecom Service Providers (CSPs) can leverage the core telecom network sites to deploy edge cloud services. **b. Enterprise service bundles :** feedback from executives working in the industry is that then revenue from enterprise segment is likey to grow in the future. Telecom Service Providers (CSPs) can leverage network assets like fiber, cell sites, and network operations center to provide comprehensive service pacakes for the enterprise customers. c. **Simplified onboarding** : The feedback from the enterprise customers, as well as the views expressed by some of the executives associated with the telecom industry was that onboarding of the enterprise customers is an area that needs to be looked in to. Feedback was that as of now it is very complex and requires significant manual interventions. This is not only creating customer dis-satisfaction but it is also slowing down the revenues coming from the enterprise customers.

Interventions in above suggested areas will enable the Telecom Service Provider (CSP)to improve revenues from existing sources as well as make incremental gains in adjecent areas especially with the enterprise segment. These are by and large the areas discovered through the survey and inputs from executives associated with the Teleom Industry. There could be more areas that Telecom Service Providers (CSPs) can explore to build comprehensive service offerings and become a one stop shop for all needs of the consumers for telecom services and evolve towards becoming a complete communication services provider.

**Digital Service Provider :** In the mid term i.e. in 2 to 3 years, the Telecom Service Providers (CSPs) can consider to look for transforming themselves to **become digital service providers**. This means besides just providing just the connectivity services, the Telecom Service Providers (CSPs) will provide new digital services. For reatil users these services can be focusred on catering for latent demands and improving the lifestyle of consumers. For enterprise customers these services can be focused on providing applications and tools required for enterprises to run their business operations. Some examples could be live content streaming, gamimg bundles, m commerce services etc for retail consumers and services such as data center, managed fiber connectivity, managed SD WAN, office collabration application suit for video conferrancing, enterprise email services etc for the customers in enterprise space. Some of the Telecom Service Providers (CSPs) have already taken some steps to evolve in this direction, however the full transformation across the industry is yet to happen. For offering these digital services the Telecom Service Providers (CSPs) will have to look at making transformative changes in their business operations.

1. **Adopt digital first approach :** The internal systems at Telecom Service Providers (CSPs) have evolved over many years but those are primarily focused on running the telecom operations. For offering digital services the Telecom Service Providers (CSPs) will have to make changes in the operating model. **a. Develop right operating model :** The sales channels for digital services would be different to that of traditional telecom services model. Also the underlaying IT and network architecture would also be different as compared to the traditional networks services. There are many industry forums where the operating models for digital service providers are being discussed. One such example is TM Forum where a comprehensive approach to becoming digital service providers for the Telecom Service Providers (CSPs) is being discussed. **b. Internal processes** : Aligning internal processes to the new business needs is critical to success. This is one of the most important factors to workupon, since its not just the designing of the new processes but also the adoption by the enterprise wide work force in the Telecom Service Provider (CSP)Organisation that is key. **c. Develop pay per**

**use or XaaS model :** Digital services charging models are significantly different to that of telecom services. When it comes to enterprise customers xaaS model can enable faster uptake of the services as indicated by many small enterprise customers. In the retail space, digital offerings related services can be offered as prepaid or add on post paid services on pay per use basis. The Telecom Service Providers (CSPs) will have to assess the type of digital services they are looking to offer and how can they develop appropriate charging model to secure fast uptake.

