4G-LTE : Mapping of Strategies with Customer Expectations

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Abstract: **The mobile market is at a critical stage in its development as many regulatory, governing, technological and strategic forces are affecting, influencing and transforming the market. Different data services are used by the end users and they always seek to use these services when they travel and want to use good speed broadband services on the mobile phones. Because of changing end-user behavior the market has become even more aggressive and dynamic. Therefore, understanding and analyzing end user expectations has become extremely important for the operators so that it becomes easy for them to predict the customer behavior for the new servicesand accordingly map the strategies in the right direction. This information will help operators to capture the market, to convert all challenges into an opportunity and to increases Average Revenue per User (ARPU). Robust connectivity and enhanced quality of experience is the most important element for customer expectation. Long Term Evolution (LTE) is a new technology standard which creates new capabilities for operators in terms of quality of experience offered to their subscribers, and at the same time also significantly increases the complexity of implementing and managing a robust new service in multi-technology environment. It will be difficult for the LTE operators to provide and offer the enhanced and assured quality experience for mobile broadband services without the right underlying technical and operational foundation in place. Operators have an opportunity to take advantage of these changes and they must be prepared with right strategies to persist and survive in the competitive.**

Keywords: 4G, LTE, LTE strategies, LTE experience, Service availability, Customer expectations, quality of experience

I. INTRODUCTION

The fastest developing telecom network of the world is in India because of its high population and development potential. However, rural India still lacks strong infrastructure. [15] The total number of subscribers in the country are 938 million and the total teledensity is 75.51% as of May 2014. [8]

Highlights on Telecom Subscription Data as on 31st May, 2014

Particulars	Wireless	Wireline	Total (Wireless + Wireline)
Total Subscribers (Million)	**910.16**	**28.18**	**938.34**
Total Monthly Net Addition (Million)	2.71	-0.18	2.54
Monthly Growth	0.30%	-0.62%	0.27%
Urban Subscribers (Million)	**533.94**	**22.31**	**556.25**
Urban Subscribers Monthly Net Addition (Million)	0.07	-0.11	-0.04
Monthly Growth	0.01%	-0.49%	-0.01%
Rural Subscribers (Million)	**376.22**	**5.87**	**382.10**
Rural Subscribers Monthly Net Addition (Million)	2.64	-0.07	2.58
Monthly Growth	0.71%	-1.14%	0.68%
Overall Teledensity*	**73.24**	**2.27**	**75.51**
Urban Teledensity*	139.72	5.84	145.56
Rural Teledensity*	43.72	0.68	44.40
Share of Urban Subscribers	58.66%	79.16%	59.28%
Share of Rural Subscribers	41.34%	20.84%	40.72%
No. of Broadband Subscribers (Million)	**50.38**	**14.95**	**65.33**

The effect that technology changes have on mobile telecommunications is generally termed as “Generations (G)”. Different “Generations (G)” represents the impact of technological change on mobile telecommunications.The cellular systems in 1980s and early 1990s were analogue in nature and were termed as “First Generation (1G)” mobile technology and the “Second Generation (2G)”systems which were digital were termed as Global System for Mobile Communications (GSM). [14]

Data sending and receiving on a wireless platform has been possible as a result of the transformation of networks from 2.5G and then to “Third Generation (3G)”.The mobile data services like GPRS (General Packet Radio Service) or EDGE (Enhanced Data rates for GSM Evolution) are offered at a speed of 56 kbit/s for the conventional modems and a speed of 144 kbit/s for the ISDN lines.Full broadband applications are getting offered at a rate of transmission which will eventually touch 2Mbit/s with 3G. After 2.75 G-New generation was 3G which provides very good speed -2 Mbps (Uplink/Downlink direction) in IP network& 384 Kbps in Mobile condition. Actually this is a very good mile stone for Mobility world because operators are able to provide much kind of innovative services via available speed on 3G. [2]

