

# Digital communication in business



## **Introduction**

The aim of this report on “ Digital Communication” is to summarise the broad concepts of a technology that has made rapid strides in all facets of our life. The objective is to understand the concept, analyse its relevance in the field of business and assess the current and future trends.

## **Fundamentals of Digital communication**

The fundamentals of digital communication is stated as “ in a digital communications system, data is transmitted from one location to another by mapping bit sequences to symbols, and symbols to sample functions of analog waveforms The analog waveform passes through a band limited (possibly time-varying) analog channel, where the signal is distorted and noise is added. In a conventional system the analog sample functions sent through the channel are weighted sums of one or more sinusoids; in a chaotic communications system, the sample functions are segments of chaotic waveforms. At the receiver, the symbol may be recovered by means of coherent detection, where all possible sample functions are known, or by non coherent detection, where one or more characteristics of the sample functions are estimated. (Kolumban, Kennedy & Chua (1997). Digital communication systems, by definition, are communication systems that use such a digital sequence as an interface between the source and the channel input and similarly between the channel output and final destination The idea of converting an analog source output to a binary sequence was quite revolutionary in 1948, and the notion that this should be done before channel processing was even more revolutionary. By today, with digital cameras, digital video, digital voice, etc., the idea of digitizing any kind of

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source is commonplace even among the most technophobic. The notion of a binary interface before channel transmission is almost as commonplace. For example, we all refer to the speed of our internet connection in bits per second.(Gallager, 2006).

Digital communication tries to convey the information from a source such as a computer to a receiver as effectively as possible. “ Modulation” is a process where the digital information is mapped to a sequence of symbols which has varied properties of an analog electromagnetic wave called the carrier. At the receiver, the signal to be received is selected by a channel filter, demodulated, interpreted, and the information is recovered.

Conversion of the digital information stream to an analog signal for transmission may be accompanied by encryption and coding to add end-to-end security, data compression, and error-correction capability. A channel encoder introduces algorithmic redundancy into the transmitted symbol sequence that can be used to reduce the probability of incorrect decisions at the receiver. Modulation is the process by which a symbol is transformed into an analog waveform that is suitable for transmission. Common digital modulation schemes include amplitude shiftkeying (ASK), phase shift keying (PSK), frequency shift keying (FSK), continuous phase modulation (CPM), and amplitudephase keying (APK), where a one-to-one correspondence established between amplitudes, phases, frequencies, phase and phase transitions, and amplitudes and phases, respectively, of a sinusoidal carrier and the symbols. The channel is the physical medium through which the information-carrying analog waveform passes as it travels between the transmitter and receiver. The transmitted signal is invariably corrupted in the

channel. Hence, the receiver never receives exactly what was transmitted. The role of the demodulator in the receiver is to produce from the received corrupted analog signal an estimate of the transmitted symbol sequence. The role of the channel decoder is to reconstruct the original bit stream, i. e., the information, from the estimated symbol sequence. Because of disturbances in real communications channels, error-free transmission is never possible.(Kolumban, Kennedy & Chua (1997).

## **Types of Digital communication**

The different types of digital communication are the internet and email, cell phones, high definition television and other electronic communication(Sarokin. D, 2015). He quotes “ in 1962 the idea of the internet was born”. Relying on packet switching — the digital transfer of short bursts of data — globally connected computer networks quickly developed into sophisticated digital communication technologies. Email over the network was introduced in the 1970s and has since grown into one of the most widespread forms of digital communication. Agnelli (in Vanderbeeken 2004, p. 2; see also Agnelli et al. 2004) argues that mobile phones have led to the overlapping of digital and physical space, so that physical presence no longer implies attentiveness or availability, and distinctions between public and private space are eroded. Digital communications is mainly associated with telecommunications and electrical engineering. Pedrozo and Wilska (2004, p. 4), the adoption of mobile phones has been ‘ one of the most conspicuous social changes to happen over the last ten years. HDTV (high definition television) is a television display technology that provides picture quality similar to 35 mm. movies with sound quality similar to that of today’s

compact disc. Some television stations have begun transmitting HDTV broadcasts to users on a limited number of channels. HDTV generally uses digital rather than analog signal transmission. HDTV and standard definition television (SDTV) are the two categories of display formats for digital television (DTV) transmissions, which are becoming the standard. (Techtarget. com, 2008). Digital communications have become ubiquitous in modern society and encompass a wide variety of technologies. Remote controls, keyless entry devices, walkie-talkies, Bluetooth earpieces, GPS satellites, cash registers and credit cards are among the many technologies that communicate digitally with people and with other devices. Futurists have coined the term “ The Internet of Things” to refer to the trend of enabling thousands of types of devices, from light bulbs to washing machines, with digital communication capabilities. Given the sophistication of the instantaneous transmission of digital data, it can be easy to overlook the more mundane communication activities. We store digital data on many types of physical media, including CDs, DVDs, flash drives, tape and compact memory chips. Every time you hand a friend or colleague a file, whether you transfer it electronically or pass along a DVD, you are engaged in a form of digital communication.(Sarokin. D, 2015)