2. **Develop Technical Assets for delivering digital services :** Telecom Services Providers have huge network assets which are designed and evolved over the years to provide telecom services, For providing digital services they will need a different kind of knowhow and assets in the enterprise. There will have to be a conserted and deliberate effort to develop these assets. Feeback from senior executives associated with telecom industry is that the Telecom Service Providers (CSPs) have limited skill set beyond managing telecom oeprations and hence this becomes an area of deep focus. **a. Open digital architecture :** This framework is suggested by leading industry bodies like TM Forum for Telecom Operators to consider, when they are looking at launching new age digital services. This framework consists of system layer and a canvas layer. The system layer is typically a hyperscaler like google cloud or AWS or Microsoft cloud or it can also be operators own private cloud. The canvas layer enables software defined buleprint for cloud native operating envroinment for enabling independently deployable cloud native applications which are based on microservices architecture and integrated using open API framework. **b. Modernise legacy systems** : Bringing the through leadership through industry specified approach like open digital architecture is essential however in order to enable that on the ground, many legacy systems will have to be modernised. As said earlier the backend IT systems in Telecom Service Proviedrs have evolved over decades but those are customised to support delivery of the Telecom Services, when Telecom Service Providers (CSPs) will look to provide digital services, many of those systems will have to be modernised. **c. Develop Agile work culture** : This aspect is not retaled to technology, rather this is related to human behaviour. The

projects in telecom networks are traditionally for large multi year projects. Most of the projects are designed to deliver on a waterfall model. So the people working in telecom environment are used to work in a wanterfall project models and they are exteremly good it it, however developing and delivering digital services requires a different agile delivery approach where instead of sticking to the initial project delivery design, the team needs to be ready to pivot and make changes on the go in order to respond to the business needs and build what is required quickly, rather than getting stuck with following what was envisaged during the initial project design. This requires not only the skill set but also the mindset changes. Top executive sponsorship will be required within the Telecom Service Provider's organisation to drive this culture change at an enterprise level.

3. **Evolve Product Offerings :** The Telecom Service Providers (CSPs) should look at evolving new offerings in the digital space to their retail as well as enterprise customers. These offerings can be taken to market on a pay per use basis for retail and enterprise customers. During the discussion with executives associated with Telecom industry some sugegstions around new digital services were discussed. These are as follows.

   **a. Customised offerings for enterprise customers** to cater end to end communication need e.g. combining mobile and fixed broadband plans in to a single pack and then offer value added services as bolt on bundles like FttX ( fiber to office ), MPLS, SDWAN, Leased line services, hosted email services, edge cloud service, IoT services etc. **b. Product bundles for retail consumers** which could be for content streaming, gaming, sports pack etc, enabling one stop shop for all services for the retail customers. c. **m-commerce** which includes micro lending and bill payment settlement services.

   These are just some of the examples, Telecom Service Providers (CSPs) have deep insights on their customers data in enterprise as well as retail sectors. This data can be analysed to come up with right set of digital offerings which can be launhed in the market to generate new and profitable revenue streams. Offering these services on XaaS model will also ensure sustained annuity based revenues which will help to build

market differentiation and enhance the valuation for the Telecom Service Providers (CSPs).

**Digital Service Enabler :** In the long term i.e. in 3 to 5 years, the Telecom Service Providers (CSPs) can consider to look for transforming themselves to **become digital service enablers**. The difference between being a digital service provider and digital service enabler is a significant one. The digital service providers look to build a set of digital services and offerings that will help the end customers in improving day to day lifestyle transactions. Whereas the digital enabler works to build a ecosystem and platform for various industry players to come together to collabrate and innovative services to tap in to latent demands and create a completely new set of revenue steams which did not exist earlier. As an example an airlines online booking app can be considered a digital service by the airline to facilitate easier booking and related amendments, webcheckins, meal selection etc. However some one like expedia, or makemytrip is a service enabler platform where it brings multiple ecosystem players to build a complete travel experience for the customer. It includes all forms of travels, trains, buses, taxies, airlines etc, it also includes hotel and restauraints. Simillarly the Telecom Service Providers (CSPs) can play a role to bring together multiple players on a common platform hosted on the existing Telecom Infrastructure to and enable new set of services.