One of the most recent initiatives as defined by the 3GPP group is the Long Term Evolution (LTE) program. LTE is not a mere replacement of currently available technologies. In fact LTE is standardized in parallel to existing radio access network technologies like EDGE (Enhanced Data Rates for GSM evolution) and HSPA (High-Speed packet Access). It is expected that various types of radio access will exist along-with others in operator networks. [10] With LTE, the Packet network, it is a flat IP network and all procedures to deliver Voice, SMS and data are done over IP based protocols. [2]

Now after high speed availability in Mobile, it is very attractive opportunity for internet domain players to increases their visibility. Now these internet players are called OTT (Over the top) provider. The face of communication has changed dramatically after entry of OTT players. Complete Mobility ecosystem is changing because it is affecting the operator’s revenue. Operators are paying huge amount of CAPEX/OPEX to maintain telecom network & OTT players are able to use the same network to reach customers and are able to provide their services without interruption of operator. Even OTT players are providing services which are substitute of operator’s service and as a result of these operators are losing their revenue for traditional services. Example –

whatsapp is killing SMS revenue, Skype is killing Voice/Video call revenue. [11]

II. OTT ROLE AND IMPACT ON TELECOM INDUSTRY

Generally operator is involved in broadband delivery of video,audioand messaging. Operator may be in the control of the distribution of the content. Over-The-Top Content (OTT) describes these services without the involvement of a multiple system operator. The operator or the service provider is not able to control the IP packets though the operator may be aware of the contents and IP packets. It is not possible to have copyright, and/or other redistribution of the content.The IP packets and the contents are pushed by a third party and are delivered to the end user device. The ISP is responsible only for transporting IP packets.This is a threat for mobile operators or we can say that M-VoIP is a threat because of high speed availability on Mobile phones which is allowing OTT players to serve to customers.OTT messaging services such as what'sApp are incredibly sticky and can spread rapidly. For instance, the take-off point for critical mass for some M-VoIP[6] and messaging application services is as low as 5% or 10%. [1]The operator community is still learning about the OTT player community and potential partnership opportunities in M-VoIP and messaging. [9]

OTT is driving the operator business, not vice versa. However, operators can be much more than a utility in the age of OTT, because they still retain key assets like Networks and Customer relationships. Only network operators can provide the quality of service that the new generation of video dominated OTT services and applications demand. Operators can leverage the resulting insight, trust and access to provide enhanced services for both their upstream customers (OTT providers) and downstream customers (end users).

III. 4G LTE

Long Term Evolution (LTE) is the recent technology from the 3GPP (3rd Generation Partnership Project) which has beenmarketed and advertised as 4G LTE. It is a wireless communication standard for high-speed data used for mobile phones as well as data terminals.LTE technology is based on network technologies like GSM/EDGE and UMTS/HSPA. These network technologies use a different radio interface along-with core network enhancements which helps to increase the capacity as well as speed.

The Evolved UMTS Terrestrial Radio Access Network (E-UTRAN) or LTE RAN, is supposed to considerably enhance the throughputs for the end-user. LTE RAN may also help in handling sector capacity as well as help in reducing user plane latency forhighly improved user experience with full mobility. LTE can help to provide support for IP-based traffic which requires end- to-end Quality of Service (QoS) sinceInternet Protocol (IP) is used and has to carry all types of data traffic. TeliaSonera has launched world's first publicly available LTE service in Oslo and Stockholm on December 14, 2009. [5]

All phones which are multi-band can use LTE. It can operate in only in those which support LTE technology because different countries can use different frequencies and different bands for LTE . LTE is likely to become the first genuinely global standard for mobile phones as it is a very natural and logical path of up-gradation for carriers with GSM/UMTS as well as CDMA networks. LTE may help to enhance the user experience to the next step with the help of applications which are in demand like mobile video blogging, advanced gaming, interactive TV, and other professional services. LTE not only supports a full IP-based network but it is also compatible with other technologies for radio access. The main driving force is the growth in wireless data. According to Cisco, mobile data traffic will grow by a factor of 39x by 2015. [7] Other important factors are the popularity of data intensive devices such as smart phones & tablets, the ever changing consumer expectation for greater mobility and broadband-on-the-go and the introduction of new data hungry media apps like Social Media, streaming video, Facebook, YouTube, Face time, etc.

