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SCHOOL OF MANAGEMENT

XPRESSIONS

IN THE ISSUE

Our Respected Chairperson, Mrs.Kiran Sahni, Inaugurating Diwali Mela and Visiting Diwali Stalls Put up by the Students of DTC

AWARDED A GRADE BY GGSIPU

Theme of the Current Issue
EMERGING TRENDS IN IT

Theme of the Upcoming February 2019 Edition of Xpressions
EMERGING HORIZONS TRENDS IN HR

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FROM THE
EDITOR'S DESK

Emerging Trends in IT

Just a few decades ago, most business offices would have been stocked with typewriters and carbon sheets, instead of computers and printers. Once computers became mainstream consumer items, the business world adopted the burgeoning technology at a dizzying pace. The modern economy places a premium on the acquisition, processing and proper use of information in all its forms and formats. Today, the sum of all computer-based and digital technology used for the management of information is referred to as information technology, or IT, in short. Information technology is responsible for innovative leaps and improvements in workplace across sectors and plays a critical role in business organizations.

Information technology drives innovation and innovation is the surest path to business success. It started with Automation, which primarily means replacing manual work with computers. We have seen computerization phase of all possible business activities. The second phase was Integration, primarily the concept of networking of isolated computers and sharing the storage across, which became the primary mode of communication from Electronic Data Interchange (EDI) to eventually the birth of Internet and more precisely World Wide Web(WWW), the graphical version of Internet, invented by the English scientist Tim Berners-Lee in 1989. Internet opened up new window of opportunities in the business world in the form of online business and it made the whole world a single market place across boundaries. Finally, Business Intelligence (BI) has changed the way decisions are taken in business. Business intelligence encompasses technology-driven process for analyzing data and presenting actionable information to help executives, managers and other corporate end-users make informed business decisions.

Digital revolution and innovative technology have paved way for many new business models by leveraging technology. Today, it is hard to imagine any business that has not benefited from the digital revolution. Now-a-days, the formula for business success is simple: drive innovation with information technology. We are witnessing how technology is disrupting many traditional industries and the trend will become more pronounced in the next 5-10 years. Uber Technologies Inc.,doing business as Uber, headquartered in San Francisco, USA, is just a ride-sharing taxi app; it does not own any cars, and is now the biggest taxi company in the world with operations in 785 metropolitan areas worldwide. Young American lawyers are already facing a stiff job-threatening competition from IBM Watson, a question-answering computer system named after IBM's first CEO Thomas J. Watson. It is capable of tendering legal advice within seconds, with 90% accuracy as compared to humans.

Tech Companies are taking over the world by leveraging technology. Google's biggest asset is its proprietary Search Engine Algorithm (SEA) and it owns more than 90% market share, by network effect. Google has become the most used search engine in the industry and it shows the company's highly innovative product design and excellent software engineering capabilities. Google's core products are Google content indexing technology, Google Ad platform and Google Mapping platform. Google builds and maintains massive index of websites and other online contents by using a highly complex and versatile indexing technology. Reach of Amazon is beyond geographical limits and has more than 350 million buyers. Amazon leverages every aspect of technology to achieve advantage for its online market place to reach the pinnacle of technical expertise and also make the online process smoother and efficient. Technological innovations have helped these companies establish a highly efficient supply chain system, with a significant attendant benefit in terms of economical inventory levels.This is the reason the first thing startups in any industry try to figure out is how to make smart IT recruiting choices. Without the backbone of information technology, a business is not going to go far.

Innovation through information technology has created radical changes in business: Online shopping is more efficient than shopping in a store; BI has given the power of intelligence to make effective decisions; Digital marketing is more efficient than high cost newspaper, television, and radio advertising; Social networking is more efficient than going to clubs; Voice over Internet Protocol (VoIP) communication is more efficient than legacy telephony; Cloud computing is more efficient than a private computer network; Searching has entered altogether in new paradigm with Internet of things (IoT), not to mention impact of AI in products and services.

Businesses that have embraced the innovation paradigm tend to have greater marketing effectiveness, higher global sales, more efficient management practices, instant customer support, and many more advantages. The technological revolution has helped businesses use sophisticated tools to make sense out of unorganized data, use processed data to make better and more economical decisions, find practical and easily acceptable ways to solve complex problems, and ensure improved resource management.It would not be an exaggeration to say that it is hard to think of long-term business growth, in terms of profits and continued patronage from its stakeholders, without the robust doze of continuous innovation and push of information technology.

In this issue we have endeavoured to focus on a few modern trends emerging on the technology front and are significantly changing the business paradigm. Authors, with requisite knowledge and experience, have attempted to explain a subject as complex as IT in an easy-to-understand manner. It is sincerely hoped that readers in general and MBA students in particular will find this issue of ***Xpressions*** useful, read it with interest, and learn the basics of IT to use in their chosen field of practice in future.

Prof. J.P. Mahajan

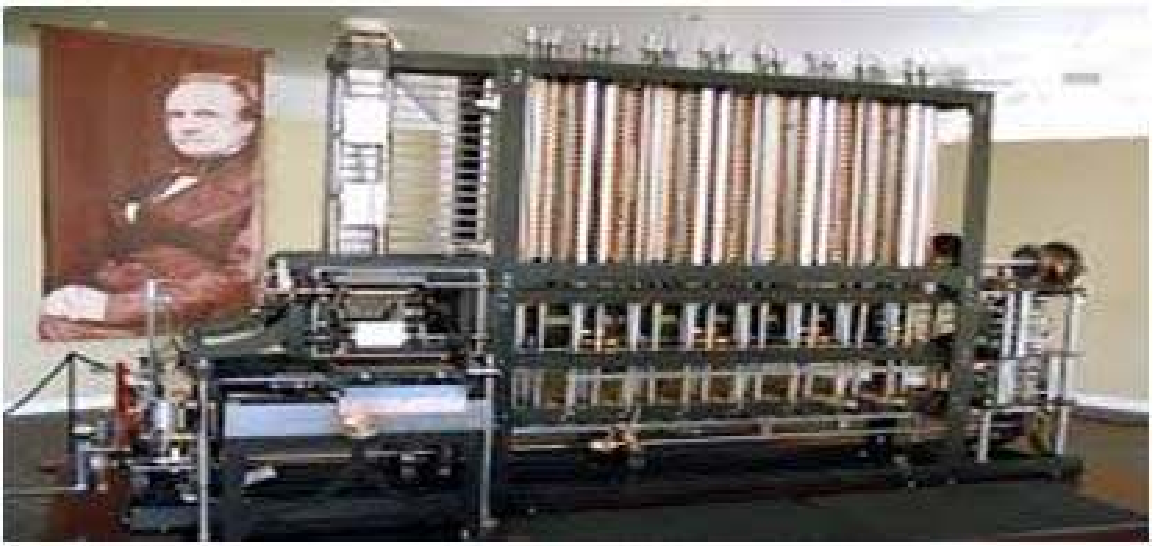
Charles Babbage: Father of Computers

(1791 – 1871)

Charles Babbage was the man who invented calculating machines. Ironically, his invention never became a reality in his lifetime, these machines were rightly seen as the forerunners of modern programmable computers.

Charles Babbage was the son of a banker, which may have been the source of his fascination with numbers. He occupied the Lucasian Chair of Mathematics at Cambridge from 1828 to 1839. Apart from being a mathematician, he was a person of wide knowledge and learning. Mathematical tables were important in Babbage's era for use in navigation, science and engineering. They were calculated by hand and then compiled into tables. Errors were sometimes made either in the calculation or in the compiling of the tables.

It is with this background that Babbage decided to design a mechanical device that could perform calculations. Such a machine would always be accurate and would save time and money.Babbage began building his first small model of the calculating engine in 1819 and it was completed in 1822 (Difference Engine). The machine calculated and printed mathematical tables and was powered by cranking a handle. The machine was called a “difference engine” after the mathematical theory on which the machine's operation was based.The British government was interested in his machine and Babbage was given £1,700 to begin on a full-scale machine. It was designed to calculate and tabulate polynomial functions.

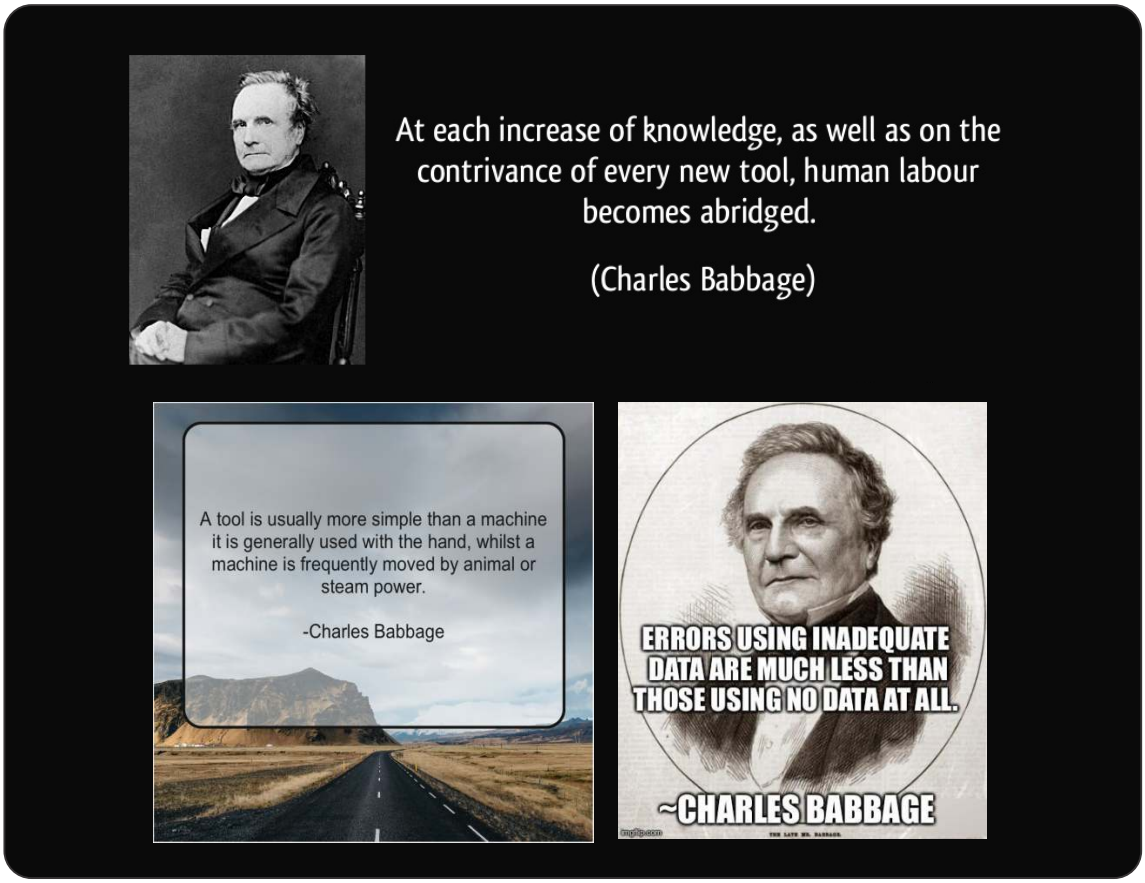


Difference Engine

In 1837, Babbage became interested in building a more ambitious analytical engine. This would be more powerful than the original difference engine and when built would be the first working computer for general-purpose computation.It was programmable by using punched cards, an idea borrowed from the Jacquard loom used for weaving complex patterns in textiles.

His machines were considered as one of the very first mechanical computers ever to be invented. The fact that they were not actually built was not due to a design flaw but rather, it was due to lack of funding.While the machines he designed were mechanical and bulky, the basic concept is similar to the modern computer. It is for this reason why he is often looked at as one of the pioneers of computers.Charles Babbage died on Oct. 18, 1871, aged 79. He is buried in the Kensal Green Cemetery in London.

Babbage's Brain is on Display at the London Science Museum



Cloud Computing: An Introduction

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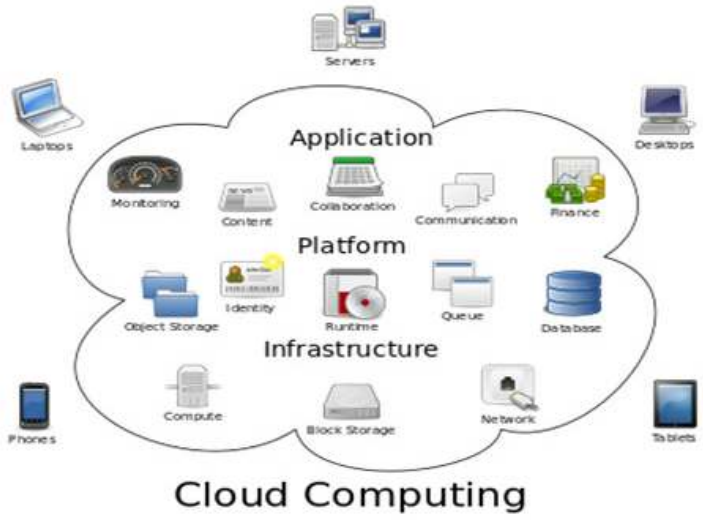
In basic terms, cloud computing is the phrase used to describe different scenarios in which computing resource is delivered as a service over a network connection (usually, the Internet). Cloud computing is therefore a type of computing that relies on sharing a pool of physical and/or virtual resources, rather than deploying local or personal hardware and software. It is somewhat synonymous with the term 'Utility Computing' as users are able to tap into a supply of computing resource rather than manage the equipment needed to generate it themselves; much in the same way as a consumer tapping into the national electricity supply, instead of running their own electricity-supplying unit.

Many businesses are using cloud computing that usually turns out to be cheaper, faster and easy to maintain. Now, not only businesses but regular Internet users are also using cloud computing services such as Google Docs, Drop Box and many more to access their files whenever and wherever they want. Cloud computing has accelerated with the wide use of the Internet services as well as development of mobile devices such as smartphones and tablets. Many people carry their portable devices when not on their desk and easily access their documents, media and pictures on cloud storage via the Internet.

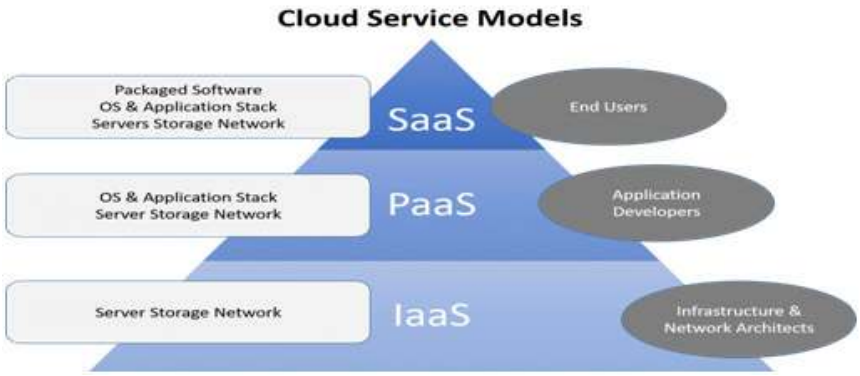
One of the key characteristics of cloud computing is the flexibility that it offers and one of the ways that flexibility is offered is through scalability. This refers to the ability of a system to adapt and scale to changes in workload. Cloud technology allows for the automatic provision and de-provision of resource as and when it is necessary, thus ensuring that the level of resource available is as closely matched to current demand as possible. This is a defining characteristic that differentiates it from other computing models where resource is delivered in blocks (e.g., individual servers, downloaded software applications), usually with fixed capacities and upfront costs. With cloud computing, the end user usually pays only for the resource he/she uses and so avoids the inefficiencies and expense of any unused capacity. However, the advantages of cloud computing are not limited to flexibility. Enterprises can also benefit (in varying degrees) from the economies of scale created by setting up services en masse with the same computing environments, and the reliability of physically hosting services across multiple servers where individual system failures do not affect the continuity of the service.



Cloud Computing Models

Following are three main models for cloud computing. Each model represents a different part of the cloud computing stack.

- ***Infrastructure as a Service (IaaS):*** Infrastructure as a Service, sometimes abbreviated as IaaS, contains the basic building blocks for cloud IT and typically provides access to networking features, computers (virtual or on dedicated hardware), and data storage space. Infrastructure as a Service provides you with the highest level of flexibility and management control over your IT resources and is most similar to existing IT resources that many IT departments and developers are familiar with today.
- ***Platform as a Service (PaaS):*** Platforms as a service remove the need for organizations to manage the underlying infrastructure (usually hardware and operating systems) and allow you to focus on the deployment and management of your applications. This helps you to be more efficient as you don't need to worry about resource procurement, capacity planning, software maintenance, patching, or any of the other undifferentiated heavy lifting involved in running your application.



Software as a Service (SaaS): Software as a Service provides you with a completed product that is run and managed by the service provider. In most cases, people referring to Software as a Service are referring to end-user applications. With a SaaS offering, you do not have to think about how the service is maintained or how the underlying infrastructure is managed; you only need to think about how you will use that particular piece of software. A common example of a SaaS application is web-based email where you can send and receive email without having to manage feature additions to the email product or maintaining the servers and operating systems that the email program is running on.

Why Should Business Use Cloud?

