New and Emerging Trends in Platformization for Transforming the Telecommunication Value Chain

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Abstract— there are massive changes in the internet world which in turn revolutionise the telecommunication business community. The various new technologies in applications such as social networking sites, mobile internet and grid computing have changed the scope and extent of the telecommunication industry. It has enabled easier sharing of resources, minimised errors, faster communication and ensured a better quality of service.

Index Terms— artificial intelligence, grid computing, internet, platformization.

1 INTRODUCTION

There are never-ending improvements and changes in the internet industrial scale. There are various emerging applications such as social networking sites, mobile internet and networking videos. The rapid changes in the internet world and their convergence is almost shocking the telecom industry. There are very fast changes happening in the telecom industry structure, where the operators' monopoly is being broken, and the purpose of the telecom industry turning to services and content. The use of internet has grown exponentially over the years as shown in the chart below.
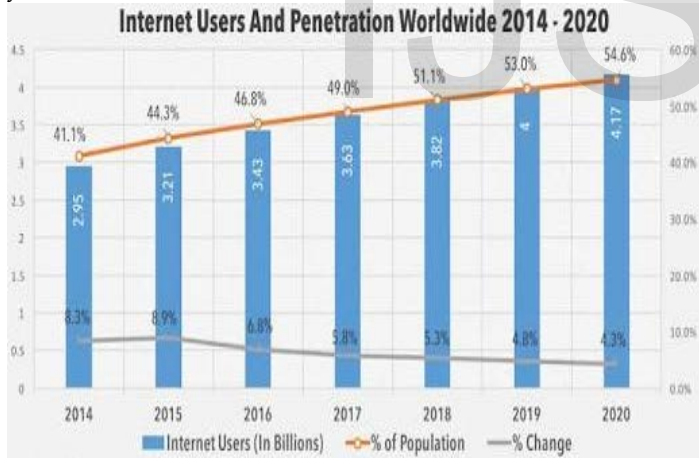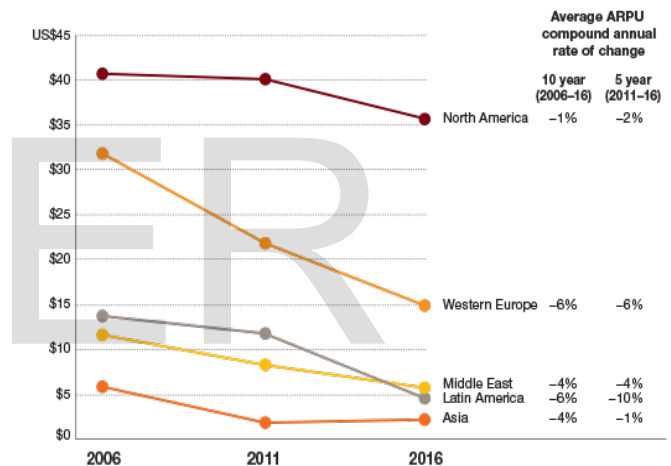

Fig. 1: Internet use growth rate

There have been projections that the telecommunication industry will one day reach a tipping point. The companies in this industry have not successfully managed to monetise all the data that runs through their networks. The competition, especially from Over the Top companies (OTT), who offer applications that stream data directly to the consumers over the internet, have more dominance in the market. These are companies such as WhatsApp, Viber, Skype and iMessaging. For example, Skype alone is responsible for a third of the world's international voice traffic. This reduces the revenues for the telecommunication industries.

Fig 2: Falling telecommunication industry revenues.

This shows that the telecommunication industries have to re-strategise so as to gain their dominance in the market.

There are also new technologies dealing with internet such as artificial intelligence, open platforms, grid computing and Mashup. These are greatly influencing the industrial structure of the internet. For example in the communication industry, the service providers are making a shift into horizontal service provision. It is discussed that the leverage opportunities provided by the ICT platforms drive their growth beyond the communication infrastructure[1].

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[1] Chen, L., Kapoor, S., & Bhatia, R. (2016). *Emerging trends and advanced technologies for computational intelligence: Extended and selected results from the Science and Information Conference 2015.*

2 NEW INTERNET APPLICATIONS

There are various new internet applications and emerging technologies which have been noted to have the biggest influence on the telecommunication development. These are discussed below;

2.1 Platformization

This is a technology which leverages the open source technologies, cloud computing and the agile4 development models in delivering lean, ready to use products which are highly configurable[2]. This has been known to help the telco industry in various ways namely;

    i)   Establishment of a digital ecosystem.

