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RESEARCH ARTICLE

TECHNOLOGY CONVERGENCE":AN ONGOING WAVE IN THE WORLD OF EVOLUTION.

Dr. Subhash Kumar Verma[1], Akshi Bhardwaj[2], Astha Allawadhi[2].

1. Professor, Galgotias College Of Engineering And Technology.
2. Btech 4th year(Electronics and communication) and Research Scholar, Galgotias college of engg. and technology.

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Corresponding Author

Dr. Subhash Kumar Verma.

Abstract

Technological convergence is one of the fastest growing phenomenon in this vast world of technology. Here, the term technological convergence is defined as two or more existing technologies getting merged together to provide multiple services of more sophisticated and improved quality. As a result of this, different technological systems evolve towards performing similar tasks. This phenomenon is not confined to a single field but it is wide ranging and ever-encompassing namely in the field of telecommunication, networking, information technology, media etc .In all these cases it is defined as the interconnection of computing and other information technologies, media content and communication networks that has arisen as the result of the evolution and globalization of internet as well as activities, products and services that have emerged in these enlisted fields. This paper tries to highlight the phenomenon, effects and consequences of technological convergence in different fields.

Introduction:-

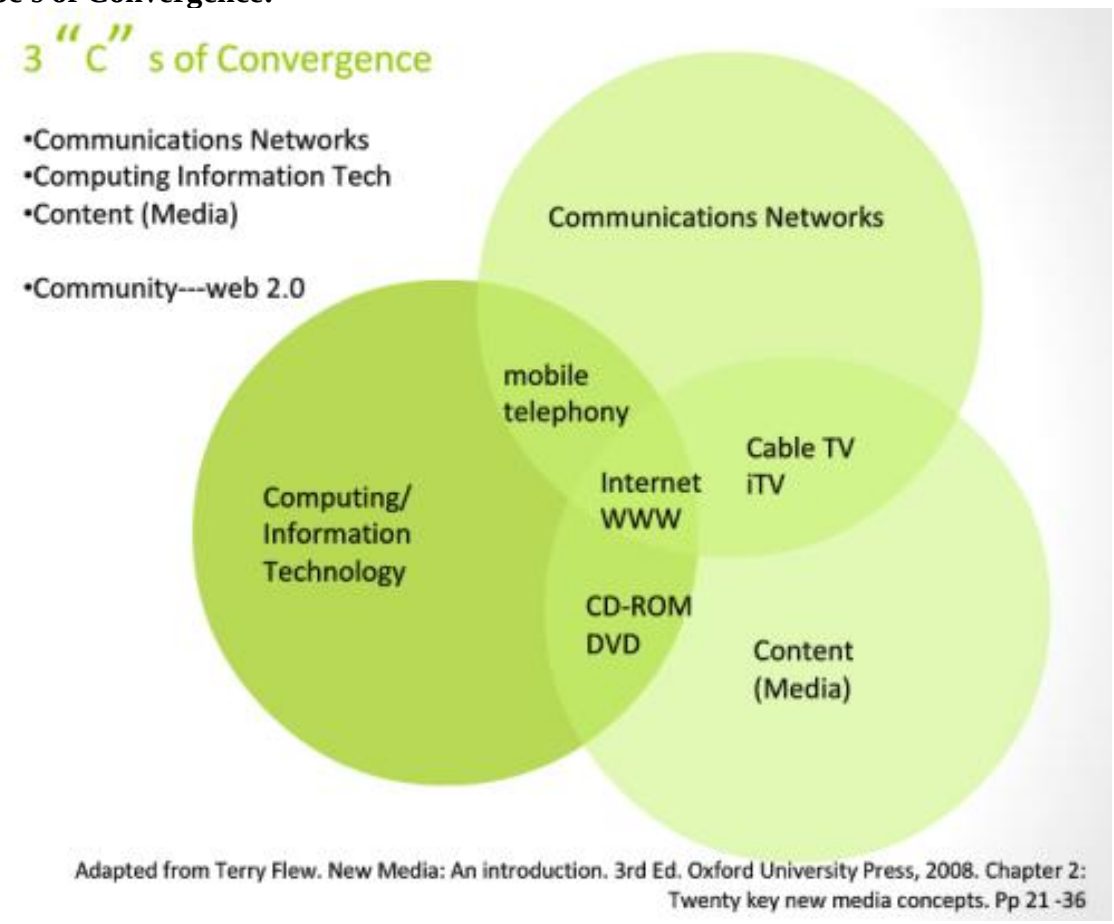
The term technological convergence is often defined in a very generalized and simplified terms as a process by which telecommunications, information technology and the media, sectors that originally operated largely independent of one another, are growing together. Technological convergence has both a technical and a functional side. The technical side refers to the ability of any infrastructure to transport any type of data, while functional side means the consumers may be able to integrate in a seamless way the functions of computation, entertainment, and voice in a unique device able to execute a multiplicity of tasks. The rise of digital communication in the late 20th century has made it possible for media organizations (or individuals) to deliver text, audio, and video material over the same wired, wireless, or fiber-optic connections. At the same time, it inspired some media organizations to explore multimedia delivery of information. Today, we are surrounded by a multi-level convergent media world where all modes of communication and information are continually reforming to adapt to the enduring demands of technologies, "changing the way we create, consume, learn and interact with each other"