Following are the major reasons for business organizations to use cloud computing:

- **Agility:** The first main reason for using cloud computing is agility. Cloud computing delivers improved agility because it has on-demand self-service and rapid elasticity. IT resources can be acquired and deployed more quickly and, once deployed; they can be increased or decreased as needed to meet demand. This means that enterprises can innovate, introduce new products and services, enter new markets, and adapt to changing circumstances.
- **Changing Business Processes:** Business agility requires the ability to create new business processes and change existing ones. This often means adding to or changing the supporting IT resources. The difficulty of doing this, and the time that it takes, can be a major barrier to innovation. Cloud computing can remove this barrier by enabling the enterprise to add to or change its IT resources quickly and easily.
- **Development and Testing:** IT resources are often needed to support development and testing of new software. Procurement of these resources can introduce significant delay. In addition, the need to pay for expensive resources for development of a new product or service can add significantly to the business risk. Cloud computing comes as a great help in this regard also.
- **Resource Scaling:** Deployed services may experience increases and decreases in usage volumes that require corresponding increases and decreases in supporting IT resources to meet user demands in a cost-effective way. These increases and decreases can be handled easily by using cloud-based resources.
- **Reduced Need for Training:** As with other forms of outsourcing, public IaaS, PaaS, and SaaS enable an organization to acquire operation and support capabilities for IT infrastructure, platforms, and applications, without its staff having to acquire the corresponding specialist operation and support skills. This can dramatically cut the time taken to deploy these capabilities. In some cases, it can enable the organization to acquire capabilities that it would otherwise not consider.
- **Productivity:** Increased productivity is another main reason for using cloud computing. It provides a more productive environment for collaborative working, and improves productivity by enabling participants in a business ecosystem to share processing logic.
- **Collaborative Working:** Use of cloud-based tools for email, instant messaging, voice communication, information sharing and development, event scheduling, and conferencing is becoming an increasingly common feature of business life. This is so much the case that people often do not think about it as being "cloud computing".Nevertheless, these services generally exhibit the five essential cloud computing characteristics, and are part of the growing trend to do business "on the cloud". These features include: better usage information, better manageability, better quality of IT provision, better business continuity, and better carbon footprint.
- **Better Business Continuity:** Businesses wish to continue their operations as normal as possible in the event of disaster, such as a fire or flood destroying a data center, but the cost of providing duplicate systems and recovery mechanisms in-house can be very high. This is a significant pain-point, especially for small businesses, where the cost is proportionately higher than it is for large ones. This means that you must either incur significant costs that decrease your competitiveness, or risk failing when disaster strikes. Cloud can solve this problem. For large cloud vendors, economies of scale make the cost and effort of providing duplicate systems and recovery mechanisms a relatively small overhead, so that they can deliver disaster recovery capabilities to businesses of all sizes at low cost. Alternatively, businesses can implement disaster-recovery capabilities themselves by using cloud services whose underlying resources are geographically separated.
- **Better Carbon Footprint:** Cloud computing can make more efficient use of resources. This means a corresponding reduction in carbon footprint. With public cloud, there is the added advantage that the resource used is off-premise.

Cost: Cloud computing can help you achieve cost reduction through server consolidation, thin clients, or community cost sharing.

- ***Thin (Lean) Clients:*** A thin client is a lightweight computer that has been optimized for establishing a remote connection with a server-based computing environment. The server does most of the work, which can include launching software programs, crunching numbers, and storing data.

  Significant cost reductions can be obtained by replacing expensive client devices – such as high-specification PCs with high processing power and large amounts of memory – by cheaper, less powerful client devices that just provide a user interface to server applications that do most of the processing. This is, however, likely to mean a substantial increase in traffic between client and server across the network, and will not be viable unless the network is reliable and fast.

- ***Community Cost Sharing:*** Community cloud provides a way for a community of enterprises to share costs of common resources. If viable payment and governance models can be established – and these may not be easy things to achieve – then community cloud can be a very cost-effective way for those enterprises to obtain IT resources. Community cloud is perhaps the deployment model that is least talked about, at least in a commercial environment. It may nevertheless have a significant role to play, just as community software development has come to play a significant role through the open source movement.

New Business Opportunities: Cloud computing can give enterprise new business opportunities as a provider of cloud services or added services.

- **Cloud Service Provision:** A company that excels in the quality of its IT can become a public IaaS or PaaS provider. A particular case of this might be where a company implements a private cloud, has spare capacity, and sells that capacity as public cloud. Processing power, data storage, and computer operating system capabilities form the basis of most IaaS and PaaS services today. There may be opportunities to sell infrastructure or platform services based on other kinds of resource. For example, in Case 16: Service Delivery, a telecommunications service provider considers how it could provide "network as a service" and "transport as a service" to online consumer service companies.
- **Added Services Provision:** Software applications providers may well find that they can increase the markets for their products by providing them added services in the form of SaaS.

Car of the Future with Cloud Computing

Artificial Intelligence (from machine learning and general AI to neural networks)

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What is Artificial Intelligence (AI)?

Back in the 1950s, the fathers of the field **Minsky and McCarthy** described artificial intelligence as any task performed by a program or a machine that, if a human carried out the same activity, we would say the human had to apply intelligence to accomplish the task.

That obviously is a broad definition, which is why you will sometimes see arguments over whether something is truly AI or not.

AI systems will typically demonstrate at least some of the following behaviors associated with human intelligence: planning, learning, reasoning, problem-solving, knowledge representation, perception, motion, and manipulation and, to a lesser extent, social intelligence and creativity.

What Are the Uses for AI?

AI is ubiquitous today, used to recommend what you should buy next online, to understand what you say to virtual assistants such as **Amazon's Alexa and Apple's Siri**, to recognize who and **what is in a photo**, to spot **spam**, or **detect credit card fraud**.

What are the Different Types of AI?

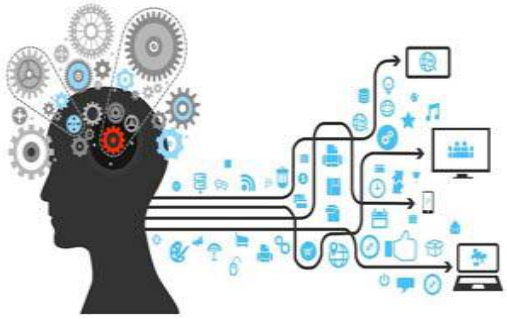
At a very high-level artificial intelligence can be split into two broad types: **Narrow AI** and **General AI**.

Narrow AI is what we see all around us in computers today: intelligent systems that have been taught or learned how to carry out specific tasks without being explicitly programmed how to do so.

This type of machine intelligence is evident in the speech and language recognition of the **Siri virtual assistant on the Apple iPhone**, in the **vision-recognition systems** on self-driving cars, in the recommendation engines that suggest products you might like based on what you bought in the past. Unlike humans, **these systems can only learn or be taught how to do specific tasks**, which is why they are called narrow AI.

What can Narrow AI do?

There are a vast number of emerging applications for narrow AI: interpreting video feeds from drones carrying out visual inspections of infrastructure such as oil pipelines, organizing personal and business calendars, responding to simple customer-service queries, co-ordinating with other intelligent systems to carry out tasks like booking a hotel at a suitable time and location, helping radiologists to spot potential tumours in X-rays, flagging inappropriate content online, detecting wear and tear in elevators from data gathered by IoT devices, the list goes on and on.



What can General AI do?

Artificial general intelligence is very different and is the type of adaptable intellect found in humans, a flexible form of intelligence capable of learning how to carry out vastly different tasks, anything from haircutting to building

spreadsheets, or to reason about a wide variety of topics based on its **accumulated experience**. This is the sort of AI more commonly seen in movies, the likes of **HAL in *2001* or Skynet in *The Terminator***, but which doesn't exist today, and AI experts are fiercely divided over how soon it will become a reality.

A survey conducted among four groups of experts in 2012-2013 by AI researchers **Vincent C Müller** and **Philosopher Nick Bostrom** reported a 50% chance that **Artificial General Intelligence** (AGI) would be developed between 2040 and 2050, rising to 90% by 2075. The group went even further, predicting that so-called 'superintelligence' -- which Bostrom defines as ***"any intellect that greatly exceeds the cognitive performance of humans in virtually all domains of interest"*** -- was expected some 30 years after the achievement of AGI.

That said, some AI experts believe such projections are wildly optimistic given our limited understanding of the human brain and believe that AGI is still centuries away.

What is Machine Learning?

There is a broad body of research in AI, much of which feeds into and complements each other. Currently enjoying something of a resurgence, machine learning is where a computer system is fed large amounts of data, which it then uses to learn how to carry out a specific task, such as understanding speech or captioning a photograph.

What are Neural Networks?

Key to the process of machine learning are neural networks. These are brain-inspired networks of interconnected layers of algorithms, called neurons, that feed data into each other, and which can be trained to carry out specific tasks by modifying the importance attributed to input data as it passes between the layers. During training of these neural networks, the weights attached to different inputs will continue to be varied until the output from the neural network is very close to what is desired, at which point the network will have 'learned' how to carry out a particular task.

A subset of machine learning is deep learning, where neural networks are expanded into sprawling networks with a huge number of layers that are trained using massive amounts of data. It is these deep neural networks that have fueled the current leap forward in the ability of computers to carry out task like speech recognition and computer vision.

There are various types of neural networks, with different strengths and weaknesses. Recurrent neural networks are a type of neural net particularly well suited to language processing and speech recognition, while convolutional neural networks are more commonly used in image recognition. The design of neural networks is also evolving, with researchers recently refining a more effective form of deep neural network called **long short-term memory** or LSTM, allowing it to operate fast enough to be used in on-demand systems like Google Translate.

Another area of AI research is an evolutionary computation, which borrows from Darwin's famous theory of natural selection, and sees genetic algorithms undergo random mutations and combinations between generations in an attempt to evolve the optimal solution to a given problem.

Finally, there are expert systems, where computers are programmed with rules that allow them to take a series of decisions based on a large number of inputs, allowing that machine to mimic the behavior of a human expert in a specific domain. An example of these knowledge-based systems might be, for example, an autopilot system flying a plane.

What are the Elements of Machine Learning?

As mentioned, machine learning is a subset of AI and is generally split into two main categories: **supervised** and **unsupervised learning**.

Supervised Learning

A common technique for teaching AI systems is by training them using a very large number of labeled examples. These machine-learning systems are fed huge amounts of data, which has been annotated to highlight the features of interest. These might be photos labeled to indicate whether they contain a dog or write sentences that have footnotes to indicate whether the word 'bass' relates to music or a fish. Once trained, the system can then apply these labels can to new data, for example to a dog in a photo that's just been uploaded.

This process of teaching a machine by example is called supervised learning and the role of labeling these examples is commonly carried out by online workers, employed through platforms like Amazon Mechanical Turk.

Training these systems typically requires vast amounts of data, with some systems needing to scour millions of examples to learn how to carry out a task effectively -- although this is increasingly possible in an age of big data and widespread data mining. Training data sets are huge and growing in size -- **Google's Open Images Dataset has about nine million**

images, while its labeled video repository **YouTube-8M** links to seven million labeled videos. ImageNet, one of the early databases of this kind, has more than 14 million categorized images. Compiled over two years, it was put together by nearly 50,000 people -- most of whom were recruited through Amazon Mechanical Turk -- who checked, sorted, and labeled almost one billion candidate pictures.

In the long run, having access to huge labeled data sets may also prove less important than access to large amounts of compute power.

In recent years, **Generative Adversarial Networks**(GANs) have shown how machine-learning systems that are fed a small amount of labeled data can then generate huge amounts of fresh data to teach themselves.

This approach could lead to the rise of semi-supervised learning, where systems can learn how to carry out tasks using a far smaller amount of labeled data than is necessary for training systems using supervised learning today.

Unsupervised Learning

In contrast, unsupervised learning uses a different approach, where algorithms try to identify patterns in data, looking for similarities that can be used to categorize that data.

An example might be clustering together fruits that weigh a similar amount or cars with a similar engine size.

The algorithm isn't setup in advance to pick out specific types of data, it simply looks for data that can be grouped by its similarities, for example, Google News grouping together stories on similar topics each day.

How Can I Get Started with AI?

While you could try to build your own GPU array at home and start training a machine-learning model, probably the easiest way to experiment with AI-related services is via the cloud.

All of the major tech firms offer various AI services, from the infrastructure to build and train your own machine-learning models through to web services that allow you to access AI-powered tools such as speech, language, vision and sentiment recognition on demand.

How will AI Change the World?

- **Robots and driverless cars:** The desire for robots to be able to act autonomously and understand and navigate the world around them means there is a natural overlap between robotics and AI. While AI is only one of the technologies used in robotics, use of AI is helping robots move into new areas such as self-driving cars, delivery robots, as well as helping robots to learn new skills. General Motors recently said it would build a driverless car without a steering wheel or pedals by 2019, while Ford committed to doing so by 2021, and Waymo, the self-driving group inside Google parent Alphabet, will soon offer a driverless taxi service in Phoenix.
- **Speech and language recognition:** Machine-learning systems have helped computers recognize what people are saying with an accuracy of almost 95 percent. Recently Microsoft's Artificial Intelligence and Research group reported it had developed a system able to transcribe spoken English as accurately as human transcribers.
- **Facial recognition and surveillance:** In recent years, the accuracy of facial-recognition systems has leapt forward, to the point where Chinese tech giant Baidu says it can match faces with 99 percent accuracy, providing the face is clear enough on the video. While police forces in western countries have generally only trialled using facial-recognition systems at large events, in China the authorities are mounting a nationwide program to connect CCTV across the country to facial recognition and to use AI systems to track suspects and suspicious behavior, and are also trialling the use of facial-recognition glasses by police.
- **Healthcare:** AI could eventually have a dramatic impact on healthcare, helping radiologists to pick out tumors in x-rays, aiding researchers in spotting genetic sequences related to diseases and identifying molecules that could lead to more effective drugs. There have been trials of AI-related technology in hospitals across the world. These include IBM's Watson clinical decision support tool, which is trained by oncologists at Memorial Sloan Kettering Cancer Center, and the use of Google DeepMind systems by the UK's National Health Service, where it will help spot eye abnormalities and streamline the process of screening patients for head and neck cancers.

Will an AI Steal Your Job?

- While AI won't replace all jobs, what seems to be certain is that AI will change the nature of work, with the only question being how rapidly and how profoundly automation will alter the workplace.
- There is barely a field of human endeavor that AI doesn't have the potential to impact. As AI expert Andrew Ng puts it: "many people are doing routine, repetitive jobs. Unfortunately, technology is especially good at automating routine, repetitive work", saying he sees a "significant risk of technological unemployment over the next few decades".

- Fully autonomous self-driving vehicles aren't a reality yet, but by some predictions the self-driving trucking industry alone is poised to take over 1.7 million jobs in the next decade, even without considering the impact on couriers and taxi drivers.
- Yet some of the easiest jobs to automate won't even require robotics. At present there are millions of people working in administration, entering and copying data between systems, chasing and booking appointments for companies. As software gets better at automatically updating systems and flagging the information that's important, so the need for administrators will fall.
- As with every technological shift, new jobs will be created to replace those lost. However, what's uncertain is whether these new roles will be created rapidly enough to offer employment to those displaced, and whether the newly unemployed will have the necessary skills or temperament to fill these emerging roles.
- Not everyone is a pessimist. For some, AI is a technology that will augment, rather than replace, workers. Not only that but they argue there will be a commercial imperative to not replace people outright, as an AI-assisted worker -- think a human concierge with an AR headset that tells them exactly what a client wants before they ask for it -- will be more productive or effective than an AI working on its own.
- Among AI experts there's a broad range of opinion about how quickly artificially intelligent systems will surpass human capabilities.
- Oxford University's Future of Humanity Institute asked several hundred machine-learning experts to predict AI capabilities, over the coming decades.
- Notable dates included AI writing essays that could pass for being written by a human by 2026, truck drivers being made redundant by 2027, AI surpassing human capabilities in retail by 2031, writing a best-seller by 2049, and doing a surgeon's work by 2053.
- They estimated there was a relatively high chance that AI beats humans at all tasks within 45 years and automates all human jobs within 120 years.