This is through interconnection of the computer systems such as through grid computing and cloud computing in bid to share resources.

    ii)   Exposing of various capabilities such as open APIs and catalogues.

Research indicates that the digital transformation of the telecommunications industry presents a close to $2 trillion opportunity for this industry and the global society[3]. Investing in new developments such as open source platforms will increase the industry's capabilities.

    iii)   Simplifying and supporting a 2 sided business model.

This is through development of business solutions which cater for both the business and customer demands as well as considering the cost implications.

2.2 Social networking

This is defined as the networks created by the relationships between people. These social sites are based on the mentality of people on social networking. Most of the Web 2.0 websites are classified as social networking sites. An example of such is Instant Messaging, blogs, podcasting, sharing music sites, networking communities and dating sites. These sites proved to provide effective communication channels and have taken the lead as the culture bearers.

There are various changes made on these sites on daily basis to increase traffic flow and provide more features. An example of such a site is Facebook. Research shows it has an annual growth rate of 550% while its partner LinkedIn has a growth rate of 182%[4]. If a company does not take considerations in the market dynamic changes it gets phased out. An example is Yahoo. It has announced its planned reshape program such as the adoption and collection of online service programs. These are aimed at increasing its market presence and get more vertisement opportunities.

2 Alonso, D. S. M. (2014). Strategies in sports marketing: Technologies and emerging trends

3 Kocovic, P., Behringer, R., Ramachandran, M., & Mihajlovic, R. (2017). Emerging trends and applications of the Internet of things.

4 National Research Council (U.S.). (2008). Emerging cognitive neuroscience and related technologies. Washington, D.C: National Academies Press.

2.3 Intelligent search

The most important driving factor of the internet today is the search drive. This increases the sharing characteristic of the internet. It is through search where one can find useful web information and also share their research. This drive is the backbone of mega internet firms such as Google, Yahoo and Baidu.

There are various technologies incorporated where search mechanism has shifted from only using text to include images, videos and music. There is also intelligent search which can link the various search items to the search habits of the user. Intelligent search has been coupled with artificial intelligence where retrieving information has improved from only keyword matching to include knowledge and concept matching. This has increased the level of machine translation, identifying phrases, searching concepts and enabling text segmentation and synonyms. The best search engine technology has been developed by Yahoo! Imatch, which has included a highly intelligent fuzzy function, where, it can easily match the search results to related user habits, intentions and previous searches so that the user's real demands can be exactly met[5]. This increases the correctness of the search results.

To achieve the intelligent search, several algorithms are applied. An example is the ontology based search. For this, a unique semantic is assigned to each information piece on the Web. All possible relationships between the data are also made using hierarchical taxonomies. A *misearch* system is then used to re-rank items depending on how close the inter-relationships are. An open directory project is also used for referencing the concept of hierarchy. A matching function is run, which gives the similarity between the results snippets, j, and the user's profile, i. the function below is used;

$$sim(user_i, doc_j) = \sum_{k=1}^{N} wp_{i,k}.wd_{j,k}$$

In the above, wp_{ik} is the concept k weight, in the user's profile i. wd_{jk} is the concept k weight in a document j in a number of N concepts.

2.4 Mobile internet

Mobile technology has been developed through the improvements of the internet and its connecting terminal equipment. This is highly instrumental to business people. The greatest improvements have been noted from the Apple's iPhone. The handheld devices have integrated the functions of both PCs and cell phones. It has improved its user interface, where it has become easier to search the internet through technologies such as image scaling and 5G technologies.

Another factor to be considered is IoT (Internet of Things). Devices are connected to the internet and can be controlled remotely. This increases the operations and eases their control as well as remote monitoring.

5 Ramos, S., Armu, C., Arenal, A., & Ferrandis, J. (January 01, 2016). Mobile Communications and the Entrepreneurial Revolution.

3 NEW INTERNET TECHNOLOGIES

Emerging technologies have played an important role in the development of internet. The following are some of the emerging technologies that have revolutionised the internet world.

3.1 Mashup technology

This technology has been developed to integrate internet data and services. One way of achieving this is through service interface mashup. This is where most websites open their network capabilities through the use of Web or Rest service interfaces. These search services are done through the Universal Description Discovery and Integration process. Another method used is the application of the API mashup (Application Programming Interface).

Fig. 3: Mashup technology

An example of this is the Google Map where the one's location can be located. The RSS (Really Simple Syndication) technology has also been used for content mashup where it simplifies data search in emails and websites through putting all the data sources into a compressed one view. SOA (Service Oriented Architecture) is another content mashup technology used for integrating inter-system data[6].