History:-

In earlier times different networks, communication systems and information technologies work individually without any interdependence. But with due course of time there was increase in demand for better technologies. So to serve this purpose these domains came together and make the current technologies better. For examples, firstly radio was designed for audio and televisions were designed for videos .The older media, such as television and radio, are broadcasting networks with passive audiences, but technology convergence permits the manipulation of all forms of information, voice, data and video. Telecommunication has changed from world of scarcity to one of seemingly limitless capacity. Therefore, all the passive audience transformed into engaged audience. There are many significant convergence which leads to the modern technologies as TV converged with nickelodeon, the word

processing program converged with the typewriter, the CAD program converged with the drafting board and digital desktop publishing converged with the Linotype machine and the letterpress.

3c's of Convergence:-



Convergence in various fields:-

Telecommunication:-

Convergence in this field may make some services antiquated but open up many doors of opportunities for the improvisation of the existing technologies. But profiting from new services and providing quality service are some of the toughest challenges for a business. Convergence in this field says that eventually all voice and data services will belong to a single data stream. Dozens of factors drive companies to converge services, but the proliferation of IP based networks, the growing penetration of broadband internet services and competition from new service providers are the main drivers of convergence. Besides all this, there are several benefits of this phenomenon. Network operators have several new options for revenue streams once they converge their services. For instance Comcast increased its revenue from video services by 0.7% in the second quarter of 2010, but its broadband Internet services jumped 10.3 percent. Other large cable and Internet service providers, such as Time Warner, saw similar revenue increases in 2010, according to Siddhartha Raja of the World Bank. A mobile phone operator may sell digital music and movies, as well as roaming Wi-Fi service. Offering new services improves customer retention and prevents the company's services from becoming obsolete.

Therefore, building the infrastructure to converge telecommunications services may take more than three years for some companies. Other companies, such as cable providers, can roll out converged services in less than a year -- because they already have the necessary infrastructure.

Companies must improve the quality of their services to meet new consumer demands. For instance, consumers may not purchase streaming movies if the media doesn't come in high definition or the company's services cannot handle

such a data-intensive service. In general, technological hurdles become less important over time, compared to the strategy behind rolling out a new service.

Networking:-

Network convergence refers to the provision of telephone, video and data communication services within a single network. In other words, one pipe is used to deliver all forms of communication services. The process of Network Convergence is primarily driven by development of technology and demand. One main goal of such integration is to deliver better services and lower prices to consumers. Users are able to access a wider range of services, choose among more service providers. On the other hand, convergence allows service providers to adopt new business models, offer innovative services, and enter new markets. Two-way communication has been limited to voice and text by the limited availability of bandwidth; broadcast media have been restricted by their one-way character and by the availability of spectrum. Nowadays technology development, fierce competition and deregulation have transformed several distinct communications service markets into a converged market. In the telecommunications world, convergence has come to mean a moving towards the use of one medium as opposed to manipulation of all forms of information including voice, data and video across all types of network instead of carrying information separately within distinct networks. In the convergent network, different forms of information can be reengineered to provide better, more flexible service to the user. For example, telephone networks can transmit data and video and cable networks are able to provide voice services.

Information technology:-

Operation Technology (OT) supports physical value creation and manufacturing processes. It therefore comprises the devices, sensors and software necessary to control and monitor plant and equipment. Information Technology (IT), on the other hand, combines all necessary technologies for information processing. During the last decades, most industries have developed and managed OT and IT as two different domains, maintaining separate technology stacks, protocols, standards, governance models and organizational units. However, over the last few years, OT has started to progressively adopt IT-like technologies. IP (Internet Protocol), for example, is gaining acceptance as an all-purpose networking protocol and Window is more and more frequent in a wide range of devices. The convergence of IT and OT will bring clear advantages to companies including cost and risk reductions as well as enhanced performance and gains in flexibility.