Heterogeneous Network Environment & Challenges

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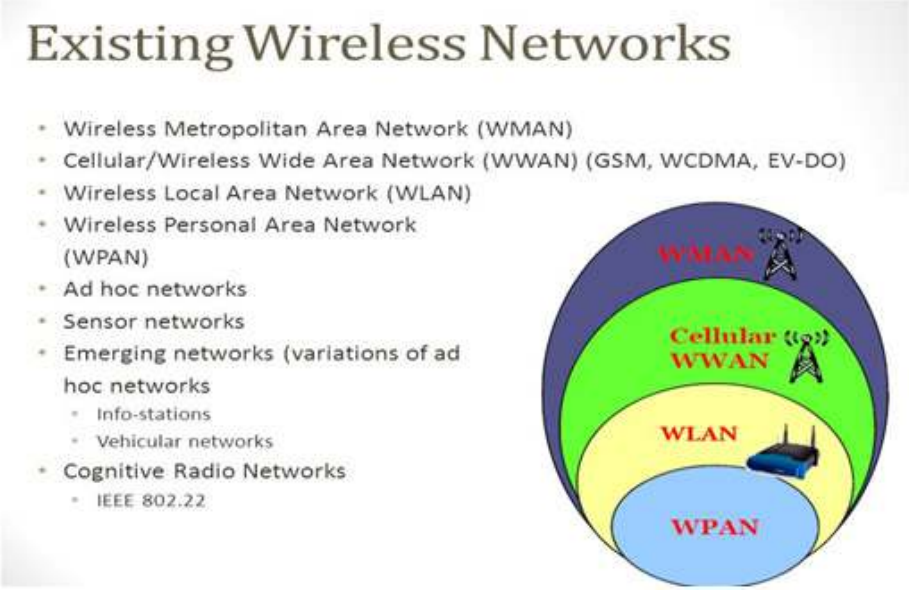
Introduction

The emergence of the cellular and wireless network technologies have changed the recent scenarios of the world. The goal of communication and network is to transfer and access information anytime, anyplace and any device. To provide all time best connectivity (ABC), network technology needs to be integrated in order to achieve common goal. The integrated heterogeneous network has proven its role as a major source of network innovation and future evolving concepts such as the Cloud of Things (CoT), Web of Things (WoT). Current network is more heterogeneous rather than homogeneous. For example, a wireless network, which provides a service through a wireless LAN and is able to maintain the service when switching to a cellular network, is called a wireless heterogeneous network. In order to keep in pace with the growing demand of the mobile users and traffic demand, the service providers have to coordinate with different radio access technologies, such as: WLAN, WiMAX, UMTS, LTE and sensor. The wireless network starting from 1G to 4G has focused on providing various services as per users' priority. The number of Internet users has grown enormously after the launch of the recent 4G LTE technology and user growth becomes exponential in future 5G technology.

Many applications have come up after the introduction of the unlicensed band spectrum for wirelessly accessible networks. In fact, there is a huge potential to create many more applications by taking advantage of low-power and low-range wide-area networks such as LoRaWAN, Wi-Fi and IEEE 802.11a/b/g/n. Heterogeneous network is a convergence of WPAN, WLAN, WMAN, WWAN, Adhoc, sensor and other type of network.



Heterogeneous networks provide deployment flexibility along with scalable capacity in situations of high demand. Traffic will keep on the rise, with new expectations of mobile consumers, the introduction of heterogeneous networks is an attractive solution for meeting such high capacity demand and performance related goals. The objective of this article is to introduce heterogeneous network and its environment.

Heterogeneous Network Environment

There is not only network heterogeneity, but also in device, applications, operating system, protocols and network providers. This aspect of heterogeneous network environment is discussed in the following sections.

- Network Heterogeneity:Today, multiple networks are coexistent. User can select any network as per his need and choice. These networks ranging from WPAN, WLAN, WMAN, WWAN, cellular, satellite network and other types of network. These networks are heterogeneous based on range of signal, bandwidth efficiency, frequency band, modulation technique and so on.

- Device Heterogeneity:Now-a-days, people connect to the network by using different devices. These devices include PDAs, smartphone, laptop, traditional desktop, wearable computers and so on. These devices are heterogeneous in term of sizes (smaller to larger).The Mobile devices are getting smaller, lighter, and more powerful; they have bigger screens and longer battery life, more features and more capabilities.
- Operating System Heterogeneity:User can use his devices with a variety of operating systems (Linux, Windows, Android … MAC, etc.). These devices coordinate with each other and can access network service seamlessly regardless of their type.
- QoS Class Heterogeneity:The user is using various different QoS classes of services such as conversational, streaming, interactive and background services. These QoS classes referred as traffic classes. Conversations and streaming services are called real time traffic due to stringent requirement of delay. The other two, interactive and background classes are called as non-real time traffic. These traffic classes can be differentiated with network parameter. Network parameters are jitter, delay, bit error rate, bandwidth, packet lost, etc. There is heterogeneous requirement of network parameter in QoS classes, for example conversational class is delay sensitive while background class is delay insensitive. The most distinguishing factor between the QoS classes is the requirement for real time services. Table 1, represents the type of QoS classes and network parameter requirement.
- Network Service Providers Heterogeneity: There are a number of service providers. These providers are heterogeneous in term of service capacity, coverage and standard. Its vary from country to country and state to state. In India's four major 4G operators Airtel, Idea, Jio and Vodafone as well as the 3G services of BSNL Mobile. Though India has many more operators than these five. User can select and port any operators, according to their quality of experience (QoE).

Table 1: Class of Service and Parameter Requirement

Serial Number	Class of Services	Example	Network Parameter Requirement
1.	Conversational, example voice,	Voice	Minimum delay required
2.	Streaming	Video streaming	Minimum Jitter and Maximum Throughput required
3.	Interactive	WWW,Web Browsing	Required low delay, but less sensitive to conversational.
4.	Background	Email, SMS	Minimum bit error rate and packet loss. Delay is not an important parameter

Challenges of Heterogeneous Network

To achieve a truly ubiquitous and heterogeneous network, different types of networks will have to be interconnected and interoperable. The major challenge for the heterogeneous wireless systems is Quality of service (QoS) and efficient resource utilization. The key challenges and issues involving in heterogeneous networks are listed below:

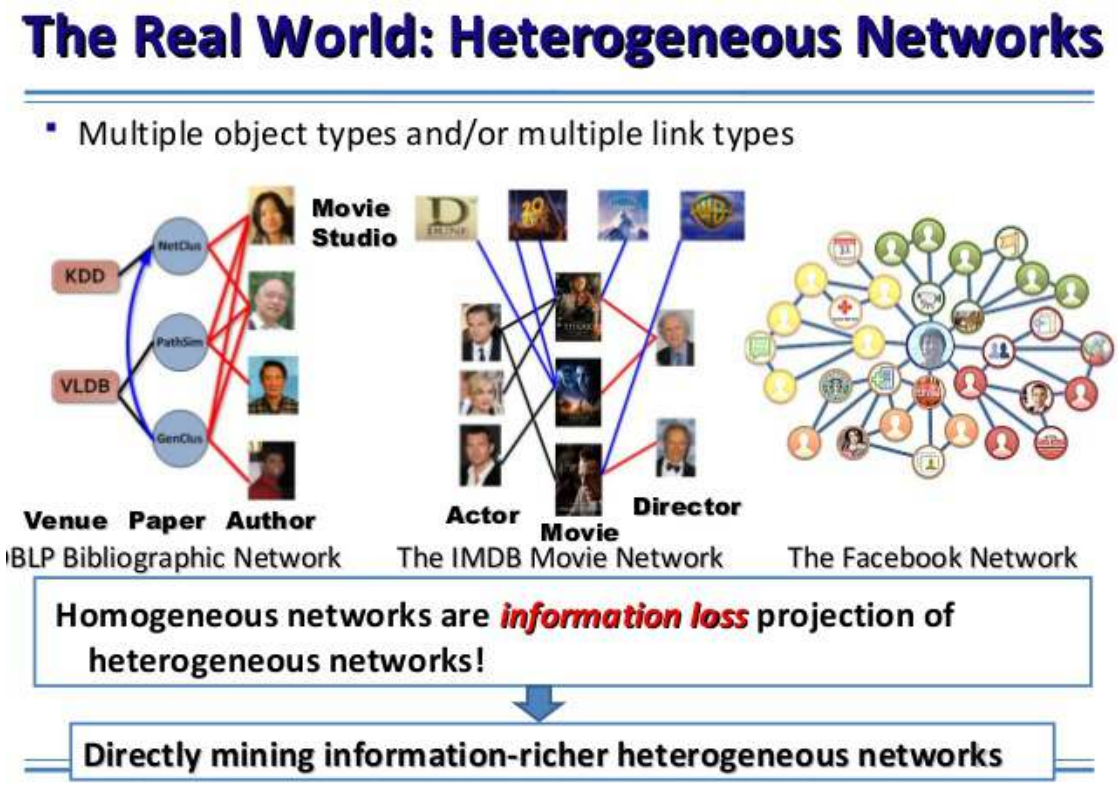
- ***Network Integration:*** Due to the different size, capacity and protocols of multiple network, one of the important challenges in heterogeneous networks are their integration in a common term that is called as heterogeneous network.
- ***Mobility Management:*** Mobility management is of two variations; handoff management and location management. In case of high mobility user will switch from one network to another. This process is called a handoff. Delay in handoff could degrade network QoS. Handoff management is a very challenging task in a heterogeneous network. Further, keeping track of the location of mobile users in heterogeneous network is not simple due to the involvement of multiple network in a single location and user mobility. An efficient way

to disseminate and update user information between heterogeneous networks remains an open challenge in QoS.

- ***Resource Allocation:*** Due to the coexistence of multiple networks and user mobility, resource coordination becomes a challenging task for each added new user. Improper coordination may lead to degradation in the QoS of heterogeneous network.
- ***Security:*** In heterogeneous networks, due to different access technologies may have required different security requirements, and multi-network environment may need high frequent authentications with stringent delay constraints.
- ***Pricing and billing:*** In HN new pricing and billing perspective is rising where user can select and connect to the service providers. How to integrate and generate bills for heterogeneous user becomes a challenging issue. A distributed, rule-based pricing strategy aimed to enhance the quality of service and to increase the global benefits of the service provider.
- ***User Churning:*** There are multiple network service providers. The user is free to port any providers, according to his QoE. This multiple option lead churning. How to retain their user/customer becomes a challenging task. User satisfaction is important in case of telecom industry just like in other industry.

Conclusion

In this article, we have provided an overview of heterogeneous network environment and challenges. IT industry is characterized by a high degree of heterogeneity. QoS of heterogeneous network can be reached by an appropriate tuning of heterogeneous network environments. Enhancements of the existing heterogeneous network system will be developed in order to address the need for higher network capacity and enrich the mobile broadband experience.



Location-Based Tech Tools
Digital Marketing is more than Social Media

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Digital marketing is not limited to marketing of offerings by using social media platforms. It is about accomplishing marketing goals by using electronic communications technology like digital interactive TV, Personal Digital Assistants (PDA) etc. and network communication technologies such as 3G, 4G Mobiles.

"Digital marketing embraces technologies which shape online marketing channels like www., e-mail, databases, mobile and wireless text communicators, mobile instant messaging, podcast, fax & search engines . Thus Digital marketing represent a bundle of marketing tools developed by using different kind of technologies for business purpose."

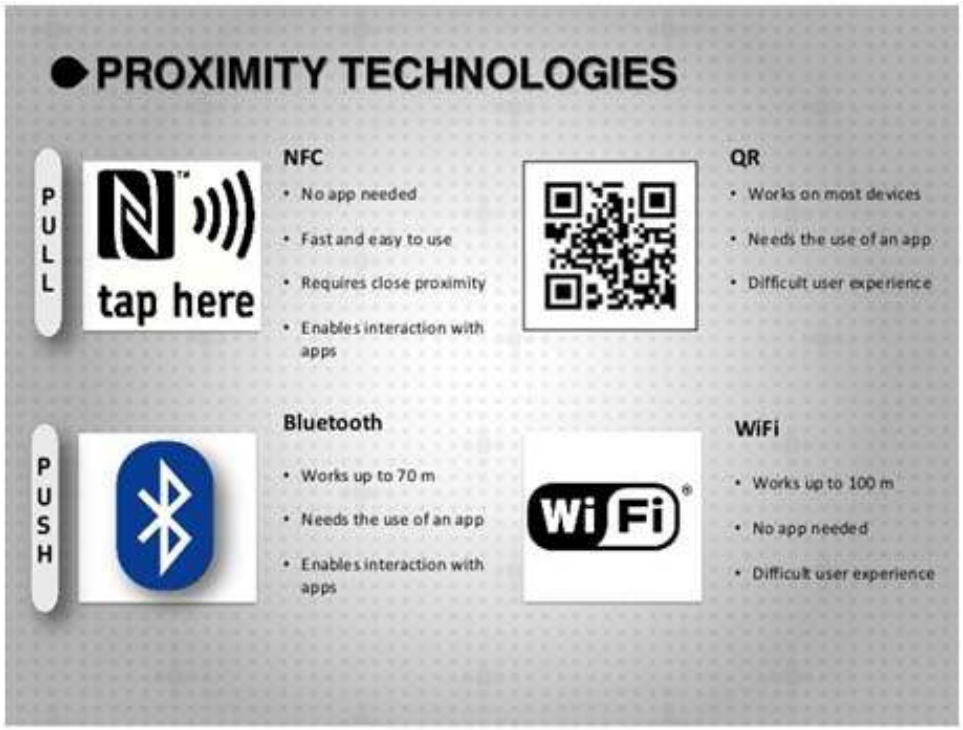
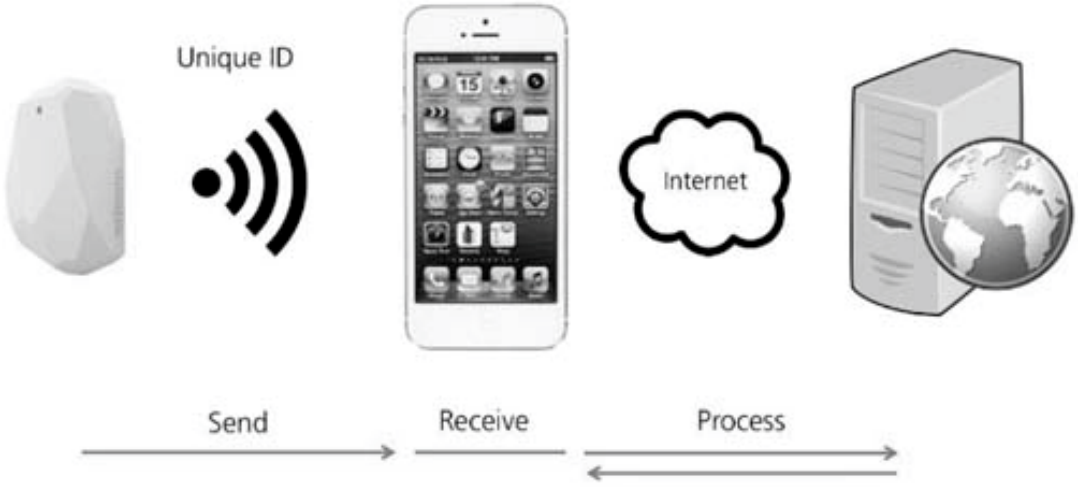


Image Credit: http://www.slideshare.net/MobileMarketingMag/daniel-angel-tamoco-making-sense-of-proximity-marketing-2014

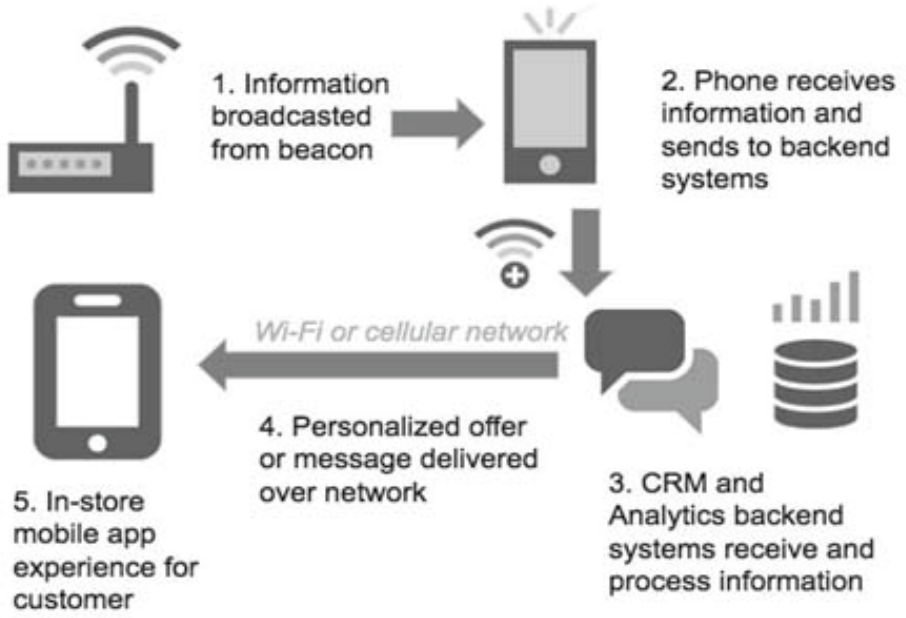
Recent addition to the categories of digital marketing tools is location-based digital marketing tools.GPS is one such technology that is used to develop many apps for delivering location information about the things on a big geographic area but the category I am talking about is different as it is a kind of indoor location or positioning technology and I anticipate that it is going to be among popular trend in 2017 as far as digital marketing is concerned. I am talking about BLE Beacons.

BLE Beacon

Bluetooth Low Energy Beacons is a device that broadcast a universally unique identifier which can interact with BLE Beacon compatible electronic application. Apple's iBeacons is a form of BLE Beacon. This technology facilitates the interaction with potential or actual consumer having smart phone as soon as he/she come in the rage area (approx. 50 meter) of BLE Beacon



As a digital marketer I see this technology as a tech-bridge between online marketing activities and offline marketing efforts.Since proximity is important for the application of this tech-mechanism so a new marketing buzz word has already in use called 'Proximity Marketing'.However this technology can be used for tracking of material goods, customers, guests, employees etc. so it has a wide range of application.