1. **Ecosystem plays** : Journey to from a digital service provider to becoming a digital service enabler is significant. Digital service provider just focuses on providing services through its own digital channels, whereas the digital service enabler builds a platform on which other industry players can build their offerings and then these can be launched in the market. The revenue generated gets distributed amongst the players in the overall ecosystem responsible for delivering the service. Amazon is a good example of the ecosystem play where the buyers, sellers and payment processing is done on a single platform. This generate immense value to the end consumer since it enables instant shopping experience and convenience of receiving the goods at home. For the Telecom Service Providers (CSPs) to become

a digital service enabler and develop ecosystem play along with other industry players, they will have to focus on three key areas. **a. Develop Industry Partnerships :** Telecom Service Providers (CSPs) are offering the connectivity services since many, through these offerings they have gathered direct customer connects with millions of users in retail and enterprise segment. This direct customer connect is a great asset which Telecom Service Providers (CSPs) can leverage to engage and create a pull with other industry players who needs market access. Through the market access the Telecom Service Providers (CSPs) can take new offerings in collabration with other industry players into the market. The netwrk infrastructure can be agumented to provide the technology to enable service delivery. Telecom Service Providers (CSPs) will have to make conserted efforts to reachout to other players in the industry to build ecosystem plays. **b. Develop deep tech capabilities** : Telecom Service Providers (CSPs) have good skills in the networking technologies since they manage large scale networks, however developing ecosystem platforms needs a different kind IT and network architecture, besides this, it also needs a different kind of manpower skill sets in the organisation. In order to develop and support ecosystem plays the Telecom Service Providers (CSPs) will have to put focused efforts in building organisational capabilities, in architectural readiness and manpower skills. **c. Build Revenue share models** : developing platform plays requires sharinmg of revenue across multiple ecosystem players who is playing a role in delivering value to the end consumer. In order to develop a successful ecosystem based offering in the market the Telecom Service Providers (CSPs) will have to build new business models which enable revenue share. The implementation of this new revenue shared based business models will also need IT and support system readiness which will also have to be taken in to the consideration by the Telecom Services Providers.

2. **Develop digital platforms :** For enabling platform play buisinesses the Telecom Service Providers (CSPs) will have to put in significant focus on developing digital

platfroms where other ecosystem players can come in and host their offerings. There were some good suggestions given by the executives working in the Telecom Industry in the areas of cloud ecosystems, building ecosystem play for startups to host their application workloads and also secure the market access, IoT or internet of things end to end platforms, AI led digital offerings e.g. health and fitness alerts, location based identity verification etc. **a. Operating model for the platform plays :** In order to enable and manage the platform play business, the Telecom Service Providers (CSPs) will have to evolve their existing operating model. This will involve setting up new departments, identifying processes and controls, developing new key performance indicators (KPIs) and financial reporting systems. Developing this operating model may need support from external consultants since the Telecom Service Providers (CSPs) may not have all the necessary skills and knowhow internally within their own organisation. It is important to adopt best industry practices while developing the operating model for the platform play business. **b. Technology Assets for the platform :** As stated earlier the present day assets technologies and assets available with the Telecom Service Providers (CSPs) are mainly developed for supporting a large scale telecom network. These assets have matured over a period of time however these are only one dimensional which is for supporting telecom network operations. However when it comes to building the platform play businesses the set of assets required are significantly different. Knowledge of cloud native applications, API economy and big data analytics and AI are critical technology components for developing a platform play business. The Telecom Service Provieders will have to put in deliberate and focused efforts as well as resources to develop these assets. **c. Industry knowledge to run platform business :** Telecom Service Providers (CSPs) have deep experties in managing telecom networks and network based businesses in retail as well as enterprise space. The management skills in Telecom Service Providers (CSPs) are honed up in one dimension which is to run the telecom business, however developing platform play businesses require multidimensional experties which not

only covers technologies but more importantly also the industry knowledge. For example if a Telecom Service Provider (CSP)is trying to develop ecosystem play business with gaming industry then it will need to have some industry knowledge from gaming industry. How does it operates, what are the revenue and cost drivers, where is the demand and what are the growth areas, what are the kinds of partnerships which can be established with players in the gaming industrty and so on. So an understanding of industry sectors where partnerships are envisaged is required. Telecom Services Providers may need to invest and bring on board requisite industry expertise through senior executives associated with various industries.