Bio-medical technology:-

Technology convergence is already a reality in communications, where it has generated new industry sectors. Increasing emphasis on translational research in biomedicine, together with the cross-fertilization of such fields as biotech, nanotech and information technology, now promise similar interdisciplinary, convergent solutions for disease prevention, screening, diagnosis, therapy, monitoring and management. Here, the views of an entrepreneur and a leading researcher on the potential of convergent biomedical technologies are contrasted with the historical perspective of an industry veteran. The next challenge for biomedical research will be to solve problems of highly complex and integrated biological systems within the human body. Predictive models of these systems in either normal or disease states are beyond the capability of current knowledge and technology. These problems have been attacked via interdisciplinary research approaches, where, for example, biologists called on engineers and computational experts and their tools. However, rather than bringing together practitioners from separate silos to provide skills, there is an increasing need to merge expertise that goes beyond the interdisciplinary intersection of fields to the emergence of new disciplines. In recent decades there have been two biomedical revolutions: molecular biology and genomics. We believe the convergence of fields represents a third revolution, where multidisciplinary thinking and analysis will permit the emergence of new scientific principles and where engineers and physical scientists are equal partners with biologists and clinicians in addressing many of the new medical challenges.

Media:-

The evolution of converged media has been slow and subtle. Publications such as Time were experimenting with television in the late 70's. Major newspaper like the Ft. Worth Star Telegram began experimenting with computer applications in the early 80's.These attempts and most other early convergence ventures were unsuccessful. Despite the huge startup costs the companies incurred and the lack of success they achieved, efforts to converge media continued. With technological advancements that made computers more affordable, a new wave of convergence efforts began in early 90's. At this time, computer world especially the internet, experienced a period of extreme growth that rivals any other in history. As more households became linked to the internet, consumer online ser ices such as Prodigy, America Online and CompuServe became increasingly popular. Recognizing the trend, many news organizations signed on the customer online services, which set up sites for the newspaper on their program. In past four-five years, media companies have been fine-tuning the concept of convergence. Local newspaper, radio station, television broadcasters and websites have combined to form fully websites. National newspapers, the New York Times and Washington Post, reached cooperative agreements with the networks ABC and NBC in 2000. While these local and national efforts have brought convergence to a new level, many major and local news organizations have yet to incorporate all the elements of media. Many so-called converged organizations merely republish or repurpose material from one medium to another. The standard newspaper-internet combination that developed in the 90's is still convergence's most common form.