Credit: https://www.code-brew.com/future-beckons-welcoming-arrival-beckons-understanding-work/

BLE Beacons & Indian Tourism

Tourism marketing in India is about how well we can tell and sell stories related to tourism destinations. As of now tourist guides do this job but this technology can be used to empower tourists to take self planned tours as location based information along with various other essential information can be delivered to tourist. Tourist can be informed to persuade about the nearby other tourism destination with the help of targeted advertising as well.

Functions, Fair, Events and BLE Beacons

India is a country of festivals. Every year millions of people attend lots of events. Now BLE Beacons based mobile applications can enable you to know which of your known is around you at a certain location in an event. In a business event the guest can be connected with the invite in real time and various updates and messages can be shared. This certainly adds value to professional networking.

Retail Marketing, B2B Marketing, Real Estate Sale etc. are some of the potential users of this technology as various promotional offers, brand messages, information updates regarding discounts, loyalty program etc. can be easily delivered.This technology also offers entrepreneurial opportunity to develop mobile applications and other related hardware to meet the industry requirement.

Business Intelligence: An Overview

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Business environment is continuously changing and today it has become more complex (pressures).The environmental forces require managers to respond quickly. In order to take quick decisions, they need relevant amount of data, information and knowledge. One of the key tools for managers in modern day is decision support systems, which use data and models to support management decision making in different ways. Now-a-days, what previously used to be called decision support systems, often comes under the umbrella of business intelligence. Analytics is the core of business intelligence, which describes the application of mathematical techniques to organizational operations. Organizations need to collect data in order to be able to understand and improve their business. They need models related to analytics to interpret the data.

What is BI?

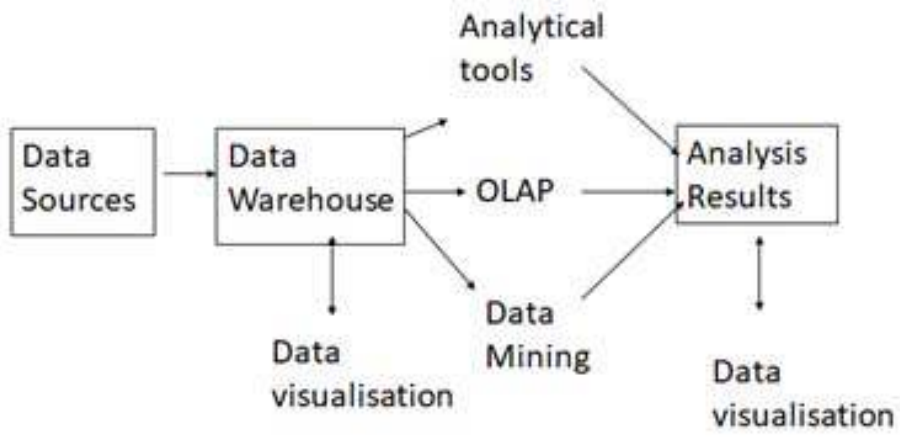
The term BI was coined by the Gartner Group in the mid-1990s.The Gartner Group is a global research and advisory firm providing insights, advice, and tools for leaders in IT, Finance, HR, Customer Service and Support, Legal and Compliance, Marketing, Sales, and Supply Chain functions across the world. They are a member of the S&P 500.

Business intelligence (BI) is a technology-driven process for analyzing data and presenting actionable information to help managers make informed business decisions and strategies. Business intelligence combines architecture, database or data warehouse, analytical tools and applications. Main objective of BI is to enable interactive access to data so that it can be manipulated by business managers for the purpose of good decision making.

BI involves acquiring data and information from a wide variety of sources and utilising them in decision-making.“The processes, technologies, and tools needed to turn data into information, information into knowledge, and knowledge into plans that drive profitable business action. Business intelligence encompasses data warehousing, business analytic tools and content/knowledge management”

BI is used for in-depth analysis of company data for better decision-making. Models are used to analyse data. Business intelligence (BI) simplifies information discovery and analysis, making it possible for decision-makers at all levels of an organization to get its easy accessibility, understand, analyse, collaborate, and act on information, anytime and anywhere .The technology and processes that make this analysis possible take unwieldy collections of information and translate them into organized, readily-accessible, human-readable compilations of data.

Data is the core of BI,it should be authentic, relevant and timely. Data is Gathered from relevant sources, filtered, and stored, analysed and arranged into meaningful patterns using different tools. Business intelligence is the knowledge gained from such data analysis.



What Can Companies do with BI?

An organization can track their own operations, track customer's activity patterns and industry trends. It can conduct fact-based assessments that help company work towards specific goals with confidence.

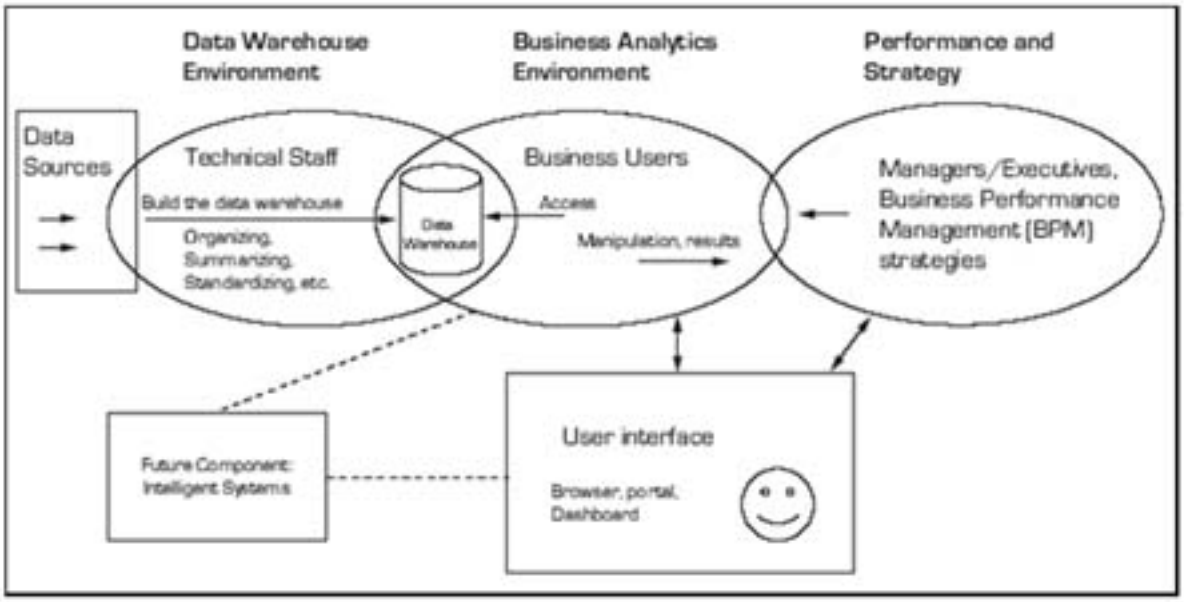
Where Does the Data Come From?

Data can be collected manually or automatically. Transaction data e.g. supermarket checkout, bank withdrawal, time studies, questionnaire, observation notes etc. Physical sensors e.g. temperature of a rooms in a house. Sensors, scanners, bar codes etc.

Depending on companies' goals, functional areas(e.g.,sales, HR, marketing) and what processes company is looking for decides the data to be chosen for analysis. Data quality is also an important issue in this regard. Data should be contextual-i.e. relevance, value, timeliness completeness, amount needed for data collection. Data should be Intrinsic i.e. it should be accurate, serves objectivity, authenticity and supports reputation, Data representation should also be easy i.e. its interpretability, ease of understanding, concise, consistent representation of data is important.

BI's Architecture and Components

1. Data Warehouse "How data is stored
2. Business Analytics (Data Mining/OLAP):How data is analyzed
3. Business Performance Management (BPM)
4. User Interface



What is a Data Warehouse?

A data repository makes operational and other data accessible in a form that is readily acceptable for decision support and other user applications. A data warehouse is notanother word for database. The specific purpose of a data warehouse is to support decisions not operations.

How is Data Analysed?

Different analytics techniques and models are used to analyse the data–types of modes normally used areSimulation,Decision analysis,Statistics: averages, correlations, linear programming: optimisation,queuing theory: "waiting line"analysis,network analysis: maximise flow through a network e.g. A supply chain,Multi-criteria decision making: scoring models.

Online Analytical Processing (OLAP) makes it quick and easy to perform ad-hoc queries and analysis of large amounts of complex data across all aspects of your business.OLAP enables to look at and access data in different ways (3-D data cubes), drill down, view summarised data, make calculations on the fly etc.

Data mining is a capability to support the recognition of previously unknown but potentially useful relationships within large databases/ data warehouses,basically a software to analyse data and spot patterns.

Business Performance Management (BPM)

Applications and methodology --BPM extends the monitoring, measuringand comparing of sales, profit, cost, profitability, and other performance indicators by introducing the concept of management and feedback.

User Interface

Dashboards and Other Information Broadcasting Tools are used as interface. It is a visual presentation of critical data for executives to view andit allows them to see hot spots within seconds and explore the situation.

Benefits of BI

- Time savings
- Single version of truth
- Improved strategies and plans
- Improved tactical decisions
- More efficient processes
- Cost savings
- Faster, more accurate reporting
- Improved decision making
- Improved customer service
- Increased revenue

Major BI Tools and Techniques

- Data Management (DBMS)
- Reporting, status tracking (OLAP)
- Visualization (DASHBOARD)
- Strategy and Performance Management (BPM)
- Business analytics (DATA MINING)
- Social networking(Web 2.0)
- New/advanced tools/techniques to handlemassive data sets for knowledge discovery

To summarize one of the major objectives of BI is to facilitate closing the gap between the current performance of an organization and its desired performance as expressed in its mission, objectives and goals and the strategy for achieving them.*The process of BI is based on the transformation of data to information, then to decisions, and finally to action.*

ERP

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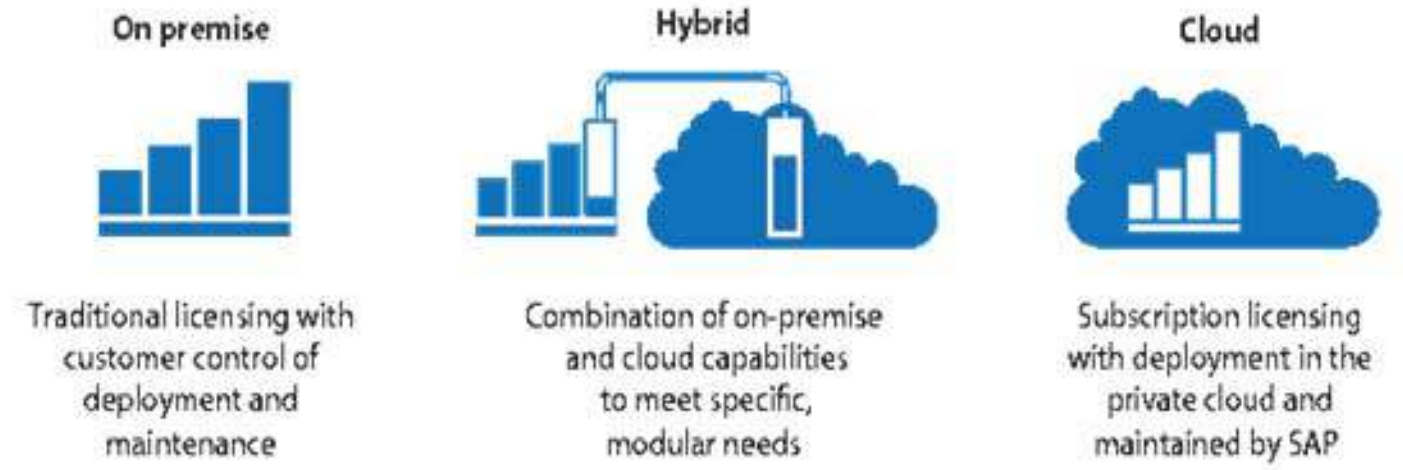
E*nterprise* **R***esource* **P***lanning* **(ERP)** is a businessmanagement software which allows various business processes to integrate under one platform related to different departments of an organization that helps to automate the various business functions of an organization.

ERP software comprises numerous core components of business process called Modules integrated together from various business areas like marketing, SCM (supply chain management), CRM (customer relationship management), finance, accounting, inventory, etc. Every organization customizes these modules or components based upon their and clients' requirements.

ERP software is different from stand-alone software application. ERP software is basically a business management system with various integrated comprehensive systems that can be used to manage and integrate all business functions within the organization. On the other hand, stand-alone business applications are designed for specific customer needs but have limited functionality and are isolated from other applications.

ERP implementation options are available on premise, cloud and a mix of the two, called hybrid, such as with platform as a service and infrastructure as a service.



Although ERP has historically been associated with expensive, monolithic, end-to-end implementations, cloud versions now enable easier deployment, which small and medium businesses (SMBs) are taking advantage of in greater numbers.

Some ERP systems also offer next-generation capabilities, such as **AI, IoT** and advanced analytics, to foster digital transformation. Businesses typically turn to an ERP system when they outgrow spreadsheetsand need the unifying capabilities of an ERP system to enable growth. As with many technology products, the specific definition of what constitutes ERP can vary widely from vendor to vendor

Many consider ERP software to be a requirement for enterprises -- especially for core business functions such as finance. The sheer volume of data that companies generate, along with the complexity of the global business landscape and modern consumer demands, has made streamlining business processes and managing and optimizing data increasingly critical. An ERP software system is typically at the core of such capabilities. There are advantages and disadvantages associated with the implementation of ERP.

Advantages

- Can save money over the long run by streamlining processes.
- Provides a unified system that can lower IT-related expenses and end-user training costs.
- Enables greater visibility into myriad areas of the business, such as inventory, that are critical for meeting customer needs.
- Enables better reporting and planning due to better data.
- Offers better compliance and data security, along with improved data, backup and the ability to control user rights.

Disadvantages

- Can have a high upfront cost.
- Can be difficult to implement.
- Requires change management during and after implementation.

Basic, core ERP modules may be less sophisticated compared to targeted, stand-alone software. Companies may require

additional modules for more control and better management of specific areas, such as the supply chain or customer relationship capabilities.
The deployment of a new ERP system in-house can involve considerable business process re-engineering, employee retraining and back-end support for database integration, data analytics and adhoc reporting. However, for a number of reasons, an ever-increasing number of companies are moving to cloud ERP, especially SaaS and hybrid ERP -- where part of the ERP software suite runs on premises and part runs in the cloud

Cloud-based ERP modules are built to be loosely coupled, which can reduce the cost and complexity of a deployment. Because cloud ERP does not require the hardware and infrastructure necessary for on-premises implementations, it can save on costs, both in terms of the technology purchases required and the IT staff required managing it. Cloud ERP may also be more efficient with automatic upgrades and easier scaling.
The most widely deployed legacy platforms are SAP, Oracle and Microsoft Dynamics, all of which have multiple ERP brands and on-premises and cloud deployment options. Their customers range from large enterprises to SMBs.
Other leading vendors include Epicor Software Corp., Infor, IFS World, Sage Software Inc., Syspro USA, IQMS and QAD Inc. Leading cloud ERP vendors include NetSuite Inc., Kenandy Inc., Acumatica Inc. and Plex..