3. **Evolve Platfrom Play business :** Contineous and sustained focus on innovation is critical to maintain market differensiation and stay ahead of the curve in platform based business. Competition is very quick to adopt and the first mover advantage is only for limited time. Quite often the fast second becomes the largest player in the market. Telecom Service Provider (CSP)organisation has been engaged in one dimensional business which is to maintain telecom networks and run connectivity busines, hence the Telecom Service Providers (CSPs) will have to adopt new ways of working to foster the culture of contineous innovation. Apart from leveraging latest that technology has to offer the Telecom Service Providers (CSPs) will also need to focus on building industry partnerships and enable platform play business at scale **a. Developing Ecosystem Partnertships :** Developing a platfrom play business at scale will require participation from multiple players in the industry. E.g. if the Telecom Service Provider (CSP)is considering to build a gaming platform business then it will require participation from multiple game developers, advertisers who would like to push advertisements in terms of captions on the gaming screens, handset & accessories manufacturers who can develop right set of device capabilities to enable immersive gaming experience and payment gateways for enabling charging mechanism. All these industry players will have to be brought

together on a common platform where the Service Service Provider can enable the offering to the end consumer. This end consumer reach is the mopst critical part where the Telecom Service Providers (CSPs) will play a pivotal role. But without active participation from other industry players the Telecom Service Provioder alone can not enable this busienss, so proactively developing the industry partnerships is critical for successful scaling up of the platform play business. **b. Enabling and scaling platform play business** : Enabling platform play business requires technical as well as cross industry knowledge, abality to pull in other industryu players and also providing market access to a large audience or potential customer base. Moreover establishing platform play business is not just a one time activity. Telecom Service Providers (CSPs) will have to make investments in enabling resourecs and ensure contineous management support to maintain market differensiation and leadership.

### 6.3 Conclusion

Looking at the feedback received from the retail as well as enterprise customers and also taking in to account the insights from the executives associated with the Telecom Industry, the conclusion through this research is that the Telecom Service Providers (CSPs) will have to evolve themselves from being just the enablers of communication services to enablers of digital services. This journey will require taking step by step initiatives for building right organisational capabilities, operating model and industry collabration.

To start with the Telecom Service Providers (CSPs) will have to focus on taking steps to build a. Market Differensiation, b. Improve Operational Effociency and c. Sweat the Network Assets further. This will enable the Telecom Service Provider (CSP)to improve revenues from existing sources and become a one stop shop for all needs of the consumers for telecom services and evolve towards becoming a complete communication services provider.

Second step could be to evolve from being a communications service provider to a digital service provider. This will require focused efforts to build new organisational capabilities. Key focus areas would be a. Adopt digital first approach in developing operating model, streamlining internal processes and developing XaaS business model. b. Build technical assets to deliver digital services by adopting industry standard network & IT architectures  e.g. Open digital architecture from TMforum, modernising internal systems and developing agile work culture. c. Evolve product offerings to create digital services for the retail as well as enterprise customers.

Eventually the Telecom Service Providers (CSPs) should terget to become digital service enabers. Evolving from a digital service provider to digital service enabler requires significant change in the market outlook. A digital service provider just focuses on providing services through its own digital channels, whereas the digital service enabler builds a platform on which other industry players can build their offerings and then these can be launched in the market. To become a digital service enabler the Telecom Service Provider (CSP)will have to focus on, a. Developing ecosystem play by involving various players across the industry, b, Developing Digital Palforms for bringing various industry players to gether on a common platform to create a end user service, and c. Contineous focus on the market to germinate new ideas and evolve the platform play businesses.

The three step approach proposed here may provide a comprehensive path for the Telecom Service Providers (CSPs) to reinvent themselves and regain the path of profitable growth. By bringing the innovation and platyform play businesses the Telecom Service Providers (CSPs) business valuation may also improve substantially.

## 6.4 Recommendations for Future Research

This research was aimed at suggesting an overall evolution framework for the Telecom Services Proviedrs to evolve their busineses in the future and improve profitability and market valuation.