3.2 Artificial intelligence

This is achieved through the popularisation and development of the internet where a machine is made to act like humans. This is done in semantic networks, robotics and intelligent search[7]. The semantic technologies enable the understanding and inferring of relationship of various computer data sets. The computer analyses all the interactions between a certain computer and human and creates a relationship, preferences and interests of the human. It creates Metadata, which enables the computer deduce meanings and offer semantic optimisation. This is also known as data mining.

3.3 Grid computing

This is the connection of computers on the internet to enable their sharing of resources, processing abilities and data inferences. The internet forms a super computer where each computer is treated as a node.
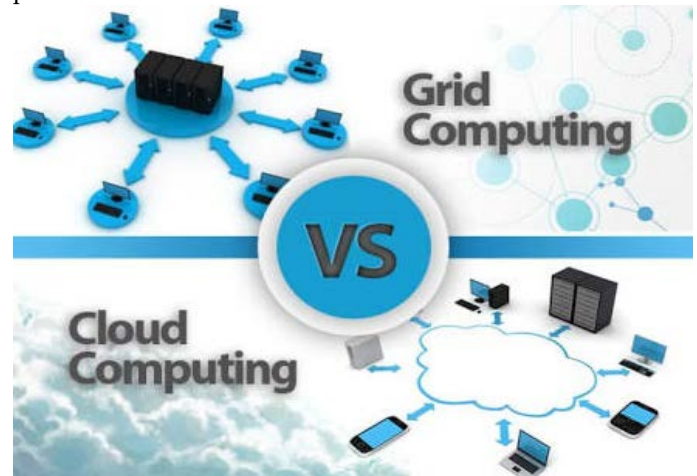

Fig. 4: Grid computing

This is mostly applied in fields which require extensive computations such as the military, power transmission, financial analysis and weather forecasts.

3.4 Open platforms

This is a unified global application which is aimed at providing social websites with developing standards. Developers write programs through the Open Social Application and afterwards can run it through the different social networks[8].

4 IMPACT ON TELECOM INDUSTRY

To effectively transform the business and operations support system through the emerging technologies, various impacts on this industry have been witnessed. These include;

  i)   Effective transformation strategy

This is where focus is on having a business process which simplifies the method and produces an agile and lean solution for implementation

  ii)   Enhanced modular design

The selected design should be such that it is extensible in provision of the appropriate IT support to cater for the digital telco needs.

  iii)   Comprehensive and reliable solution

The model utilised should have an end product which observes the business and regulatory SLAs[9]. It should also cater for the business and customer needs.

6 Zhang, J. (January 01, 2017). Changes of mobile Internet ecosystem structure and suggestions for regulatory policy. China Communications, 11, 1, 60-68.

7 Funk, T. (2009). Web 2.0 and beyond: Understanding the new online business models, trends, and technologies. Westport, Conn: Praeger.

8 Lee, J., Ma, S., & Liu, A. (2012). Service life cycle tools and technologies: Methods, trends, and advances. Hershey, PA: Information Science Reference.

9 Kocovic, P., Behringer, R., Ramachandran, M., & Mihajlovic, R. (2017). Emerging trends and applications of the Internet of things.
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iv)   Low total cost of ownership

The cost of the solution should be linear, where the revenues are linked through flexible and open based models.

v)   Consolidation of the numerous tools

The CSPs have invested intensity in making their IP networks enabled. These networks can thus be consolidated through an OEM agnostic solution. This will reduce the operations complexities and costs.

vi)   Automation of the IP network

If this is implemented, there will a high percentage of error reduction, operation complexities and also the operation costs. If this monitoring is automated, the company will be assured of a committed and a high quality service to its customers.

vii)   Integrating the separate processes

For a telecom company to achieve simplification of the operation processes, the following activities can be carried;

- Implementing a committed quality of services (QoS)
- Monitoring the operations and devices in its network of operations (NoC)

5   CONCLUSION

If the right platforms are used, the CSPs in the world will be simplified and transformative operations will result, which will enhance the customer service. These ready-to-use platforms have been known to modernise the operations environment and simplify the operation processes. These platforms are very essential in the telecom industry as they enable them to launch new and improved products, fasten their services and reduce the costs of running the industry.

The internet and telecommunication industry complement each other very well. The emerging new technologies have revolutionised the development of the internet and have become the reference for the telecommunications operators. Since the internet and the telecom networks are based on the IP technology, their operations business is developing towards overlapping. Their business and development are aimed at networking converging.

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