Internet of Things (IoT)

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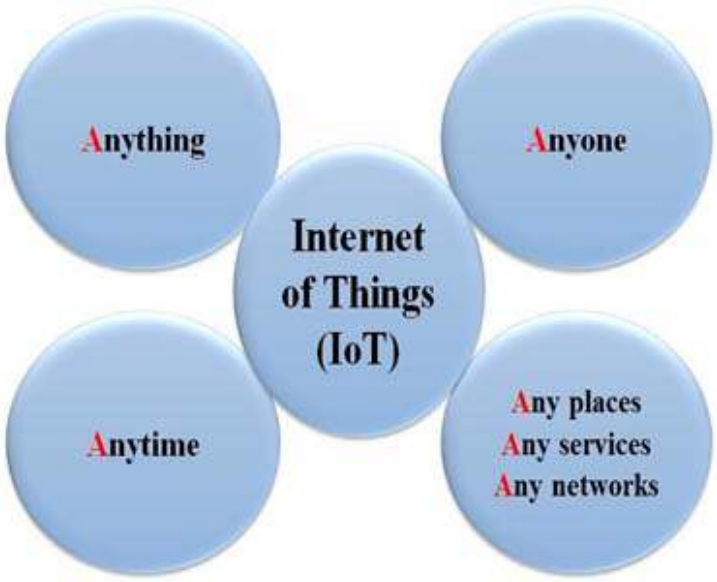
Introduction

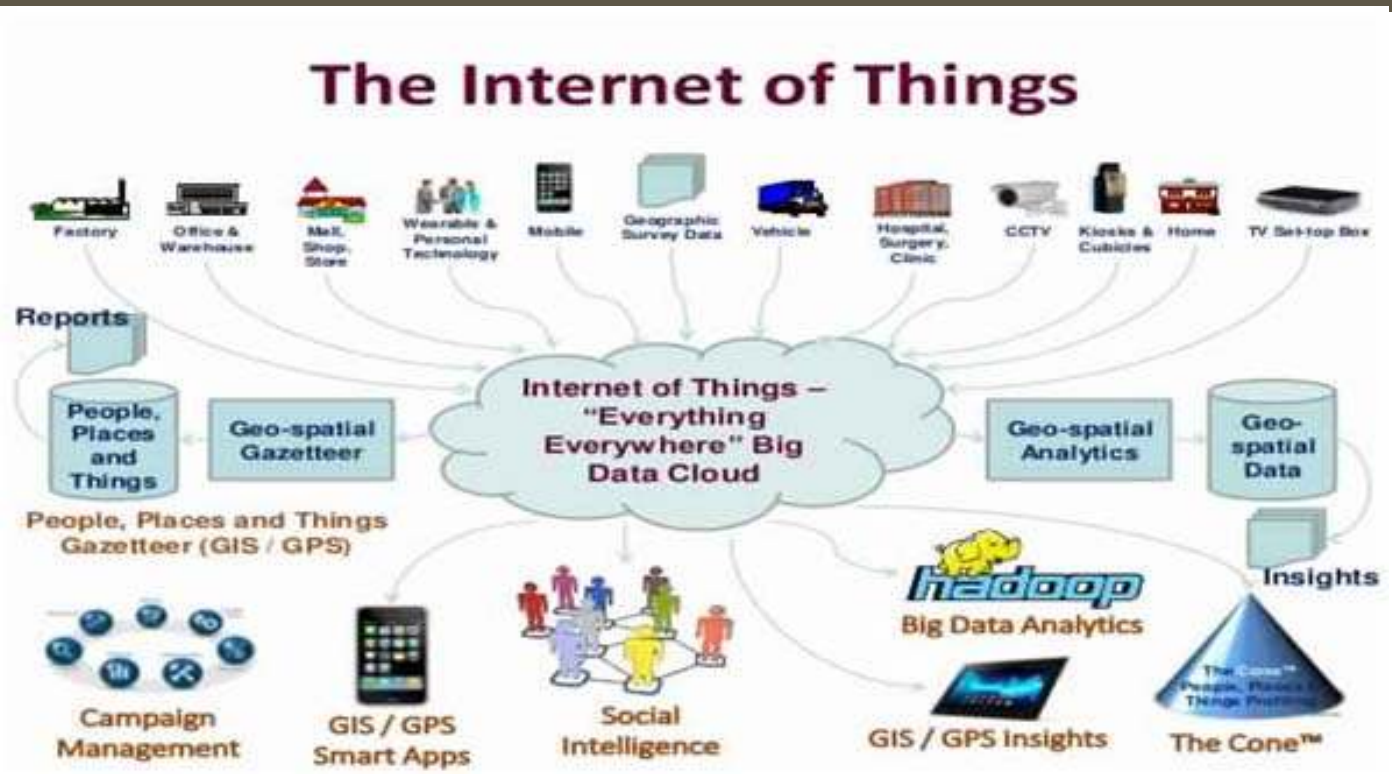
With the continuous advancements in technology a potential innovation, IoT is coming down the road which is burgeoning asan ubiquitous global computing network where everyone and everything will be connected to the Internet. IoT is continuallyevolving and is a hot research topic where opportunities are infinite. Imaginations are boundless which have put it on the vergeof reshaping the current form of internet into a modified and integrated version. The number of devices availing internet services isincreasing every day and having all of them connected by wire orwireless will put a powerful source of information at our finger tips



The concept of enabling interaction between intelligent machines isa cutting-edge technology but the technologies composing the IoT are not something new for us. IoT, as you can guess by its name,is the approach of converging data obtained from different kinds ofthings to any virtual platform on existing Internet infrastructure.The concept of IoT dates back to 1982 when a modified coke machine was connected to the Internet which was able to report thedrinks contained and that whether the drinks were cold.

Later In 1991, a contemporary vision of IoT in the form of ubiquitousComputing was first given by Mark Weiser . However in 1999,Bill Joy gave a clue about Device to Device communication in histaxonomy of internet. In the very same year, Kevin Ashton pro-posed the term "Internet of Things" to describe a system of inter-connected devices.

The basic idea of IoT is to allow autonomous exchange of usefulinformation between invisibly embedded different uniquely identifiable real world devices around us, fueled by the leading technologies like Radio-Frequency Identification (RFID) and Wireless Sensor Networks (WSNs) which are sensed by the sensor devices and further processed for decision making, on the basis ofwhich an automated action is performed..



Radio Frequency Identification (RFID)

RFID is the key technology for making the objects uniquely identifiable. Its reduced size and cost make it integral to any object. It is a transceiver microchip similar to an adhesive stickerwhich could be both active and passive, depending on the type of application. Active tags have a battery attached to them dueto which they are always active and therefore continuously emitthe data signals while Passive tags just get activated when they aretriggered. Active tags are more costly than the Passive tags however they have a wide range of useful applications. RFID system comprises readers and associated RFID tags which emit the identification, location or any other specifics about the object, on getting triggered by the generation of any appropriate signal. Theemitted object related data signals are transmitted to the readers. Using radio frequencies, these are then passed onto the processors to analyze data.

Depending on the type of application, RFID frequencies are dividedinto four different frequencies ranges, which are given below:

1. Low frequency (135 KHz or less)
2. High Frequency (13.56MHz)
3. Ultra-High Frequency (862MHz 928MHz)
4. Microwave Frequency (2.4G, 5.80)

Applications of IoT

Consumer applications: A growing portion of IoT devices are created for consumer use, including connected vehicles, home automation, wearable technology, connected health, and appliances with remote monitoring capabilities.

Smart homes: IoT devices are a part of the larger concept of home automation, which can include lighting, heating and air conditioning, media and security systems. Long term benefits could include energy savings by automatically ensuring lights and electronics are turned off.A smart home or automated home could be based on a platform or hubs that control smart devices and appliances. For instance, using Apple's HomeKit, manufacturers can get their home products and accessories be controlled by an application in iOS devices such as the iPhone and the Apple Watch having dedicated app or iOS native applications such as Siri. There are also dedicated smart home hubs that are offered as standalone platforms to connect different smart home products and these include the Amazon Echo, Apple's HomePod, and Samsung's SmartThings Hub.

Elders' care: One key application of smart home is to provide assistance for those with disabilities and elderly individuals. These home systems use assistive technology to accommodate an owner's specific disabilities. Voice control can assist users with sight and mobility limitations while alert systems, can be connected directly to cochlear implants worn by hearing impaired users. They can also be equipped with additional safety features. These features can includesensors that monitor for medical emergencies such as falls or seizures.

The term "Enterprise IoT" refers to devices used in business and corporate settings. By 2019, it is estimated that EIoT will account for 9.1 billion devices.

Commercial Applications of IoT

Medical and healthcare: The Internet of Medical Things (also called the internet of health things) is an application of the IoT for medical and health related purposes, data collection and analysis for research and monitoring. This 'Smart Healthcare, as it can also be called led to the creation of a digitized healthcare system, connecting available medical resources and healthcare services. IoT devices can be used to enable remote health monitoring and emergency notification systems. These health monitoring devices can range from blood pressure and heart rate monitors to advanced devices capable of monitoring specialized implants, such as pacemakers, Fitbit electronic wristbands, or advanced hearing aids. Some hospitals have begun implementing "smart beds" that can detect when they are occupied and when a patient is attempting to get up. It can also adjust itself to ensure appropriate pressure and support is applied to the patient without the manual interaction of nurses. A 2015 Goldman Sachs report indicated that healthcare IoT devices "can save the United States more than $300 billion in annual healthcare expenditures by increasing revenue and decreasing cost." Moreover, the use of mobile devices to support medical follow-up led to the creation of 'm-health', used “to analyze, capture, transmit and store health statistics from multiple resources, including sensors and other biomedical acquisition systems”.

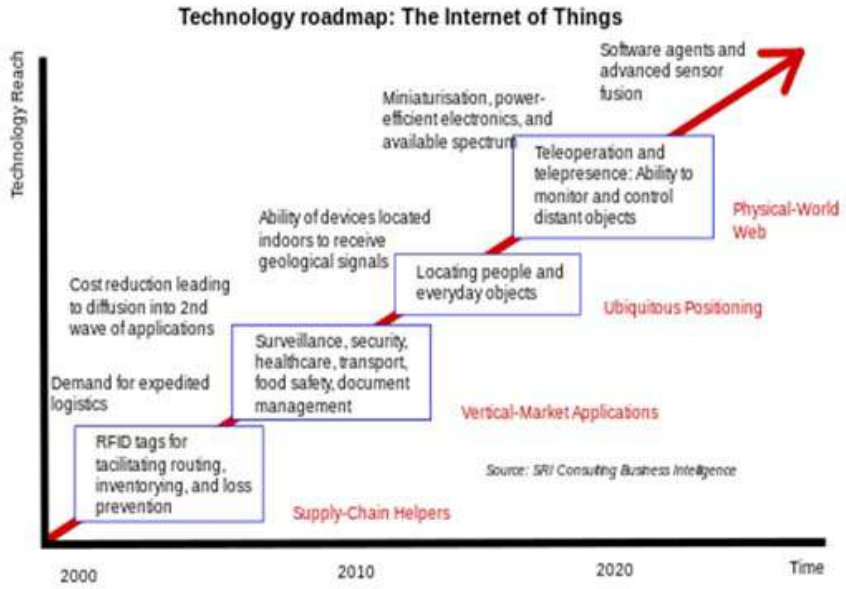
Specialized sensors can also be equipped within living spaces to monitor the health and general well-being of senior citizens, while also ensuring that proper treatment is being administered and assisting people regain lost mobility via therapy as well. These sensors create a network of intelligent sensors that are able to collect, process, transfer and analyze valuable information in different environments, such as connecting in-home monitoring devices to hospital-based systems. Other consumer devices to encourage healthy living, such as connected scales or wearable heart monitors, are also a possibility with the IoT.End-to-end health monitoring IoT platforms are also available for antenatal and chronic patients, helping one manage health vitals and recurring medication requirements.

As of 2018 IoMT was not only being applied in the clinical laboratory industry, but also in the healthcare and health insurance industries. IoMT in the healthcare industry is now permitting doctors, patients and others involved (i.e. guardians of patients, nurses, families, etc.) to be part of a system, where patient records are saved in a database, allowing doctors and the rest of the medical staff to have access to the patient's information Moreover, IoT-based systems are patient-centered, which involves being flexible to the patient's medical conditions. IoMT in the insurance industry provides access to better and new types of dynamic information. This includes sensor-based solutions such as biosensors, wearable's, connected health devices and mobile apps to track customer behavior. This can lead to more accurate underwriting and new pricing models.

Transportation: The IoT can assist in the integration of communications, control, and information processing across various transportation systems. Application of the IoT extends to all aspects of transportation systems (i.e. the vehicle, the infrastructure, and the driver or user). Dynamic interaction between these components of a transport system enables inter and intra vehicular communication, smart traffic control, smart parking, electronic toll collection systems, logistic and fleet management, vehicle control, and safety and road assistance.In Logistics and Fleet Management for example, The IoT platform can continuously monitor the location and conditions of cargo and assets via wireless sensors and send specific alerts when management exceptions occur (delays, damages, thefts, etc.). If combined with Machine Learning then it also helps in reducing traffic accidents by introducing drowsiness alerts to drivers and providing self-driven cars too.

Building and home automation: IoT devices can be used to monitor and control the mechanical, electrical and electronic systems used in various types of buildings (e.g., public and private, industrial, institutions, or residential)in home automation and building automation systems. In this context, three main areas are being covered:

- The integration of the Internet with building energy management systems in order to create energy efficient and IOT driven “smart buildings”.
- The possible means of real-time monitoring for reducing energy consumption and monitoring occupant behaviors.
- The integration of smart devices in the built environment and how they might to know what to be used in future applications



SOME EXAMPLES OF IoT

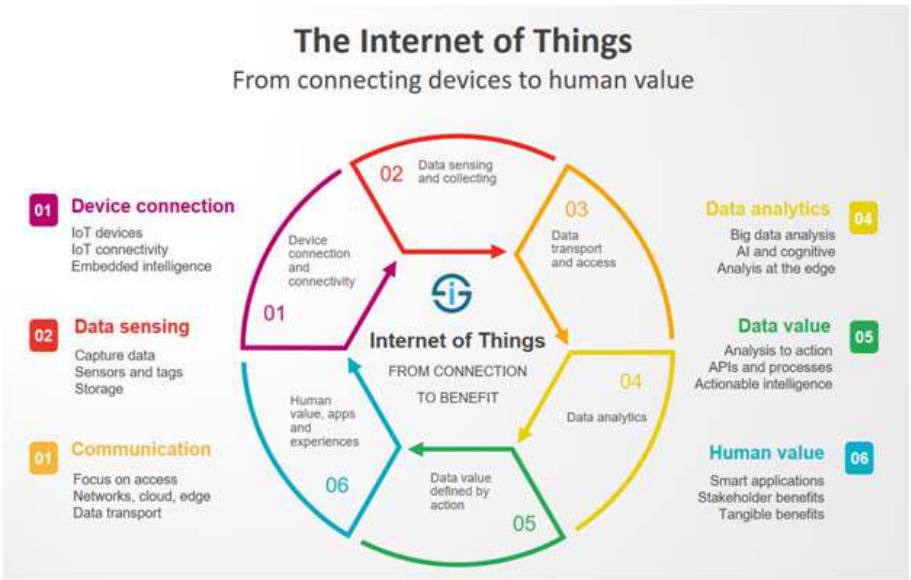
Peace of mind with monitoring & alerts: Family members and caregivers can monitor their loved-one's activity, such as how much time is spent in bed, in a favorite chair or out of the house. And with intelligent sensors to track and learn the home's activities of daily living. Wellness can identify anomalies that may signify a problem.

Nest Smart Thermostat: One of the most highly visible and popular pieces of Internet of Things technology is the Nest, a smart thermostat that's connected to the internet. The Nest learns your family's routines and will automatically adjust the temperature based on when you're home or away, awake or asleep, hot or cold, to make your house more efficient and help you save on heating and cooling bills. The mobile app allows you to edit schedules, change the temperature when you're away from home, and even receive alerts when it looks like something has gone wrong with your heating or cooling system.

August Smart Lock: With this smart lock, you'll never need keys again—it unlocks automatically when you get home, and locks behind you when you close the door. You can grant guest keys to friends or the dog sitter, and have them expire when you no longer want to give that person access to your house. An optional keypad means you can set a code to open your door in case you don't have your phone with you (like if you're out for a run). You can even view the activity log and grant access from your smart phone remotely. Smart security systems are becoming more popular with the increase in options, and a smart lock like this one is a great place to start.

Conclusion

The future of IoT is virtually unlimited due to advances in technology and consumer's desire to integrate devices such as smart phones with household machines. Wi-Fi has made it possible to connect people and machines on land, in the air and at sea. It is critical that both companies and governments keep ethics in mind as we approach the fourth Industrial Revolution with so much data traveling from device to device, security in technology will be required to grow just as fast as connectivity in order to keep up with demands. Governments will undoubtedly face tough decisions as to how far the private sector is allowed to go in terms of robotics and information sharing. The possibilities are exciting, productivity will increase and amazing things will come by connecting the world.



RFID Initiative Supply Chain

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RFID – The Technology

Radio-frequency identification (RFID) is the use of an object(known as RFID Tag), applied to or incorporated into a product, animal, or person for the purpose of identification and tracking using radio waves.

RFID refers to a technology whereby digital data encoded in RFID tags or smart labels (defined below) are captured by a reader via radio waves. RFID is similar to barcoding in that data from a tag or label are captured by a device that stores the data in a database. RFID, however, has several advantages over systems that use barcode asset tracking software. The most notable is that RFID tag data can be read outside the line-of-sight, whereas barcodes must be aligned with an optical scanner.

RFID is a possible and better replacement to more common Bar Coding system.

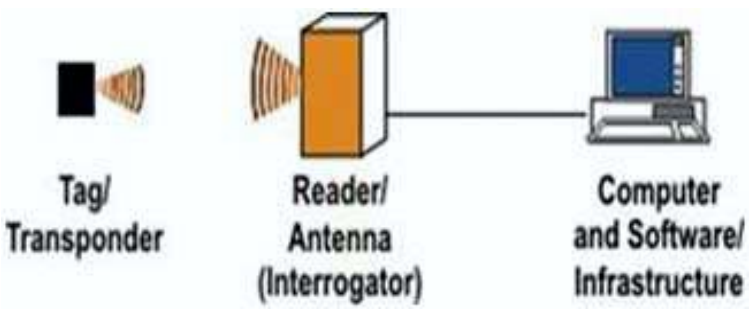
Comparison between Bar Code and RFID

Parameter	Barcode	RFID
Frequencies used for tag reading	Optical frequencies	Radio frequencies
Type of communication	Line of sight communication	Non-line of sight communication
Data Volume	Physical limitation exists. It is very difficult to read a very long barcode.	Can carry relatively large volume of data.
Range of data readability	Very limited range, less than a feet or two.	Can be read up to several feet.
Cost	Cheap	Expensive, but likely to cost less as more industries adopt the technology.

Working of RFID System

RFID belongs to a group of technologies referred to as Automatic Identification and Data Capture (AIDC). AIDC methods automatically identify objects, collect data about them, and enter those data directly into computer systems with little or no human intervention.