By trensformating from the current position of communication service provider to a digital service provider and eventually becoming the digital service enabler, the telecom players can also add better value to the socienty at large. Within the suggested framework in this research there could be specific areas where further research could be undertaken. For example this research gives recommendation on what the Telecom Service Proverders should do, there could be further research possibilities on individual topics about how the Telecom Service Providers (CSPs) should go about developing the organisational capabilities, developing platform play businesses and what approach could be appropriare to build industry collabration to enable ecosystem for platform play businesses. Areas like, what are the key financial KPI that needs to be monitored in a platform play business and how to evolve the internal network systems at Telecom Service Providers (CSPs) for may be explored.

APPENDIX A
SURVEY COVER LETTER

Dear Sir / Madam;

I am researching for my Doctorate in Business Administration on identification of of opportunities for diversification for Telecom Service Provider (CSPs) for new revenue sources and its impact on the profitability of the business . I am reaching out to you to secure your views which will be a valuable input to understand the areas which Telecom Service Providers (CSPs) can consider in developing their business in the future.

This study's findings have the potential to influence the product offerings by Telecom Service Providers (CSPs) in the upcoming times as well as transforming their business to regain profitable growth .

The survey is anonymous and does not collect your email even if you are signed in. The sign-in helps to save the form input so you could continue later. In case you would like a copy of the research once its published, only then you can specify your email in the last section.

This questionnaire will take 15-20 minutes of your time. For any further information, please feel free to reach out to me via LinkedIn or on my following email.

I look forward to your input!

Thank you,

Abhijit Atale

abhijit.atale@gmail.com

APPENDIX B

SURVEY QUESTIONNAIRE FOR RETAIL CONSUMERS

**Research Survey Questionnaire for Retail and Enterprise consumers of Telecom Services**

**User Survey Part 1 : Survey for retail customers of telecom services :**

**Introduction :**

Thank you for participating in my survey. The objective of this survey is to understand consumer demands from telecom services providers today as well as in the future. Your feedback is invaluable in helping me to complete my research in pursuit of my DBA degree.

**Demographic Information:**

Age:

Gender:

Occupation:

Monthly income

**Current Telecom Services:**

Which telecom provider are you currently subscribed to and what are the services you subscribe to ?

Name of the service provider :

List top 5 services you use :

How satisfied are you with their service?

(Scale: Very Satisfied, Satisfied, Neutral, Dissatisfied, Very Dissatisfied)

**Usage Patterns:**

1. How often do you use your mobile phone for calls?

Rarely

Occasionally

Frequently

Very frequently

2. How often do you use mobile data:

Rarely

Occasionally

Frequently

Very frequently

3. How often do you use text messaging (SMS)?

Rarely

Occasionally

Frequently

Very frequently

**Service Preferences:**

What features do you value the most in a telecom service? (Select all that apply)

Affordability

Network coverage

Data speed

Customer service

International calling options

Data usage tracking

Other (please specify):

How important is it for you to have bundled services (e.g., TV, internet, phone)?

Not important at all

Slightly important

Moderately important

Very important

**Future Needs:**

Are there any additional services or features you would like to see in your telecom provider's offerings?

Would you be interested in switching to a new telecom provider if it offered better rates or service quality?

**Feedback:**

Do you have any additional comments or feedback regarding your current telecom service or the telecom industry in general?

APPENDIX C

SURVEY QUESTIONNAIRE FOR ENTERPRISE CONSUMERS

**User Survey Part 2 : Survey for enterprise customers of telecom services :**

**Introduction :**

Thank you for participating in my survey. The objective of this survey is to understand consumer demands from telecom services providers today as well as in the future.Your feedback is invaluable in helping me to complete my research in pursuit of my DBA degree.