There are manyattractive drivers& motivation in front of operators for LTE services by which they can increase their revenue. On the other hand, they also have many challenges to successfully implement LTE services. Operators are not able to concentrate on all the dimensions at one time because of CAPEX & OPEX limitation.Indian operators havealready invested huge amount to take 3G spectrum & also spent huge amount to enable network for 3G, so they have a limitation on spending. They can concentrate only on priority dimensions and not all possible dimensions.

OTT video industry is an upcoming industry which can become a source of revenue for telecom operators although they cannot challenge superiority of the erstwhile Television. [4].It can provide a satisfactory customer experiences which will in attracting customers, customer retention as well as help generate revenue. Delivering superior experience involves integration of many functions of the enterprise into an integrated and sometimes invisible ecosystemand which can be achieved through use of LTE technology.

As per predictions made by Deloitte,by the end of the year 2012, LTE subscriptions are predicted to exceed 200 million and about 300 LTE devices such as smartphones, tablets and dongles will be made available. So the year 2012 was supposed to be give momentum to LTE technology. [3]

As the cellularmarket has become increasingly competitive, customer retention and loyalty have become major challenges as a result of which the service providers have to resort to aggressive marketing by way of attractive promotions andbetter services offerings in order to lure customers..It is very essential for the service providers to take quick decisions and actions in order to achieve customer satisfaction. This study can prove to be veryinformational for mobile operators. The findings specify that factors like customer satisfaction are highly affected by perceived quality, perceived value and

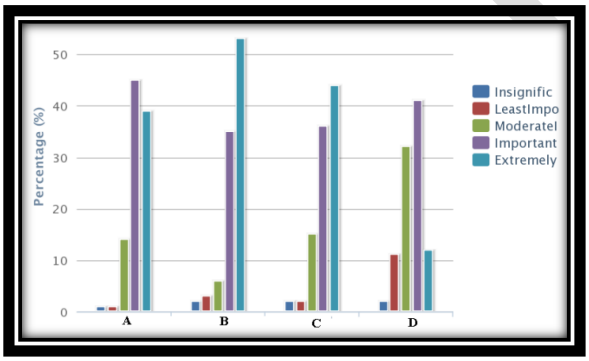
corporate image. If organizations lay more stress on these factors then they can achieve customer satisfaction and thereby achieve customer retention.

IV. METHODOLOGY

The main objective was to study the customer expectations with respect to LTE services for which primary data was collected from 133 mobile customers. The research instrument used was questionnaire. The online survey method was used for data collection.Different attributes were used to formulate the questionnaire in order to collect appropriate data for achieving the objective of this study.Online survey was taken from different demographic segments, different geographic areas.The customer's feedback was filled in two months duration.The data was analysed after which results and recommendations were proposed.Researchers have made use of secondary data, whenever required in order to support the primary data.Secondary data was usd to obtain the data on Global market growth for LTE, consumer behaviour and experience for LTE in different countries etc.

V. DATA ANALYSIS, INTERPRETATION AND FINDINGS

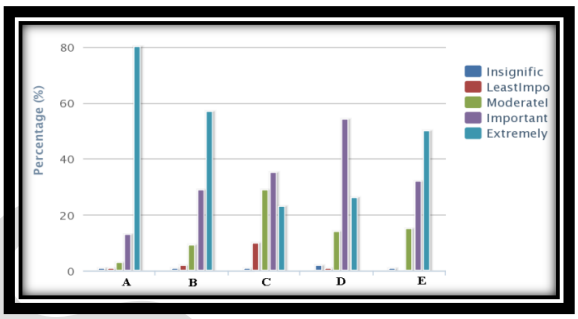
	Service Delivery
A	Easy processing for any request { Change of add / Service close / Service upgrade / Plan Upgrade}
B	Operator share complete relevant Information regarding your requirement (Plan/Offer)
C	Operator's adherence to service activation timelines & proactive update in any delay.
D	Hygiene factor of operator's retail gallery (example - Vodafone store).



Findings:

1. More than 50% of customers believe that it is extremely important that Operator must share complete relevant Information regarding your requirement (Plan/Offer).
2. Operator's adherence to service activation timelines & proactive update in any delay is also an important parameter for customer satisfaction.