RFID methods utilize radio waves to accomplish this. At a simple level, RFID systems consist of three components: an RFID tag or smart label, an RFID reader, and an antenna. RFID tags contain an integrated circuit and antenna, which are used to transmit data to the RFID reader (also called an interrogator). The reader then converts the radio waves to a more usable form of data. Information collected from the tags is then transferred through a communications interface to a host computer system, where the data can be stored in a database and analyzed at a later time.



History of RFID

RFID was developed out of the radar experiments.

Date of invention is 1948.

During 1970s implementation started.

During 1980's significant development had occurred.

During the 1990's the proliferation of competing systems and radio frequencies employed

Development of standards is still going on with the latest standard being release late in 2004.

The final piece of the RFID puzzle was the miniaturization of the tags and the improvements in manufacturing.

Types of RFID Tags

Active RFID Tags: Active RFID tags have a transmitter and their own power source (typically a battery). The power source is used to run the microchip's circuitry and to broadcast a signal to a reader (the way a cell phone transmits signals to a base station).

Passive RFID Tags: A passive tag is an RFID tag that does not contain a battery; the power is supplied by the reader. When radio waves from the reader are encountered by apassiverfid tag, the coiled antenna within the tag forms a magnetic field. The tag draws power from it, energizing the circuits in the tag.

Battery assisted passive RFID Tags: Sometimes called Semi-Passive or Semi-Active,Battery-Assisted Passive (BAP) tags are essentially passive RFID tags with an internal battery. ... It then back scatters, or returns a signal, to the RFID reader in the read zone.

Role of RFID in Supply Chain Planning

- Radio frequency identification (RFID) is becoming a mainstream tool for capturing information about products and assets as they move through the supply chain.As that happens, new levels of visibility, security, accountability, flexibility and operating performance are sure to follow. It also is likely that many supply chain competencies and relationships will soon take dramatic, unexpected turns. RFID, after all, goes where no bar code has gone before.
- At its core, RFID is simply an enabling technology that has the potential of helping retailers provide the right product at the right place at the right time, thus maximizing sales and profits.

- RFID provides the technology to identify uniquely each container, pallet, case and item being manufactured, shipped and sold, thus providing the building blocks for increased visibility throughout the supply chain.
- RFID promises to revolutionize supply chains in a new era of cost savings, efficiency and business intelligence. The potential applications are vast as it is relevant to any organization engaged in the production, movement or sale of physical goods. This includes retailers, distributors, logistics service providers, manufacturers and their entire supplier bas

RFID Adoption in the Retail Industry Supply Chain

Three retail giants across two continents are among the true drivers of RFID technology throughout the retail industry.

- Wal-Mart in the US,
- Metro in Germany
- Tesco from the UK have already integrated RFID technology into their respective supply chains.

Benefits of RFID

- Reduce warehouse and distribution labor costs.
- Reduce point-of-sale labor costs.
- Reduce inventory errors.
- Improve forecasting and planning.
- Reduce theft.
- Reduce out-of stock conditions.
- Improve customer experience.

Drawbacks of RFID

- Tag costs are still high.
- Readers can't always read all the cases on a pallet..
- One frequency and one tag design does not fit all.
- Standards are in a state of flux.
- End -users lack real RFID knowledge.
- Radio interference can upset the best-laid plans.

Some other applications

- Manufacturing industry as a whole will be able to fine-tune the supply chain to optimize efficiency and minimize inventory and waste.
- The pharmaceutical industry will be able to reduce or even eliminate counterfeiting by giving each unit of dosage a unique Electronic Product Code (EPC) number.
- Merloni Elettrodomestici, an Italian appliance maker, has created a smart washing machine using RFID technology.

A STRATEGIC CASE FOR RFID-WAL-MART AND ITS SUPPLY CHAIN

In the 1980s, as Wal-Mart grew to a size that gave it a commanding bargaining power, it began to pressure its vendors to keep costs down.Wal-Mart has recognized that distribution is a crucial element in its success

RFID Initiative at Wal-Mart

- RFID is the latest technology that Wal-Mart has identified to achieve incremental gains in supply chain efficiency. Stock-outs were reduced by 16%.Replenishment is three times faster in the stores.
- Wal-Mart's motive for the forceful adoption of RFID in its supply chain is to allow the retail giant to catapult to a zero or negative cash-to-cash cycle which would give it an enormous competitive advantage over its competition and entrench its ability to continue offering Every Day Low Prices.

Conclusion

Applications that currently use barcode technology are good candidates for upgrading to a system that uses RFID or some combination of the two. RFID offers many advantages over the barcode, particularly the fact that an RFID tag can hold much more data about an item than a barcode can. In addition, RFID tags are not susceptible to the damages that may be

E-Commerce: a critical view

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"By 2020, brick and mortar retail spaces will be little more than showrooms."

– Eddie Machaalani& Mitchell Harper
Co-CEOs of Bigcommerce

E-commerce -- electronic commerce -- is the buying and selling of goods and services, or the transmitting of funds or data, over an electronic network, primarily the internet. These business transactions occur either as business-to-business, business-to-consumer, consumer-to-consumer or consumer-to-business.

Today, few people remember that till the late 1990s, Banks in India transacted only between 1000 and 1400 hrs. And if you happened to reach at 1355 hrs, you were rudely asked to come to the bank branch the next day because the cashier needed a few minutes to close the window. Indeed, transacting physically is a criminal waste of time and energy for an individual. And this is just one example. This occurred and is still occurring in all walks of life ranging from depositing the college fee to paying utility bills. Sum up this waste of time and energy for a nation of1.3 billion people, you will immediately comprehends the criticality of smart technologies. In this sense, digitization is a nation building tool because it will release time and energy for other tasks which enhance the nations' GDP.

In the era of the Internet revolution, E-Commerce industry is the brightest star! According to Statista.com in 2017, retail E-Commerce sales amounted to 342.96 billion US dollars and are projected to surpass 600 billion US dollars in 2019. Retail E-Commerce in the U.S. is projected to generate a hundred billion U.S. dollars in revenue by 2019. The figures clearly explain the power of E-Commerce

Benefits of E-Commerce

Challenges in E-Commerce

Benefits of E-Commerceshould not make one believe that all companies are consistently making money and do not encounter challenges. Small as well as big companies have to face various challenges. Major ones are listed here.

Associating trust and brand as the key differentiators: Consumer trust and brand loyalty is essential for any business to succeed. The traditional brand building exercises are mostly irrelevant in the current E-Commerce sector. It is easy to lose an online customer to the "next big thing". Failure to deliver on any one aspect of customers' demands would lead to failure in retaining them.

Involvement ofmiscellaneoussystems leading to poor experience:There are various data management systems such as - Point of Sale (POS), Enterprise Resource Planning (ERP) and CRM systems. These systems differ tremendously in their architecture, deployment and usage; usually built on dated technology and are prone to stagnation. What does this mean for businesses? - A great deal of your resources (cost, time, labor) is being spent on separate systems, interfering with internal business demands.

Paucity of cross-departmental collaboration:Saurabh Chandra, Head of IT, Myntra talks about the challenges of running an online store that involves four key divisions - Technology, Data Curation, Product Delivery and People Management. Modern companies face the challenge of collaborating between different departments, some geographically isolated and present in different time zones. Marketers, merchandisers and E-Commerce managers need to learn to strategically operate through one integrated channel.

Personalization through a repository:Modern E-Commerce thrives on delivering the best personalized experience to their consumers. Managing a repository of customer data is a challenge in itself, added to that E-Commerce companies have to understand how to use that data. Delivering customized content in the form of advertisements, special offers etc. are some of the methods which can be employed.

Ease of use: an unnecessary power to the consumers:Ease of use and advancements in technology have given consumers more power and increased global competition in the E-Commerce sector. Omni-channel retailing is the way forward for E-Commerce. This places pressure on companies to deal with technical issues of running an online store like: server issues, bandwidth issues, dynamic IP address, data privacy and security issues. The transition from a multi-channel business to an omni-channel is another aspect that is not easily adopted by many companies.

Managing logistics and inventory accounting forE-Commerce:Managing logistics, seller registration, and inventory accounting present bigger challenges for the E-Commerce companies. To overcome these internal challenges would require greater deployment of manual resources and cannot just be solved through cloud services.

Absence of online identity verification: When a visitor visits an E-Commerce website and signs up, the portal is unaware of the customer except for the information he/she entered. The customer is genuine or not is questionable. This creates huge revenue losses for a company when a customer makes a Cash-On-Delivery (COD) purchase and the information entered like phone number, the address is invalid or fake.

Competitor analysis:In this competitive world, there will be too many competitors who will be offering same products and service as you. Unless you have the best strategy that differentiates yourself from other competitors; it will become difficult to survive.

Maintaining customer's loyalty:No matter how attractive or fancy your website looks, if you would not be able to build the customer trust and loyalty, the business has to struggle another day!It's the work of lots of efforts for companies to make a new a customer and maintain the same customer for a long time. One of the reasons why ecommerce companies face the struggle while building trust and loyalty with the customer is because a seller and a buyer don't know each other nor they can see each other while making a transaction, unlike street-shopping. It takes few transactions, time and plenty of efforts by the company to build the customer trust and loyalty.

The headache of product return and refund:In a survey by comScore and UPS, 63% of American consumers check the return policy before making a purchase and 48% would shop more with retailers that offer hassle-free returns. This clearly shows how conscious consumers are for the return and refund policy.When the product is returned, due to whatsoever reason, whether a customer was dissatisfied or the product was damaged, the business suffers a heavy loss of shipment and reputation. Cost of logistics and shipping has always been scary for those E-Commerce sellers who deliver the product for free.

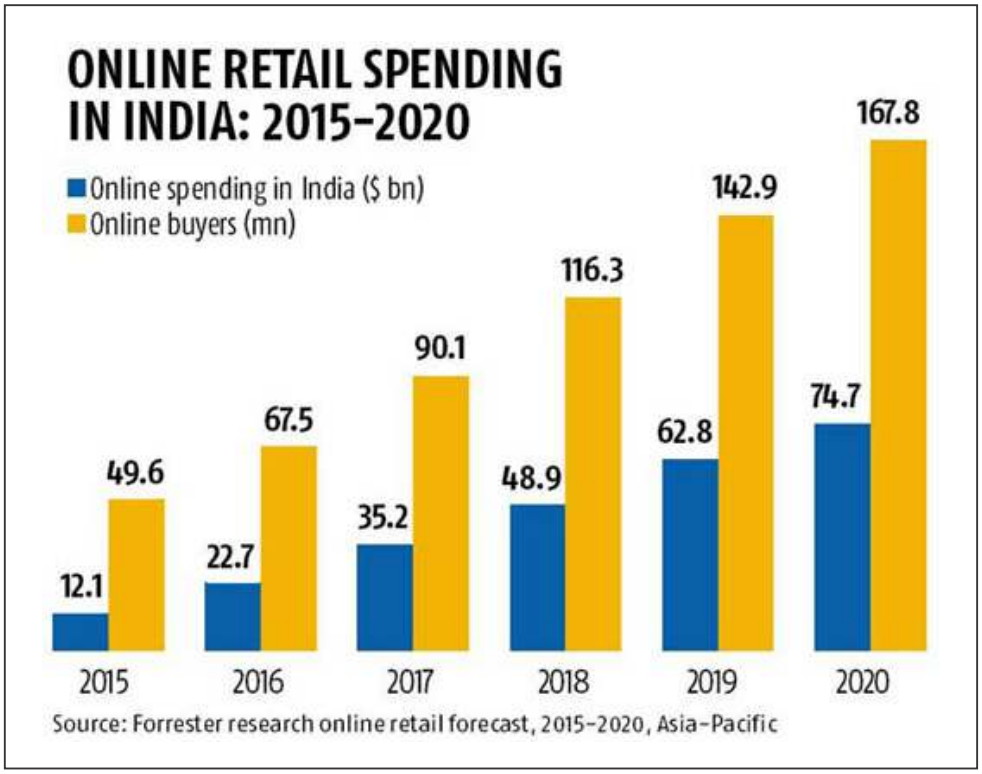
The struggle of competing on price and shipping: Online merchants frequently compete on price. Plenty of sellers may list equal products on their sites. The product is same but the only difference here is the price. They are vying to sell the product to increase their market share.The price competition affects the small ecommerce business badly. Because the mid-sized or large competitors often offer products for less price and free shipping on nearly every order, while they couldn't afford to offer the same with competitive price.Online sellers like Amazon and Walmart generally have the shipping amenities around the country. Their distributed warehouses allow large E Commerce businesses to ship orders from the closest facility; approximately 60 percent of orders are in the same area the customer is in. As the orders are shipped from the nearby warehouses, the cost to send the order decreases and the order arrives in a day or two.Ultimately every online shopper expects fast and frees shipping that too at lowest price.

Competing against retailers and manufacturers: Many online stores bulk buy products wholesale from manufacturers or distributors to sell that in retail from their online store. This is the basic business model for online stores. Unfortunately, because of ecommerce's low barrier to entry and other reasons, many product manufacturers and retailers to start selling directly to consumers. The same company that sells your products may also be your competitor. For an example, ABC Garments, sells not just your online marketplace, but also directly to consumers on its website. Even some of manufactures builds distributors that makes the scenario worse.

Problem of data security: Security issues over the web can lead to nightmare. Fraudsters post lot of spam and they may attack the web host server and infect all websites with viruses. They can get access to all your confidential data about your customer's phone number, card details etc.

Conclusion

On the basis of the above listings it can be concluded that everyone is running to either open an E-Commerce company or work with one! But little is known of the pain a large E-Commerce company faces. While most of us see bright images and the big discounts of E-Commerce, there are only a few who know the challenges these companies regularly run in behind the scenes.



New Paradigm for Payments: Mobile Wallets

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Introduction

Financial Inclusion or inclusive financing is the delivery of financial services at affordable costs to sections of disadvantaged and low-income segments of society. Government of India is helping in the growth of fin-tech industry with various incentives and initiatives. The number of mobile phone users globally is expected to cross five billion by the middle of the year 2017, according to a study released in February, 2017 by GSMA, the association of mobile operators. According to GSMA's 'Mobile Economy' report, India alone is expected to add some 310 million new subscribers in the coming three years. The smartphone user base in India – with Chinese brands dominating the market – crossed 300 million in 2016. Mobile phones are rapidly shaping how consumers search, purchase and pay for goods and services.

Since the invention of smartphones, significant innovations have been focused on mobile as a channel. The near ubiquity of smartphones and high-speed connectivity is enabling innovation in areas such as artificial intelligence and driving the digital transformation. According to a report from the Internet and Mobile Association of India and market research firm IMRB International, the number of Internet users in India is expected to reach 450-465 million by mid-2017, up 4-8% from 432 million in December 2016. The report said overall Internet penetration in India is currently around 31%. The report also pointed out that 77% of urban users and 92% of rural users consider mobile as the primary device for accessing the Internet, largely driven by availability and affordability of smartphones

Mobile Wallets

A mobile wallet is a mobile technology that is used as a real wallet. With mobile wallet, it is possible to hold all of the items on your mobile device that a physical wallet would carry. A mobile wallet can hold reward cards which are useful for increasing brand loyalty and making it extremely useful for customers to conduct transactions with a specific company via a mobile device. A mobile wallet can also hold credit and debit cards that let a customer make secure transactions and allows them to hold different cards in their mobile device. Mobile wallets are playing a very important role in facilitating financial inclusion in India. The necessity of financial inclusion in India was to include the financially excluded people, who were unable to access the financial services provided by banking and financial institutions.

The ownership of mobile phones across the world is far exceeding than any other device or platform. With the rapid adoption of smartphones over the last decade, improvement in telecom connectivity and declining handset prices, mobile has become the primary device around which our daily lives revolve and it is shaping how consumers search, purchase and pay for goods and services. Significant investment and innovation across industries and the capability to store and process payments through mobile phones has allowed companiesto focus on using mobile as a delivery channel and thus, create a seamless delivery and payments experience.Nowadays, mobile phones are a low-cost means to create financial access and payments.

Mobile Wallets for Masses

Mobile wallet acts like a virtual wallet, which can be preloaded with your preferred amount of money from your bank account or credit or debit cards and used to spend it for making various payments.Government initiatives such as Digital India and demonetization act as key factors for the growth of mobile wallet industry in the country. An increase in the internet and mobile penetration in India has also contributed to the increase in adoption of mobile wallets. Huge amount of money has already been spent by major mobile wallet players to attract the customers by offering discounts and offers. India is moving towards mobile-based payment systems

Advantages of Mobile-based Payments

Mobile payments offer the following advantages that can overcome the challenges posed by the Indian payments landscape.