Impact of convergence:-

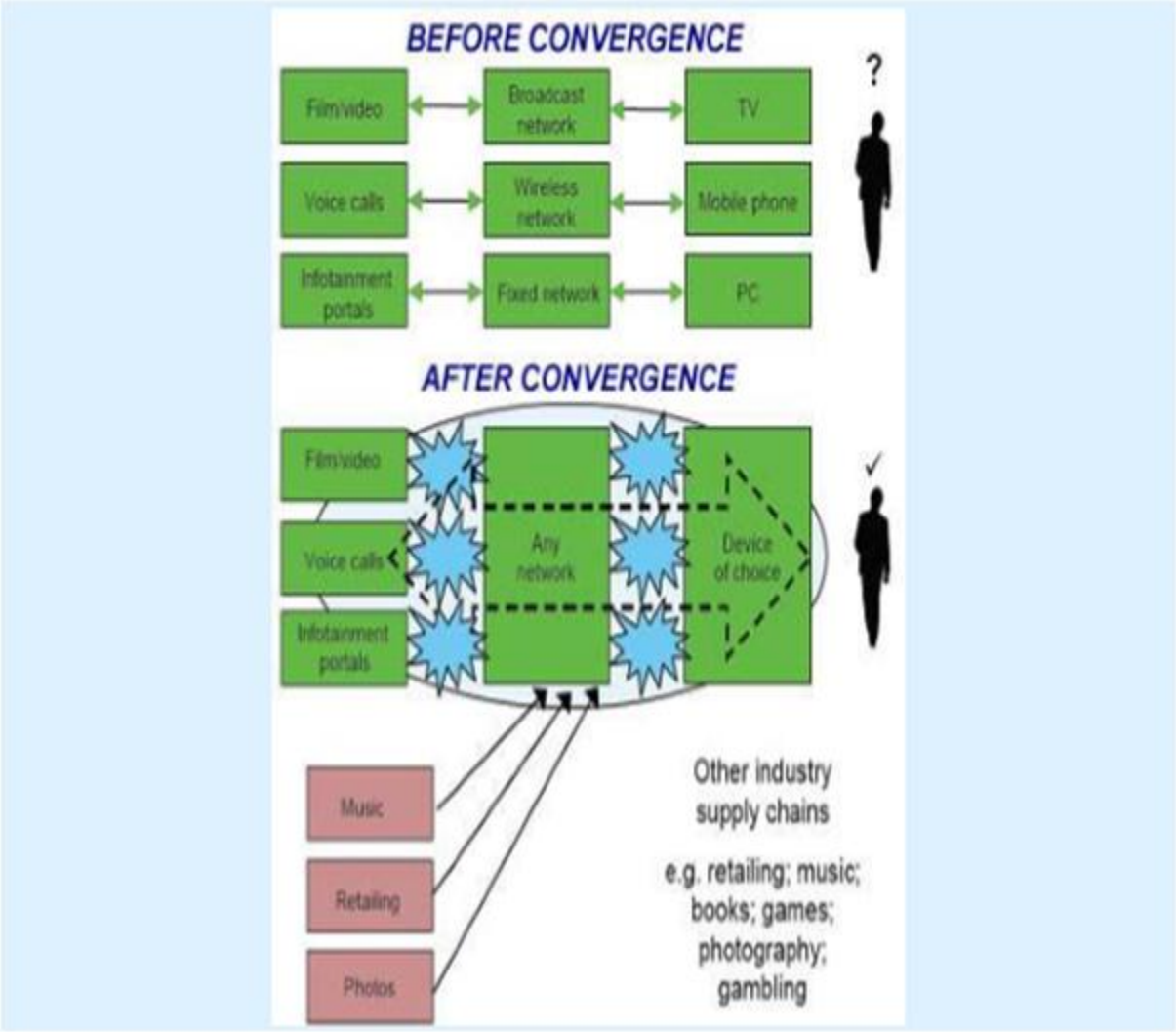


Fig2

Technology convergence has a very eloquent impact on each and every field. Before this phenomenon was discovered for each field there was a separate industry and their services were very fundamental but with the evolution of convergence all these industries came together to form one big converging industry whose services are advance and progressive. Like, in television industry, the development of alternatives means transmission such as satellite, cable, ADSL or fiber, brings about new challenges, unforeseen in legacy sector specific regulation. First of all, television activities can no longer be regulated, as it is a source of competition among convergent service providers. Moreover, Convergence has lowered barriers of entry to the market for new operators and service providers. The emergence of new market players intensifies competition, giving consumers an extensive pool of providers and services to choose from and lower communication costs.

Additionally in a technological convergent environment industry boundaries become blurred, allowing service providers to offer services in multiple markets. For example, besides access to television, cable operators can also offer voice telephony and internet services.

Content providers can now easily access consumers with no need to own the distribution network. For example, a company may produce TV content and distributed it through cable networks without having to own it. Established companies will find in convergence an opportunity to operate more efficiently, increase returns on technology investments and realize other business benefits through development of new services and rapid market expansion.

Convergence opens up new sales markets for companies, a case observed in mobile operators. As the market saturates, they look to non-voice services, such as video streaming, portals, messaging, information services, and gaming, to drive future revenue growth. New applications have given rise to new ways of entertainment (i.e. online gaming) and socialization (i.e. chat rooms). The convergence of voice, video and data gives consumers new ways of communication as we can all talk, send text and video over one single network, using one single application at much lower costs than before. At device level, consumers find in convergence an opportunity to enjoy the convenience of having many devices all in one, saving on both size and ownership costs. For example, a single mobile phone device can receive television programmes and play videos, thus enabling simplicity and convenience in device ownership as one device can be used to access multiple services.

Conclusion:-

As we are moving from a physical world based on atoms to a digital world based on bits. Today new techniques of Information packaging and delivery ensure its availability at the point of demand instantly. Technology convergence offers massive opportunities for the development of new value-added services, convenience, efficiency and the expansion of markets and consumer choice. It also raises a number of issues of adjustment to the new environment by telecom operators, service providers, policymakers, regulators, and users. As society becomes increasingly interconnected and dependent of ICT networks, cybercriminals continue to invent increasingly cunning ways to exploit human and computer vulnerabilities to their malicious benefits. This, challenges operators, service providers and users to take measures to minimize risks of network intrusions, attacks and viruses. In a similar way, as technologies and systems become complex, the higher is the risk of their instability. Product designers, manufacturers and operators are challenged to guarantee the reliability of these new technologies.

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