**Customer Information :**

1. Company Information:

   Company Name:

   Industry:

   Number of Employees:

**Usage Patterns:**

1. Current telecom services which you are availing from your Telecom Service Provider (CSP): Specify top 5

2. How long have you been with this provider?

   Specify approx. number of years

3. Overall satisfaction with the current provider

scale: 1-5, 1 being very unsatisfied and 5 being very satisfied

**Service Preferences:**

1. Services Utilized: Please indicate which services your company currently utilizes from your telecom provider:

Voice (e.g., landline, VoIP)

Internet (e.g., broadband, fiber optic)

Mobile (e.g., cellular plans, data plans)

Cloud-based services (e.g., hosting, storage)

Other (please specify):

2. Service Quality:

Rate the reliability of your current telecom services

scale: 1-5, 1 being very unreliable and 5 being very reliable

Rate the quality of customer support received from your provider

scale: 1-5, 1 being very poor and 5 being excellent

**Needs and Expectations:**

a. What are the most critical aspects you consider when selecting a telecom provider for your enterprise?

b. What improvements or additional services would you like to see from your current provider?

**Future Considerations:**

a. Are there any additional services or features you would like to see in your telecom provider's offerings?

b. Would you be interested in switching to a new telecom provider if it offered better rates or service quality?

**Feedback:**

Any additional comments or suggestions you would like to share ?

**Other Information (Optional)**

Your Position/Role:

Length of time in your current role:

Location of your company

APPENDIX D

TOPICS COVERED WITH TELECOM INDUSTRY LEADERS

**Questions and Topics to be covered in conversation with Telecom Industry Leaders**

1. Can you please give me a background about yourself, your company and your current role and responsibilities ?
2. What are key offerings from Telecom Service Providers (CSPs) today, which are most popular according to you ?
3. Who are the target customers and how Telecom Service Providers (CSPs) are positioning their offerings?
4. What are the offerings which are major revenue drivers for Telecom Service Providers (CSPs) Today ?
5. What are the offerings which are major profit drivers for Telecom Service Providers (CSPs) today ?
6. If you are from a Telecom Service Provider (CSP), how has been the financial performance of your organisation in the last 3 years and where do you think are potential areas for improvement ?
7. What according to you are some of the key challenges for Telecom Service Provider (CSP) business today ?
8. What according to you would be the challenges for building a profitable and growing business in the future for Telecom Service Providers (CSPs) ?
9. What are some of the assets ( e.g. Network, market access etc ) which you think has the potential to generate new or incremental revenue streams for Telecom Service Providers (CSPs) ?

10. What are new business lines which you think Telecom Service Providers (CSPs) can focus in the future?
11. What are some of the constraints accoring to you ( e.g. licensing conditions, local regulations, market limitations etc ) which are there for Telecom Service Providers (CSPs), preventing it from fully exploring possibilities for diversification and generating new revenue lines ?
12. Whar are some of the organisational strengths as well as limitations for a Telecom Service Providers (CSPs)when it looks for diversification of its business and venture in to new business ares or revenue lines ?
13. What according to you would be the major threats to Telecom Service Providers (CSPs) business in the future?
14. What trends in new technologies ( e.g Gen AI etc ) which you think would help Telecom CSPs to improve its business valuation in the future ?
15. What according to you would be the retail and enterprise customer demands from Telecom Service Providers (CSPs) in the futurte ?
16. What are the ecosystem partnerships that Telcom Service Providers (CSPs) can enter in to the future where they can leverage their existing market presence to diversify in to new and profitable business lines ?

## APPENDIX E

## INFORMED CONSENT

The following consent was taken for the Research on a "A proposed Model To Generate New Revene Streams for Telecommunications Customer Service Providers (CSP) By Leveraging The Existing Infrastructure And Market Reach" from all participants who participated in the survey.

Dear Participant,

You are being invited to participate in a research study titled "A proposed Model To Generate New Revene Streams for Telecom Customer Service Providers (CSP) By Leveraging The Existing Infrastructure And Market Reach". The primary objective of this research is to empirically investigate the possibilities of diversification for Telecom Service Providers (CSPs) to generate new revenue lines which are profitable, thereby enabling profitable growth in the future. This study's findings have the potential to influence the strategies of Telecom Service Providers (CSPs) in the future.

Your participation in this study providing your expert insights is highly appreciated. Please take the time to read this consent form carefully before deciding whether or not to participate in the study. If you have any questions or concerns, you may contact the researcher using the contact information given below.