1) ***Easy payments:*** Smartphones help us to do payments across any merchant stores easily. There is no need to take out the cash from ATM again and again for doing your purchase. Various variants of apps are already launched, which are – mobile wallets, UPI application from banks, Aadhaar merchant app, NUUP's USSD code. With just a few clicks, these apps will help you necessary transfer payments against any of your purchase.
2) ***Good for Industry:*** Going digital decreases the operational cost and increases the efficiency of the workforce which will help industries to grow at a faster pace. At times, it also takes a time to clear a cheque payment from a bank which eventually delays your work. But with the launch of digital cash payments, work moves at a faster pace.
3) ***Reduce money theft:*** Money theft will become a thing of the past because with the emerging usage of digital cash, people have started going cashless. Nowadays, people hardly keep money in their pocket because of which theft of money has reduced a lot.
4) ***Get those loyalty points:***Mobile payments make it easier for small businesses to keep their customers engaged with them. Goods and services can be sold to the customers with the attraction of return. This attraction is uplifted by smart marketing tactics such as customer loyalty points and bonus points. Through mobile payment system, the business owners can give loyalty points to the customers very conveniently. Once the customer is at the benefit of achieving loyalty points with their mobile payment purchase, he is bound to think about returning to that store in the future.

Challenges to Mobile-based Payments in India

Although mobile payments are on the rise in India, there are challenges in their growth. Following are the challenges to the mobile-based payments in India:

1) ***Speed:***The speed of mobile payment transactions is still slow, especially at the point of sale, where consumers and merchant look for a quick turnaround. Moreover, in areas of poor connectivity, transactions often fail or time out. This results in poor consumer experience, which discourages them from using mobile payments.
2) ***Low digital literacy:***Anotherchallenge is the low digital literacy of consumers. A large segment of the target population is not comfortable with technology. Public and private institutions need to come together to educate consumers on how to use mobile as a banking and payments platform.
3) ***Technical difficulties:***Each new mobile payment system comes with its own technical difficulties and thus common merchandises are no able to adopt this system. Also, unless most of the market places are loaded with a similar mobile payment format, the public will not get used to coming directly to the market place carrying a single mobile phone only.

4) ***Trust:***Consumers are inherently slow to change their habits and trust new service providers, especially when it relates to their payments and transactions. Also, more and more merchants are hesitant about adopting a wholly cash-less or plastic-less approach to receiving payment from their customers.
5) ***Pre-existing bank account:***Most mobile payments platforms also require customers to have a pre-existing bank account, which is a challenge as there are still many unbanked people in India.
6) ***Last mile delivery of services:*** For consumers to use mobile payment services on a regular basis, it is critical that they are ensured of easy availability of cash whenever they require, especially in the remotest parts of the country. BCs in remote locations are not easily accessible or they become inactive due to low transaction rates. Unless a framework is created at an industry level to ensure the availability of cash at BCs and their viability, consumers are unlikely to use mobile as a store of value.

Adoption of Mobile Wallets in India

Mobile wallet acts like a virtual wallet, which can be preloaded with your preferred amount of money from your bank account or credit or debit cards and used to spend it for making various payments. There has been an increase in the adoption of mobile wallets in India. Players like Paytm, Mobikwik, Freecharge, etc have taken charge in the mobile payment system. There are four types of mobile wallets in India:

1) ***Open Wallet:***This wallet allows a user to buy goods and services, withdraw cash at ATMs or banks, and transfer funds. These services can only be jointly launched with a bank. Additionally, it allows its users to send money to any mobile number bank account. Example: M-Pesa by Vodafone and ICICI Pockets.
2) ***Semi-open Wallet:*** This wallet allows its users to transact with merchants that have a contract with the semi wallet company. A user cannot withdraw cash or get it back; he will have to spend the amount he had loaded. Example: Airtel Money.
3) ***Closed Wallet:***It is quite popular with e-commerce companies. Here, a certain amount of money is locked with the merchant in case of a cancellation or return of the order, or gift cards. Example: Flipkart e-wallet
4) ***Semi-Closed Wallet:***It does not permit cash withdrawal or redemption, but allows users to buy goods and services at the listed merchants. Example: Paytm.

Classification of Mobile Wallets

Mobile wallets are provided by a number of industries in India. These include - private entrepreneurs, which offer only mobile wallets; banking industry; and telecom industry. Below is the list of number of mobile wallets in India

Mobile Wallets In India		
Wallets by Private Entrepreneurs	**Wallets by Banks**	**Wallets by Telecom Industry**
Paytm, Mobikwik, Oxigen Wallet, Citrus Wallet, ItzCash, Freecharge, PayU Money	Axis Bank Lime, PingPay by Axis bank, ICICI Pockets, SBI Buddy, HDFC PayZapp, Citi Masterpass	Airtel Money, Idea Money, Jio Money, mRupee by TataDocomo, Vodafone m-Pesa

- **Wallets by Telecom Industry:** Almost every major telecom service provider in India has a mobile wallet as part of its product portfolio. This may be because one of the initial services offered by mobile wallets was mobile recharge. Airtel was one of the first movers in the market and had a joint venture with State Bank of India back in 2011. They got the Payments Bank license from RBI in August 2015 and started Airtel Money in a joint venture with Kotak Mahindra Bank. Then, Reliance Jio was also granted a Payments Bank license with State Bank of India. Idea also got their license for Idea Money with their partner, Axis Bank. Vodafone has m-Pesa, another major player in the market along with TATA Docomo with mRupee.
- **Wallets by Banks:**Banks and financial institutions also adapted their services to the changing needs of their customers. Most major banks in the Indian market are already developing mobile wallets for their customers. We have ICICI Bank that launched ICICI Pockets in February 2015, LIME and PingPay by Axis Bank and the State Bank of India that has launched its State Bank Buddy on August 18, 2015.
- **Wallets by Private Entrepreneurs:** There are number of independent mobile wallets in India. One of the leading mobile wallets Paytm is an independent mobile wallet by One97 Communications. Other independent mobile wallets includeOxigen Wallet, Citrus Wallet, Freecharge, Mobikwik, etc. Partnerships are plenty with these independent market players.

Indian Mobile Wallet Industry

The Indian Mobile Wallet industry has been increasing specially after demonetization. Government of India and the regulator Reserve Bank of India are taking steps to facilitate financial inclusion in India especially in rural areas. Mobile wallet is one of the most popular methods of digital payment. According to a study titled 'Indian m-wallet market: Forecast 2022,' conducted by ASSOCHAM jointly with research firm RNCOS, the Indian m-wallet market in FY 2016 was around INR 1.54 billion or Rs 154 crore, and it is expected to grow at a compounded annual growth rate (CAGR) of 141 per cent during the period between 2015-16 to 2021-22 and reach till INR 300 billion or Rs 30,000 crore by the end of FY 2022. It is also anticipated that the market value of m-wallet transactions in India will grow at a CAGR of 154 per cent during the period FY 2016 to FY 2022, and reach INR 55 trillion or Rs 55 lakh crore from INR 206 billion or Rs 20,600 crore, more so as m-wallet transaction is among the fastest growing paperless modes of payment or banking, and it is expected that the majority of transactions will go paperless in the next 10 years. Besides, in FY 2016, the total m-wallet transaction was 0.6 billion; and it is expected to reach 120 billion by FY 2022, growing at a CAGR of 142 per cent. While mobile wallet service contributed 21 per cent share in mobile payment volume transactions in FY16, its share in total mobile payment volume transactions is expected to increase to 79 per cent by FY22.

Driving Factors

There has been a growth in the mobile wallet market in India, especially post-demonetization and it is expected to grow further as well. The major driving factors of this growth are as follows:

1) ***Rise in mobile internet users:*** One of the major driving factors of Indian m-wallet market is the incline in the usage of mobile internet. This is primarily because the telecom operators have reduced their service charges due to extensive competition and introduction of new technologies. The 3G user base has been growing significantly since 2013, and mobile internet has become an affordable service to many people in India as compared to early 2000's.
2) ***Rise in usage of smartphones:***Decreasing handset prices and data plans tariffs consequently increased penetration of smartphones in the last several years. The median price of handsets has dropped significantly, making internet enabled devices affordable for the masses. The entry of many Chinese smartphone manufacturers in India, for instance - Xiaomi, CoolPad, Vivo, Oppo, is resulting in lowering Average Selling Price. The Indian market is flooded with INR 5000-15000 price range of smartphones, resulting into period of feature-to-smartphone.
3) ***Growth of E-commerce industry:***Mobile Payments are the backbone of an e-commerce industry. The e-commerce market in India is growing at a rapid pace, as a result of growing smartphone and internet penetration. E-Commerce companies are making strategic acquisitions to expand their market presence, enter newer markets and niche segments. Also, few e-commerce companies operate only through mobile application and do not have web presence, which require only m-payment.
4) ***Huge benefits at online and offline stores*****:** The major growth driver of m-wallet market is the availability of huge cashbacks and discount, which is attracting customers rapidly. As Indians have tendency to save, they are easily attracted by the coupons, discounts or cashbacks that allow them to spend less. M-wallet in India allows users to get minimum 5% discount, and cashback ranges from INR 100-500 on shopping at their merchant outlets. This benefit can be availed at online as well as offline stores.
5) ***Ease and convenience:***Convenience and ease of doing the transaction are the key growth drivers of the Indian m-wallet market. The convenience of making payments on the go, and easy accessibility of this new mode of payment makes it a natural choice. Additionally, those who do not have a credit card or a debit card can go to their nearest wallet recharge kiosk and get their wallets loaded against cash. M-wallet users can pay their utility bills, insurance premium, and can recharge their metro cards with just one click from anywhere. They do not have to go the government offices or to the merchants for paying bills and wasting their time.
6) ***Government initiatives:***Government initiatives such as Digital India and demonetization also act as key factors for the growth of mobile wallet industry in the country. Post- demonetization, there has been a remarkable increase in the mobile wallet industry.

Roadblocks for Mobile Wallet Market

Although there are various factors responsible for the growth of mobile wallet market but there are some roadblocks as well. These roadblocks are as follows:

1) ***Consumer mindset:***The consumer's mindset is the biggest factor that is a roadblock to the growth of Indian m-wallet market. Some people are not aware about this service in India and some people who are aware are more worried about the safety and security issues as in the case of internet banking. Often people complain that their money has been debited but the transaction got declined while transacting via mobile, and to avoid such problems users keep away from using mobile wallet related services.

2) ***Competition from debit/credit cards:*** Mobile wallets still face tough competition from debit or credit cards in India, as these cards have several advantages over m-wallets. M-wallets allow limited amount of money transfers from wallet to wallet or wallet to bank, which is not the case while transacting from debit or credit cards. Therefore, these wallets are not suitable for higher purchases, for example buying a laptop or a mobile. Also, only a limited amount can be transacted in a single transaction while using m-wallets. For example: Oxigen allows maximum amount that can be transacted in a month is INR 10,000 or INR 10,000 in single transaction, whereas the daily upper limit in Paytm for wallet to bank account transactions is INR 5,000 and the monthly limit is INR 25,000.
3) ***Compatibility issues:*** Mobile wallets are not made for all types of operating systems. Some mobile wallets are compatible only with 1 or 2 operating systems. For example: SBI Buddy does not work with Windows operating systems, it is meant for Android and IOS users. Therefore, if a windows operating system user wishes to download SBI Buddy on his phone, then he will not be able to do it. He would have to switch either to android or IOS smartphone or to any other mobile wallet app.

RBI Guidelines for Mobile Wallets

The Reserve Bank of India (RBI) issues guidelines under Section 18 of the Payment & Settlement Systems Act, 2007 (Act 51 of 2007) for the operation of Prepaid Payment Instruments (PPIs) in the country, and to ensure development of this segment. Consequent to the passing of this act, banks and non-bank entities have been issuing PPIs in the country after obtaining necessary approval from RBI. The initial guidelines on "Issuance and Operation of PPIs" were issued in April 2009. In March 2017, RBI has issued new guidelines which are known as the RBI Master Directions 2017. These new rules come into effect right away and help set up a number of different norms,so that different wallets don't operate differently anymore. Following are the new guidelines issued by RBI for mobile wallets:

1) According to section 18, PPIs will be allowed to participate in other interoperable payment systems. Thus, In the future, you may be able to send money directly from your Paytm wallet to your Airtel Money balance.
2) The minimum net worth to run a prepaid instrument like a mobile wallet has now been raised to Rs. 25 crores, from Rs. 5 crores earlier, as per section 5.2. The companies have until 2020 to meet this requirement.
3) According to section 4.2, KYC wallets will be used for cross-border transactions. This would let you - for example - use your Amazon Pay balance not just on Amazon.in but also on Amazon.com.
4) As per section 9.2, all wallet accounts must now do KYC within 60 days; otherwise, no more money can be added to the wallet - though you can still use the money in it. Until now, you could have a wallet account with a balance of under Rs. 20,000 without an ID check under KYC norms.
5) According to section 15 that talks about security and risk management, wallets need to have separate logins and passwords to ensure that access to PPI is not made part of access to other services offered by the issuer or its associate/parent/group company etc.
6) As an additional security measure, in section 17.5 the rules state that the mobile app should not be allowed to be installed on rooted devices.
7) Necessary agreement requirement of wallet services with the e-commerce platforms and payment gateways rather than individual merchants. The companies will have to submit the list of merchants it hosts to the bank and timely update it.

Indian economy is migrating from cash-rich to cash-less economy and thus, it is very important to study about the most popular means of digital payment i.e. mobile wallets.

Thus, we conclude that there is no significant impact of the awareness level of respondents on the importance level of pricing, convenience, privacy, and secured transaction. On the other hand, there is a significant impact of the awareness level of respondents on the importance level of ease of use, utility of innovation, and usefulness of mobile wallet.:

Google vs Apple vs Microsoft

A comparative Analysis

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The companies that lead the world with technology leverage are without any doubt more than any other companies. Apple Inc.,Microsoft Corporation and Alphabet Inc. (popularly Google) dominate the technology field and consumer access. Even though they compete across a huge range of sub-industries, such as computing software, hardware, operating systems, mobile devices, advertising, applications and Web browsing, yet each firm takes a different approach in terms of organizational and philosophical perspective. So, it is important to understand these companies and reason for their success.

If we look at the market valuation of these companies, it is very easy to see which model is the most successful, at least superficially.

Apple had a market cap of around $986 billion and was the largest company in the world.

Google had a market cap of approximately $766.4 billion.

Microsoft came in third with a market cap of $750.6 billion not far behind Google.

Market cap is only one and definitely a good measure of business success,but it is not necessarily a great predictor of business model sustainability.

If we look at the product offering, all three companies rely on unique product offerings to generate the bulk of their revenues, and each has tried to break into the others' markets with alternative services with varying degrees of success.All three companies offer a phone, tablet, TV-based operating system and a desktop operating system. Each firm is fighting for position in cloud-based technology.

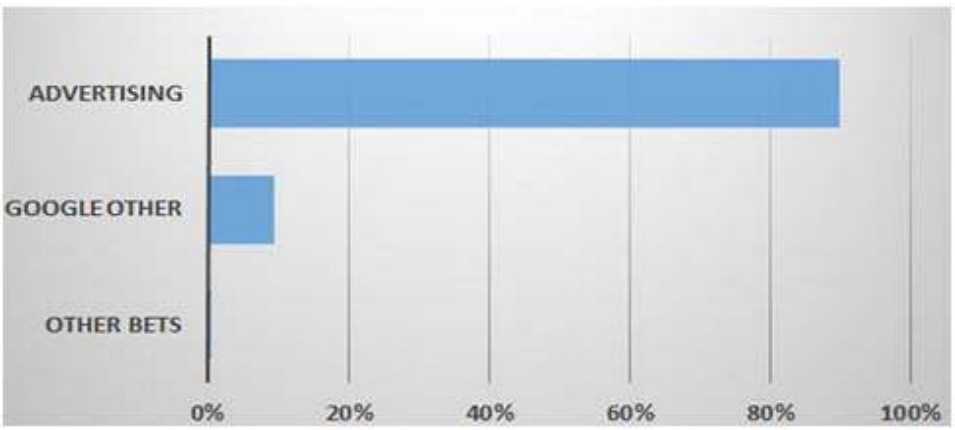
Google still performs best with business and information revenue since AdSense sells far better than Apple's iAd or Microsoft's Bing Ads (until 2015).

Apple relied on product innovation and customer loyalty; Google thrived on low-cost services and its unique Internet status.

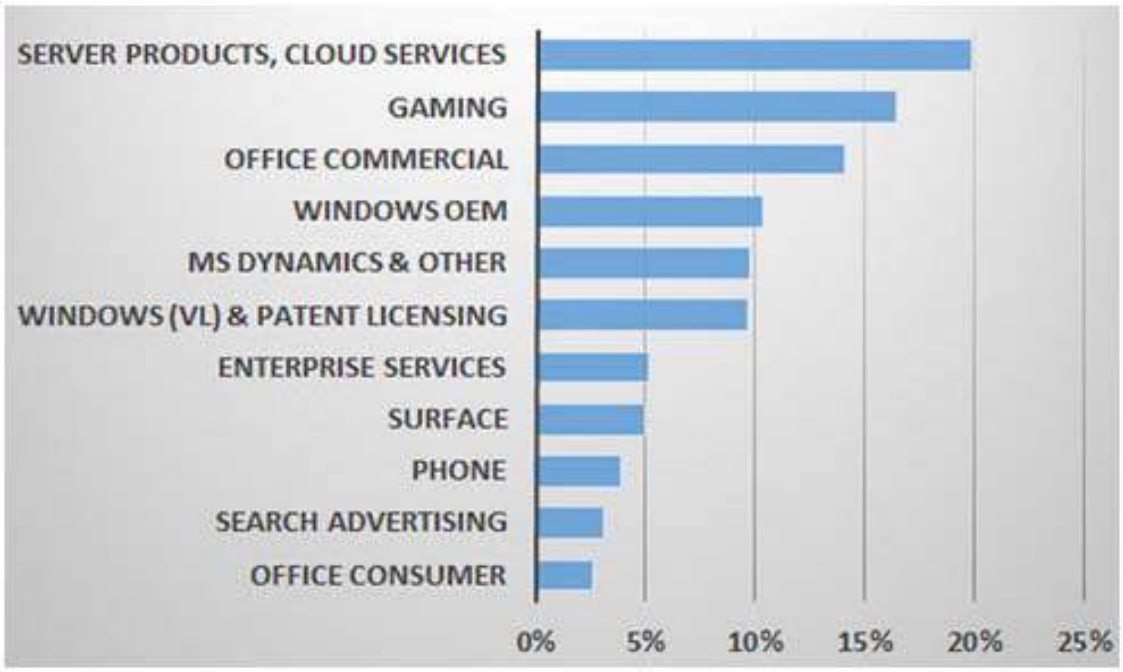
Microsoft's empire was built on servicing businesses and licensing software.