### **Importance of Digital communications in business**

Long, Sarah M (2010)states social life in the United States today is changing rapidly with the growing use of Web 2. 0 technologies. Many realms of social life are being reorganized in different ways by the spread of computers, the internet, cell and smart phones, Ipods, and similar communications and information technologies. More business is transacted by ecommerce and

many jobs are being restructured by the centrality of computers and access to the Web. Many people participate in politics through the internet, clicking to donate to political causes, sending letters to Congress via email, and mobilizing people for protests through list serves. Education ranging from K-12 to college is increasingly reliant on computers and access to information through the Web. Even personal life, ranging from family life to friendship to intimate relationships are being affected by these new technologies as all kinds of social interactions are mediated by technology. In this context, Ernst& Young (2011) states that the real imperative in a world where ‘everything’ is digitised is that businesses need to pursue innovation to disrupt their own business model before the competition does. Without innovation strategies, companies will lose their competitive advantage in an increasingly commoditised world. There is no time to lose, as technology change accelerates and new digital platforms and devices are emerging. Furthermore, the expectations of the new ‘generation Y’ or ‘digital natives’ mean that companies must keep up with the pace of change or lose relevance. It further states that businesses must use digital channels to create seamless and consistent engagement in the view of the pace of technology change that is increasing exponentially. The challenge of most businesses would be to face loss of control over the customer relationship since the proliferation of digital channels and devices gives consumers greater access to information, and the means for communication and collaboration. The physical world is being replicated in the digital world through digital communities, businesses and assets, fundamentally changing the way consumers engage with businesses and each other. It also states the need to engage digitally with suppliers and employees. Therefore the use

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of use digital technology to enhance traditional business models, transform existing business models digitally and Invent entirely new business models or different engagement models. There is an increased competition and the risk of commoditization. Digital channels lower barriers to entry and increase globalisation, leading to a spiral of intensifying competition and commoditisation. Innovative organisations are taking the opportunity to diversify, bringing cross-industry convergence and blurring of the boundaries between industries. Previously physically distinct products and sectors now compete with one another, over less clearly defined customer bases. Many companies are already developing responses to the challenge of digital by moving from a transactional to an ‘ interactional’ relationship with their customers. They are inviting their customers to become part of the R&D process, the design process and the go-to-market. They are also encouraging them to participate in the post-sale support process, and taking advantage of ‘ prosumerism’ as a low-cost way to provide service. It is through differentiation and innovation that organisations can create the shift in mindset necessary to win in the digital game.

## **Current & future trends**

It is assumed that the future trends in digital communication will continue to be important and digital literacy will continue to develop distinct registers.

Convergence refers to the capacity to integrate technological functions in a single device. Hence, the mobile phone doubles up as camera, MP3 player and so on – or the home media system deals with music, TV, telephonics and e-mail. The general direction of convergence is to allow for access to multiple media from a single source. Convergence pairs up with portability,

because as devices become more compact and wireless connection becomes more affordable and more ubiquitous, the possibilities of being able to use all media, more or less at any time or place, increase. Pervasiveness suggests that digital technologies will feature in more and more areas of everyday life, becoming even more closely interwoven with the way we get things done. As this pervasiveness increases, it is also likely that technological innovation will focus on making devices and their interfaces more transparent – in ways that touch screens and desktop icons begin to suggest.(Kaul, 2012). Digital is changing the world, and progress is not linear. In a world where a smartphone is no longer just a smartphone, but a potential revolution. Not every digital initiative will work for every organisation, and it is important to assess capability and capacity for change before deploying a digital strategy. In general, the more holistic the initiative is, the greater the chance of success. Ernst & Young(2011). The next step in digital communication as reported byReuters (2014)in the Times of India edition is the WebRTC. This free browser-based technology looks set to change the way we communicate and collaborate, up-ending telecoms firms, onlinechatservices like Skype and WhatsApp and remote conferencing on WebEx. Web Real-Time Communication is a proposed internet standard that would make audio and video as seamless as browsing text and images is now. Installed as part of the browser, videochattingis just a click away with no need to download an app or register for a service. WebRTC allows anyone toembedreal-time voice, data and video communications into browsers, programs more or less anything with a chip inside. The use of a WebRTC-compatible browser like Mozilla’s Firefox can be made to start a video call just by sending someone a link. By the end of the decade, consultants Analysys Mason reckon there will

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be 7 billion devices supporting WebRTC, nearly 5 billion of them smartphones or tablets. Automatic voice and video encryption means web conversations should be safe from eavesdropping or external recording. Those championing WebRTC say the technology isn't so much about challenging what's available today, but more about creating opportunities for new products and services tomorrow.

## **Conclusion**

In conclusion, Das (1998) states " most of the technological developments in digital communication has been very rapid and has taken place in the last two decades. As a result , the senior professionals and academics have not been able to keep pace with these developments and therefore there is an urgent need to update the knowledge in these areas. Moreover, it is very necessary that our electrical engineering students specializing in communications must have a strong base in digital communications systems as well. The reason being the rapidly advancing price/performance capability of computing, storage, and bandwidth is contributing to an adoption rate for the digital infrastructure that is two to five times faster than previous infrastructures, such as electricity and telephone networks. (Core Edges Blog, 2009).

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