Procedures: If you agree to participate in this study, you will be asked to:

1. Provide demographic information (such as age, gender, and occupation).
2. Answer a series of questions related to your experiences and opinions regarding Telecom services you consume or provide.
3. Share any relevant personal experiences, if ans where applicable.

Risks and Benefits: There are minimal risks associated with participating in this study. Some questions may touch upon your personal preferences, however your replies would be completely kept anonymous. However, you are not obligated to answer any questions that make you feel uncomfortable, and you have the right to withdraw from the study at any time.

By participating in this study, you may benefit from a greater understanding of the type of services which a Telecom Service Provider (CSP) may be able to rollout in the future, which may be of interest to you in your daily life.

Confidentiality: Your privacy and confidentiality will be strictly protected throughout the study. Any information collected during this research will be treated as strictly confidential and stored securely. Your responses will be anonymised and aggregated when reporting the findings, ensuring that your identity is not disclosed.

The data collected in this study will be used solely for research purposes and will not be shared with any third parties without your explicit consent.

Voluntary Participation and Withdrawal: Participation in this study is entirely voluntary. You have the right to withdraw your consent and discontinue participation at any time, without providing a reason, and without any negative consequences to you. You may also choose not to answer specific questions if you are uncomfortable doing so. Your decision to participate or withdraw will in no way affect your current or future relationships with the researcher or the institution involved.

Contact Information: If you have any questions, or concerns, or would like additional information about the study, you can contact Abhijit Atale at abhijit.atale@gmail.com

# REFERENCES


Airtel, 2018. *Airtel to build ten data centers across India ,* s.l.: FRPT Telecom Snapshot.

Airtel, 2023. *Our Winning Strategy.* [Online]
Available at: https://www.airtel.in/about-bharti/equity/our-strategy

Anon., Sep 2021. *Harappa.* [Online]
Available at: https://harappa.education/harappa-diaries/causal-comparative-research/#heading_1
[Accessed 23 Mar 2024].

Azalea, I., 2022. *Causal-Comparative Research (ex post facto research).* [Online]
Available at: https://doi.org/10.31237/osf.io/r63f9
[Accessed 18 03 2023].

Bhandari., P., June 2023. *Correlational Reserach - When to use.* [Online]
Available at: https://www.scribbr.com/methodology/correlational-research/#:~:text=A%20correlational%20research%20design%20investigates,be%20either%20positive%20or%20negative.
[Accessed Mar 2024].

Ejaz Ahmed, M. H. R., 2016. Mobile Edge Computing: Opportunities, solutions, and challenges. *Future Generation Computer Systems,* Volume 70, pp. 59-63.

Encyclopedia, W., 2005. [Online].

Frissen, I. E. M., 2024. Experimental research in knowledge management. *Knowledge & Process Management*, Jan, pp. 60-68.

Garther, 2012. *Cloud Market Growth ,* s.l.: Gartner .

GSMA, 2022. *GSMA Annual Report,* London: GSMA.

IDC, 2023. *DC Telecom Services Tracker Finds the Market Growth is Speeding Up as the Effects of Inflation are Becoming Visible in All Global Regions.* [Online]
Available at: https://www.businesswire.com/news/home/20230505005285/en/
[Accessed 10 10 2023].

India, A., 2018. *Airtel to build 10 data centers across India,* s.l.: Bharti Airtel Ltd.

International Financial Corporation - World bank Group, 2010. *Mobile Banking in Indonesia,* s.l.: Australia Indonesia Partnership (AIP) & Advisory Services in Indonesia (IFC).

Katia Passerini, S. G. K. C., 2004. Opportunities in the digital economy: a new value chain and services for mobile telecom operators. *AMCIS 2004 Proceedings. 302,* Issue http://aisel.aisnet.org/amcis2004/302.

Kim, W. J. a. D. H., 2018. Design and Implementation of e-Health System Based on Semantic Sensor Network Using IETF. *Department of Computer Engineering, Jeju National University, Jeju 63243, Korea.*

Lynette Ryals, H. W., 2005. International Journal of Market Research. *Expremental Methods in Market Research,* 47(4), p. 349.