There is a saying:'If you want to know why a company acts the way it does, just follow the money'.Let us have look at the revenue model of these companies.

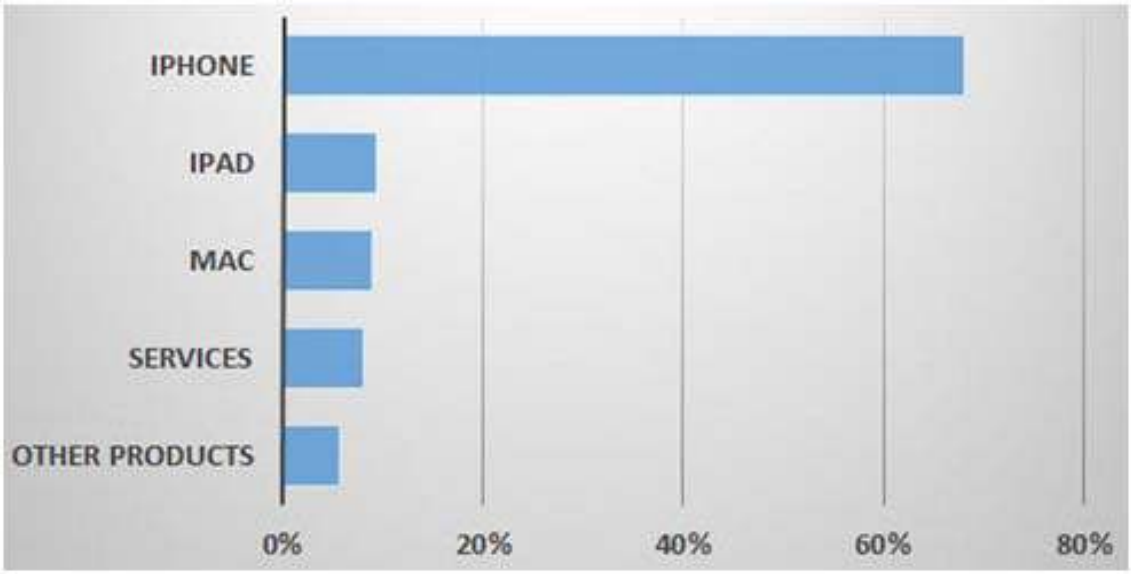
Larry Page and Sergey Brin,co-founders of Google, changed their company's corporate structure, turning Google into a subsidiary of a new parent holding company, Alphabet Inc.The organization chart might look different, but the business hasn't changed. Google still contributes virtually all of Alphabet's revenues (99.4 per cent), and the overwhelming majority of revenues (89.9 percent) comes from advertising.



Unlike Google and Apple, with each having a single dominant product, Microsoft has spread its chips around the table, with no product contributing more than 20 per cent of the total



· For Apple, the iPhone continues to be the cash cow of Cupertino (Cupertino is a city in California's Silicon Valley; known as the headquarters of Apple),accounting for more than 68 per cent of the company's total revenues. The Mac segment has continued to grow steadily, bucking the trend in the larger market for PCs. The iPad segment, on the other hand, has shrunk significantly.



Business Model of Apple, Google and Microsoft

- ***The Apple Model:*** Apple model is all about dominance and taking risk.Apple dominated by the ideas and personality of one individual, Steve Jobs. Jobs'remarkable innovations propelled Apple to unprecedented heights until his sudden death. During Steve Jobs'second reign, Apple returned to relevancy and revolutionized multiple sub-industries. It took over the Walkman industry from Sony and completely redefined mobile phones when the iPhone was released. AAPL also practically invented the tablet industry.Steve Jobs was also ruthless about using patents, litigation, intimidation and other hardball tactics to limit competition, and his successors are no different.

  Apple easily outwits its competitors in terms of hardware sales and high-end gadgets. Thanks to the company's early 2000s reputation as a non-conformist response to Microsoft, millennials grew up using Macs in large numbers. More than GoogleL or Microsoft, Applerelies on a loyal consumer base. This is sustained by the

company's brilliant insistence on integrating its products, making it easier to keep using new Apple products and simultaneously more difficult to switch to a competitor's interface; this is sometimes referred to as the "Apple Ecosystem Lock."

The weakness in the Apple model lies in the historic success of the company's golden invention: the iPhone. Nearly three-quarters of all Apple revenues come from iPhone sales, and no new innovation has taken off since its former CEO died. This is not dangerous as long as iPhones remain popular, but just ask Blackberry about the sustainability of single-product sales.

Tom Austin, VP & Gartner Fellow, and David Mitchell Smith, VP & Gartner Fellow emphasized the following characteristics about Apple:

- Apple is a consumer oriented company. They take consumerization to the extremes, having a secondary interest in the enterprise.
- Apple is focused on design and user experience.
- Two major OSes: Mac OS X and iOS.
- iOS uses two different platforms: App Store, which is closed and strictly controlled, and HTML5 which is an open technology Apple contributes to.
- There are rumours about Apple building their own cloudy data centre.
- They are also trying the waters in the advertising business in response to Google's entrance in the mobile space.

- **The Microsoft Model:** Microsoft model is all about having a new approach. For years, Microsoft dominated the computer industry with its Windows software; Apple was an afterthought for more than a generation of operating products. Before Google Web browsing began to dominate the market, Microsoft gave away Internet Explorer for free and drove Netscape out of business.

  The Microsoft revenue model historically relied on just a few key strengths. The first and the most important was the licensing fees charged for use of the Windows operating system and the Microsoft Office suite. After a few years of increasing irrelevance in the race against Google and Apple, Microsoft unveiled a new vision in April 2014, instantly shifting focus to make Windows software more compatible with competitor products, such as the iPad. Microsoft also has a few successful products, highlighted by the Microsoft Surface and Surface Pro that battle Apple devices.

  Moving forward, Microsoft realizes it cannot simply stick with the same old method and continue to compete with Apple and Google. Paid software is a more difficult sell in an age of low-cost alternatives. Additionally, tablets and phones are replacing PCs. A newer Microsoft business model has been telegraphed by CEO Satya Nadella, one that emphasizes product integration and a "freemium" software package. For example, Microsoft wants customers to be more engaged and fixated on its products. In 2015, CMO Chris Capossela explained this concept with a simple example: "Rather than using Skype on Sunday night to phone home, you are using Skype for messaging 15, 20, 30 times every single day. That's engagement."

  David Mitchell Smith said about Microsoft:

  - They are in the business of democratizing technology. A “PC in every home was the company's vision for a long time”, and they have achieved that.
  - They have also targeted the enterprise and managed to do well.
  - They are a platform company, creating “ecosystems around things and to make money from them.”
  - They've been trying to expand beyond Windows and Office, entering the search and advertising market, stepping on Google's toes. As a response Google has started an asymmetric war by entering into the enterprise and the OS business, in order to force Microsoft to concentrate on those areas and lose focus on search and advertising. The war is asymmetric because Microsoft uses a lot more money than Google to win enterprise customers.
  - Unlike Google which starts projects then easily throws them away if they are not embraced by potential users, Microsoft is very persistent to do things right, managing that usually “on the third try”.

- **The Google Model: '**Give It Away for Free' is the mantra of Google and whole philosophy of their model. No

surprise, the heart and soul of the Google revenue stream is its search engine and Web advertisements. While Google is not the only company to give away free services and bundle them with other goods, few do it as well or as successfully.

Google services do not cost the user anything. Instead, Google lures in users and collects their data, and then sells access to eager buyers across the planet. Every marketing firm in the world wants the kind of information and repeat usage Google enjoys. Moreover, the company keeps getting better and more sophisticated at targeting consumers and businesses, syncing preferences and playing economic matchmaker.

This no-fee model is not just profitable, but is very disruptive to Apple and especially to Microsoft. While Apple and Microsoft keep competing to find better and more innovative products to charge consumers, Google is all too happy to find a way to monetize activities for which users are eager to stop paying. Google does not charge for Android, which is one of the chief reasons manufacturers are so drawn to it. The Google Web apps, which bear a striking resemblance to Office programs, are also free. Since Google began offering a free operating system and computer software, sales for Microsoft Windows and Office have slowed and, in the long term, threaten to die out.

Tom Austin said about Google:

- Google is in the business of democratizing information.
- They are focused on the "next 2 billion" users. Enterprise is secondary for Google.
- They are very concerned with what could be a potential roadblock in reaching their goals: the network providers, the RIA solution providers such as Microsoft with Silverlight, OS providers – Microsoft, Apple-, anyone that might interfere with Google's ability to monetize information display via advertising.
- Google is a radical innovator, building an entire new cloud-based infrastructure.
- Google's search infrastructure, which is used by other services, is built from zero. They have designed their own motherboards, they use their own networking solutions, dispatching mechanisms to distribute work over hundreds of thousands or even millions of machines across the world. Because of this technology, Austin considers them the "cloud computing leader".

According to Austin and Smith, both Microsoft and Google are doing well financially, but none of them is growing, so they are looking for opportunities for growth. While Microsoft wants a share of the search and ads business, and another in cloud computing, Google's plans are not so predictable. They have built an entire array of tools – Chrome, Check-out, Analytics, YouTube, Search, GMail, etc.-, and they have access to a large amount of people's data – IP, location, search history, websites visited, videos watched, tweets, etc., leading the Gartner analysts to think how Google could monetize the "democratization of information" by using "social and demographic trends, behavioural targeting, implicit social profiles, personal preferences", all using "creeping details" of users.

Apple's story is different because they have had strong growth for the last few years. The iPod, iPhone and iPad are all showing signs of health and creating increasing profit for the company.

Following is Gartner's study on how enterprises perceive these three companies:

Enterprise Perceptions

	Apple	Microsoft	Google
Focus	Consumer	Enterprise	Consumer
Cost	Expensive	Inexpensive	Free
Coolness	Coolest	Chilly-corporate	Cool-aid
Consumer-ization	Partner with others (MSFT?)	Control and Web 2.0	Enterprises will come around
Openness	Tight control	Control	Aggressive
Innovation	Savvy elegance	Detailed follower	Geeky
Cloud	Investing	Empire striking back	Putative leader
Emerging device	iPad	TBD	Chrome-based devices

Gartner

Each company has its strengths and weaknesses. They are all going to be around for a long time, but it is pretty hard to predict their evolution. If one chooses to go either with Apple, Google or Microsoft, a good advice is to avoid vendor lock-in if possible.

A Few Interesting Facts about Computers and Internet

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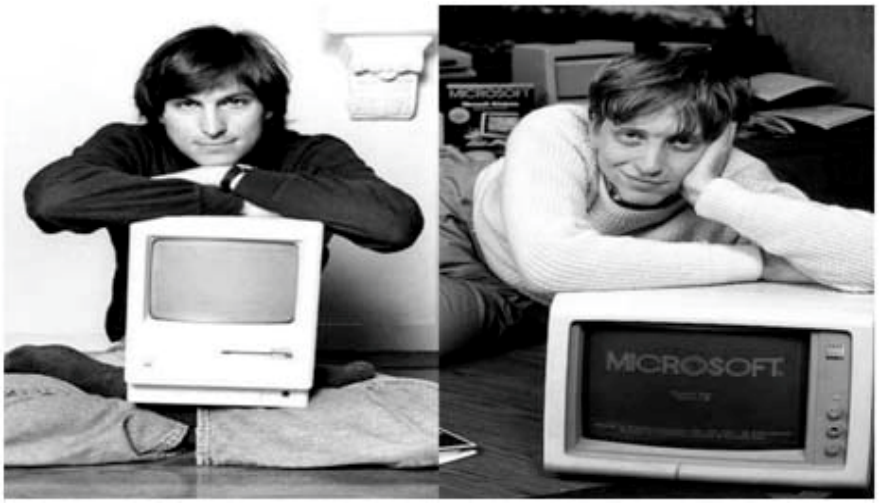
- In 1833, Charles Babbage invented all the parts a modern computer uses, but it wasn't until 120 years later that the first modern computers were invented.
- World's first super computer was developed by IBM in the year 1956 which weighed nearly a ton and would store up to 5 MB of data.
- ENIAC, the first electronic computer, would weigh around 27 tons and took an area of about 1800 square feet.
- The first Apple logo was designed by Steve Jobs and Ronald Wayne in 1976, featuring Isaac Newton sitting under an apple tree. It was inspired by a quotation by Wordsworth that was also inscribed into the logo that said: "Newton... a mind forever voyaging through strange seas of thought" with 'Apple Computer Co.' on a ribbon banner ornamenting the picture frame.

- The first domain name ever registered in World Wide Web was www.symbolics.com and it was done on 15 March 1985.
- Email facility was invented before the World Wide Web was even introduced to the mainstream public.
- If computer's brain was designed just as a human brain then it could store 3584 terabytes of data and perform 38 thousand trillion operations each second. Do not underestimate your own brain!
- Facebook offers up to $500 to those hackers who can find any security bug and threat without actually doing the harm themselves.
- Steve jobs and Bill Gates were close pals and Gates actually used to work in Jobs' firm Apple Inc. as an employee. The idea of Graphical User Interface was to be launched in the firm and patented but Gates quit the job and started his own firm, Microsoft, the most familiar term in every household. The GUI (in the name of Windows) was then introduced in Microsoft first which led to more of a competition between the two.



- Over 1 million domain names are registered every month online which clearly indicates that the data is expanding and hence the need of Big Data is what considered a milestone strategy in the software industry.
- It is estimated that 1 out of 8 couples in total meet online and marry each other in the United States.
- About 90% of the total currency of the world population exists in the database, the rest 10% contributes into hard cash.

- Over 80% of the total emails that an average person receives on daily basis are Spams.
- eBay, being one of the leading online retail company, has a transaction of more than $680 per second.
- The background scheme of Facebook is blue colored due to the reason that its founder Mark Zuckerberg has a type of color blindness which shows only the blue part and not the red and green.

- The name 'Google' is actually derived from the mathematical term 'googol' which is basically 1 with a 100 zeros following it. Co-founders Larry Page and Sergey Brin originally named Google 'Backrub.'
- The term "World Wide Web" was invented by Tim Berners, an English Engineer and computer scientist, in 1990.
- In 1936, the Russians made a computer that ran on water

- Sony created a robotic dog called Aibo, one of its first toys that could be bought and played with. It could express emotions and could also recognize its owner. This was the first of its kind; however, today you will find more expensive and evolved versions of the same.
- TYPEWRITER is the longest word that you can type only using first row of alphabets in your keyboard.
- At the rate at which Artificial Intelligence (AI) is being adopted in various areas of our lives, it is predicted that it will replace 16% of our jobs over the next decade.
- With Machine learning and language recognition, it is no surprise that 85% of telephonic customer service jobs will be performed by computers and will not need human interaction..

All India Management Association (AIMA)
Academic Conference
Managing in the Age of Disruption: Future of Organizations

6-7 December 2018, Hotel Shangri La's Eros, New Delhi

School of Management Faculty Members at AIMA conference {L-R} Prof. Anupama Sharma, Prof. J.P. Mahajan (HoD), Prof. Pranay Tanwar (Dean Academics), Ms Megha Gaur, Ms Sanober Khan

{L-R} Mr. Richard Rekhy (Board Member, KPMG), Prof. Raj Agrawal (Director AIMA), Prof. J.P. Mahajan (HoD School of Management, Delhi Technical Campus), Rajan Saxena (Vice-Chancellor Monjee Institute of Management Studies)

AIMA Academic Conference being addressed by Prof. T.V. Mohandas Pai (Chairman Manipal Global Education)

S oM Faculty Members at AIMA Conference sharing frame with Key-Note Speakers Prof. Mohandas Pai and Prof. Rajan Saxena

SoM Faculty Members with Prof. Rajan Saxena

SoM Faculty Members Participating in Sports Day

Three Colleagues from Commerce Department Delhi University

(R-L) Prof. Jagdish Mukhi (Bhagat Singh College, Presently Governor of Assam)
Prof. JP Mahajan (Kirori Mal College, Presently HoD/School of Management, Delhi Technical Campus)
Prof. NK Kakkar (Ramjas College, Presently Advisor, Maharaja Agrasen University, Himachal Pradesh)

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