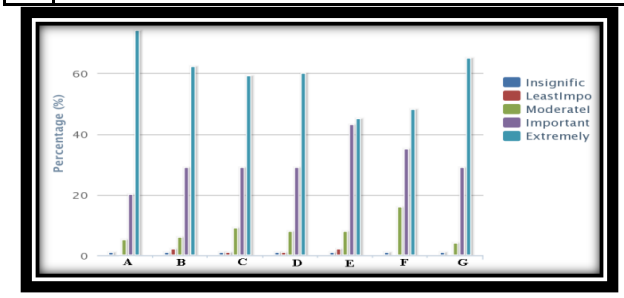
	Tariff plan availability & billing options?
A	Accuracy & transparency in billing for services.
B	Real time charging information for both Pre & Postpaid connection (By SMS/Mail/USSD).
C	Balance & Validity transfer facility from one mobile to other mobile.
D	Availability of various billing mode options (Usage based/Time based/Speed based/Flat plan).
E	Pricing is competitive & provides value for money.



Findings:

1. As seen in above graph more that 80% of customers feel that Accuracy & transparency in billing for services are extremely important.
2. Balance & Validity transfer facility from one mobile to other mobile is not very important to look for by operators.

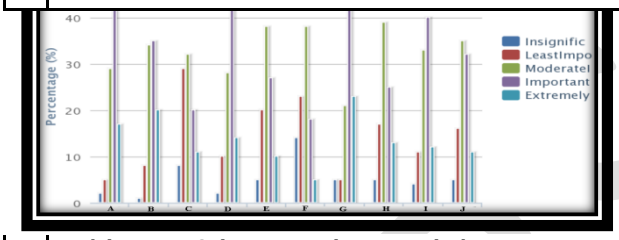
	Quality of Service in 4G/LTE
A	Operator's coverage availability in your city.
B	0% Call drop when you are using 4G (LTE) for voice call.
C	Uninterrupted browsing experience.
D	Quality of audio when you are using voice service.
E	Video streaming Quality.
F	No service interruption in heavy rains.
G	24 X 7 X 365 service availability.



Findings:

1. Network coverage is very important parameter for customers.
2. Most of the customers feel that Qos parameters like
   Network, minimum call drop, uninterrupted service and service availability are important factors.

	(VAS) in 4G(LTE).
A	Call forwarding / Call waiting / Missed call alert / Caller tune.
B	Location based service- I want weather/traffic/hospital/Mall/Station info based on my location.
C	Online interactive Gaming.
D	Video conferencing facility.
E	Online Movie/Song library.
F	Astrology / Business / Cricket / Sports update.
G	M-Commerce: Able to transfer money from one saving A/C to another Saving A/C via mobile.
H	Mobile Health - Online medical store/ First aid suggestion from experts.

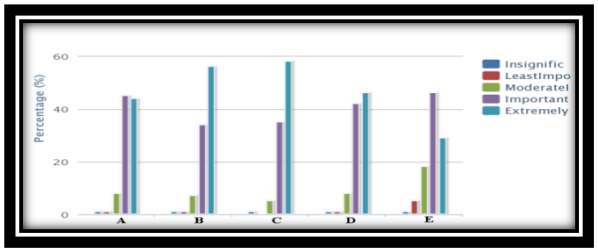


I	Mobile News - Online news update on regular basis.
J	Mobile Education - Online library on your interest area Physics/Politics.

Findings:

1. Majority of customer feels that VAS services like
   - Call forwarding / Call waiting / Missed call alert / Caller tune.
   - Video conferencing facility.
   - M-Commerce: Able to transfer money from one saving A/C to another Saving A/C via mobile.