Mariana, 2003. *Industry Dynamics & Strategic Positioning in the wireless Telecommunication Industry case of Vodafone PLC,* London: South Bank University Business School.

Michael Berkwits, T. S. I., 1998. Making use of Qualitative Reserach Techniques. *JGIM,* Volume 13, p. 95.

Mihailović, J., 2019. The Future of mobile operators - New business models. *Journal of Sustainable Business and Management Solutions in Emerging Economies,* Volume 2, pp. 73-84.

Moodys, 2022. *Organic telecoms revenue to grow by 2-3%, ,,* s.l.: Capacity Magazine. 12/12/2022.

Pachler, N., Portillo, I. d., Crawley, E. F. & Cameron, B. G., 2021. *An Updated Comparison of Four Low Earth Orbit Satellite Constellation Systems to Provide Global Broadband.* Montreal, IEEE.

Partners, S., 2012. *Telcos in the Cloud: 3 strategy groups and 3 future scenarios.* [Online] Available at: http://www.telco2.net/blog/blog/2012/11/telcos-in-the-cloud-3-strategy.html

Posey, M., 2020. *Vodafone Corporate Website.* [Online] Available at: https://www.vodafone.com/business/news-and-insights/analyst-view/vodafone-business-from-telco-to-tech-comms

Rehman, W., Rehman, Wagas 2019. *Streaming architecture for multi-access edge computing assisted video streaming.* [Online] Available at: https://www.researchgate.net/figure/Streaming-architecture-for-multi-access-edge-computing-assisted-video-streaming_fig1_335744133 [Accessed 13 02 2024].

ResearchGate, 2019. *A-generic-IoT-ecosystem-comprising-a-variety-of-everyday-objects.* [Online] Available at: https://www.researchgate.net/figure/A-generic-IoT-ecosystem-comprising-a-variety-of-everyday-objects_fig1_332996159

Riccardo Coppola, M. M., 2016. Connected Car: Technologies, Issues, Future Trends. *ACM Computing Surveys, article 46,* 49(3), pp. 1-36.

Sabat, H. K., 2002. The evolving mobile wireless value chain and market structure. *Telecommunications Policy,* 26(9 to 10), pp. 505-535.

Sheikkh, A., Sheikkh, Aijaz 2016. *Digital Banking Ecosystem.* [Online]
Available at: https://www.researchgate.net/figure/Digital-banking-ecosystem_fig1_297730887
[Accessed 10 03 2024].

Sriganesh K Rao, R. P., 2018. Telecom Operators Business Model innovation in a 5G world. *Journal of Multi Business Model Innovation and Technology,* 4-3(Open Access Publication Dept of Business & Technology Aarhus University Herning 7400 Denmark), p. 149 to 178.

STL, 2012. *Cloud Computing Market,* s.l.: STL Parrtners.

Sukamolson, S., 2007. Fundamentals of quantitative research. *Chulalongkorn University,* pp. 3- 5.

Telefonica, 2020. *Strategy 2020.* [Online]
Available at: https://www.telefonica.com/en/about-us/strategy/

The OECD Going Digital Toolkit, b. o. t. O. B. p., 2011-2022. *Mobile Data usage per mobile broadband user ,* s.l.: http://www.oecd.org/sti/broadband/broadband-statistics .

Tijana Dabic, Z. S., 2014. Techniques for collecting qualitative data in edication reserach. *Sinteza,* Issue 10.15308/SInteZa-2014-362-367, pp. 362, 363.

T-Mobile, 2023. *T-Mobile Digital Transformation.* [Online]
Available at: https://www.t-mobile.com/business/5g/5g-hq/5g-and-you

Urizar, A. A. a. I., 2016. 4G Technology : Role of Telecom Carriers. *Springer International Publishing Switzerland.*

Wang, Y. H. Z. L. J., 2020. Business Value of Telecom Operators Big Data. *Journal of Physics : Conference Series,* 1437(012067), pp. 2, 3.