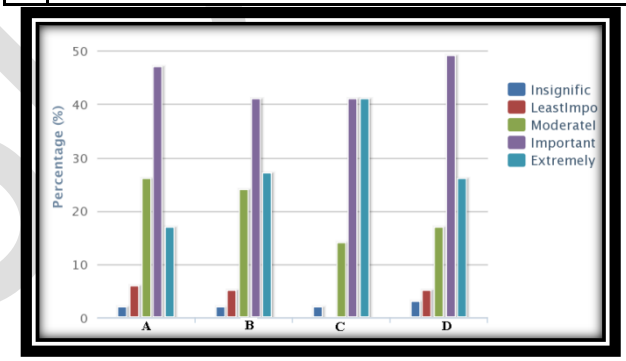
	Customer Care
A	Query resolution time should be low.
B	IVR Waiting time to connect to CC executive should less (<2 mins).
C	Right information regarding your query.
D	Behavior of CC staff - polite & courteous.
F	Instead of you call to CC,they will call to you @ your convenient time.You just drop SMS for call.



Findings:

2. More than 50% customer feel that IVR Waiting time to connect to CC executive should be less (<2 mins) and Right information regarding your query parameters are extremely important.

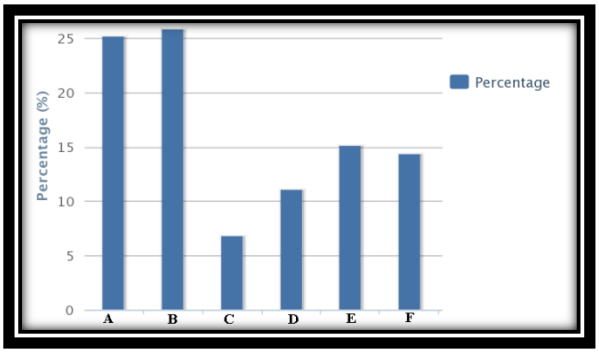
	Advertisement/Promotion for 4G (LTE)
A	Promotions should attractive & update to me regularly (New services, discounts, Features etc.)
D	Advertisements of my service provider provide true & complete information about products/services.
B	My current mobile plans & offers are clear and easy to understand.
C	I am willing to promote operator if I'll get benefits in terms of discounts/Validity to me.



Findings:

- More than 50% customer feels they are willing to promote their operators if they get discounts.
- Customers feel that it is important to have promotions and advertisements should be attractive.

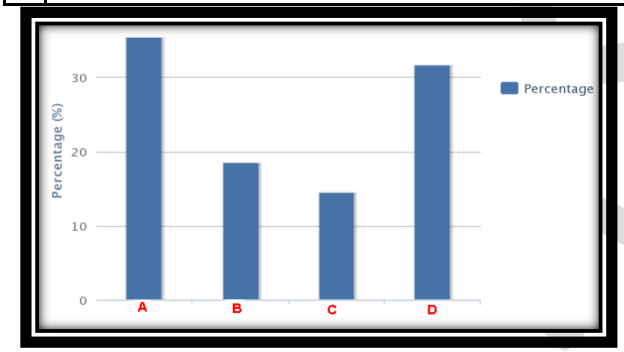
	One thing you would like to change or improve in your existing service provider
A	Processing for any request.
B	Quality of service like clear audio/Video.
C	Resolution time taken for any problem resolution.
D	Billing accurate & transparency.
E	Brand Image.
F	Product Portfolio Improvement - Mobile/DTH/Broadband/Landline from single operator.



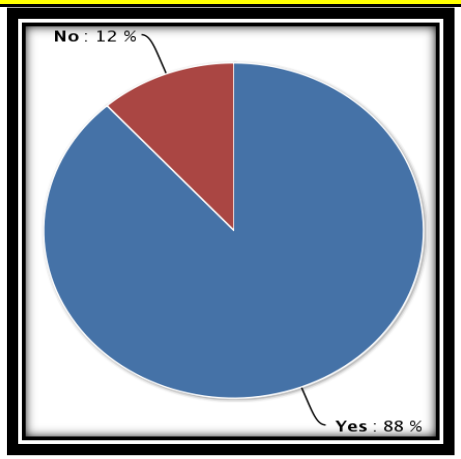
Findings:

- There are two important parameters for customers which are required to be improved by their existing service provider.
  - Ease of processing request
  - QoS

	Which below OTT applications you are frequently using in internet domain (via Mobile or Computer).
A	Watsapp
B	Gtalk/Yahoo messenger - for audio/Video calling
C	Skype - For video calling
D	Facebook



	If your operator will provide same kind of OTT in better quality (Nominal charges) then you will use operator's service



Findings:

- 88% are ready to use operator's OTT if operate develop it.

VI. CONCLUSION

There are many attractive drivers and motivation in front of operators for LTE by which they are able to increase revenue. But operators also have to face many challenges to successfully implement LTE. Operators are not able to concentrate on all dimensions at one time because of CAPEX & OPEX limitation.

Hence through this research we have studies customer expectation from operators with respect to 4g services based on different parameters. It will help operators to concentrate on below important parameters on priority.

Five extremely important parameters as per customer point of view

- Operator's coverage availability in your city. [86.99%]
- 24 X 7 X 365 service availability [79.6%]
- Accuracy & transparency in billing for services.[69.91%]
- 0% Call drop when you are using 4G (LTE) for voice call.[66.66%]
- Quality of audio when you are using voice service.[65.0%]

Five important parameters as per customer point of view

- Availability of various billing mode options (Usage based/Time based/Speed based/Flat plan) [54.13%]
- Company should have many retail outlets so that customers are able to reach for their queries. [48.12%]
- Promotions should be attractive &customer needs to be update regularly (New services, discounts, Features etc.) [47.36%]
- Easy processing for any request { Change of add / Service close / Service upgrade / Plan Upgrade} [46.61%]

VII. RECOMMENDATIONS

A. Operators should ensure they have the technical capability to offer a good quality-of-service (QoS) to end usersto maximize the quality of their LTE experience

Operator's coverage availability in city,LTE data speeds and robustness of delivery will be essential for operators to position LTE as a premium experience because is one of

B. Operators should invest in improving tools to offer more transparency & Accuracy in billing

Bill accuracy & Transparency is the main barrier for data-roaming usage and it will be a major boundary for LTE. Smartphone applications need to evolve to provide accurate and real-time information about usage and be integrated across other operator channels such as the Internet and the contact center.

C. Operators should invest in improving tools So that they can provide various kind of billing mode options.

Usage based/Time based/Speed based/Flat plan

D. Operators should support to develop their own OTT applications for their customers:

88% of the responded are ready to use operators OTT if operator provide good quality & in nominal charges.

E. Operator should provide new Value added services

Like : Mobile News , M-Commerce

REFERENCES

[1]. Addressing-Mobile-Voip-Threat N.d. http://www.telecomasia.net/content/addressing-mobile-voip-threat, accessed September 26, 2014.
[2]. Dahlman, Erik, Stefan Parkvall, Johan Skold, and Per Beming 2010 3G Evolution: HSPA and LTE for Mobile Broadband Academic press. http://books.google.co.in/books?hl=en&lr=&id=cmMgp4j23D0C oi=fnd&pg=PP2&dq=LTE&ots=KDbb4Uqq1_&sig=1m9lTv3E A2k2Et2GVh9tPxbmY0, accessed October 7, 2014.
[3]. Deloitte - A Strong Year for LTE Adoption N.d.
[4]. Informa Telecoms & Media's Top Predictions for 2014 N.d. http://www.informa.com/Media-centre/Press-releases--news/Latest-News/Informa-Telecoms--Medias-top-predictions-for-2014/, accessed September 26, 2014.
[5]. LTE Timeline N.d.
[6]. Ma, Kevin J., Radim Bartos, Swapnil Bhatia, and Raj Nair 2011 Mobile Video Delivery with HTTP. Communications Magazine, IEEE 49(4): 166–175.
[7]. Reshaad Sha N.d. CISCO - An Opportunity and a Challenge for the Mobile SP.
[8]. TRAI Press Release No 37-2014.pdf N.d.
[9]. http://www.gartner.com/id=2245715&pcp=itg
[10]. http://www.telecoms.com
[11]. http://ws.lteconference.com
[12]. http://www.deloitte.com
[13]. http://www.gsacom.com
[14]. http:/www.wikipedia.org/wiki/
[15]. TRAI website