THE INFORMATION AGE

INTRODUCTION

The attempt of humans to address the three limitations of communication or exchange of information led to new technologies.

These technologies affected the social, political and economic role of information leading to the so-called **Information Revolutions.**

The start of the information revolution was made possible by the invention of **language**, **writing** and **printing**.

HISTORY OF INFORMATION AGE

The invention of **language**, **writing** and **printing** greatly improved how human exchange information and communicate.

From these, early and primitive forms of information and communication technology were developed.

The following were ways of exchanging information in the past: drum rolls, fire signals, hand signals, use of pigeons, use of flags and papyrus. Many of them are still in use today. However, they remain to have limitations.

FIRST INFORMATION REVOLUTION

Information Revolutions aimed to address the limitations of communication. The **first Information Revolution** began in the **mid-nineteenth century** with the invention of the telegraph, telephone and radio. It lasted until the 1950s.

American inventor **Samuel Morse** was credited for developing the first operational model of the **telegraph**. His prototype was patented in 1940, but was first used in 1945.

The use of the telegraph became widespread in America and then in Europe. It increased the connection between people separated by great distances.

The telegraph played an important role during the **American Civil War**. It was used by the US Government to communicate military information, command, and intelligence reports to its troops.

Telegraphs were also used by diplomatic offices in Europe to communicate with other countries. This enabled easier communication and linkage among countries.

After the invention of the telegraph, the **telephone** was invented. The first telephonic device was developed by **Johann Philip Reis**. However, **Alexander Graham Bell** was credited for the invention of the telephone in 1876. Unlike telegraphs, telephones can send sound waves.

After its invention, the telephone became very popular in the US and eventually, in Europe. Networks of telephone communication were established. It impacted businesses, military, foreign affairs and many other human activities.

The **radio** is another important technology of the First Information Revolution. It was **Guglielmo Marconi** who invented and patented the first radio. However, his radio can only send Morse codes. It was **Reginald Fessenden** who discovered how to send voice and music through the radio.

Radio networks and stations were eventually established in the US and in Europe. Radios were used by the military during the World Wars. After the wars, the radio played a key part in the development of the broadcasting (news) and the music industries.

SECOND INFORMATION REVOLUTION

The **Second Information Revolution** began in the **1950s until the 1980s.**

The Second Information Revolution further improved communication due to the invention of the **television, early generation computers, and satellites.** This revolution made the "world smaller".

The **television** was actually developed in the 1920s based on the work of 3 inventors. **Farnsworth** invented the **process of image scanning. Zworykin** invented the **iconoscope tube** and the **kinescope television tube. Dumont** invented the **receiver picture tube.**

However, the television's immense improvement and wide use happened after World War II. Until now, televisions are ubiquitous and have significant global impact.

The development of the early **computers were due to the needs of the military. John Vincent Atanasoff** was credited for developing the first electronic digital computer in 1939. **Alan Turing** developed the **first working digital computer,** the '**Collossus**'. It was used during World War II to decode Nazi war codes.

In 1946, **J. Presper Eckert** and **John Mauchly** developed **ENIAC** or **Electronic Numerical Integrator And Calculator**. The problem with ENIAC and other first-generation computers was that they used vacuum tubes which generated a lot of heat causing overheating or burning out.

The problem on overheating led to the development of **transistors** by Willia**m Shockley, Walter Brattain**, and **John Bardeen**. The use of transistors are the basis for the second-generation computers. The **second-generation computers** were smaller, faster and more reliable.

The invention of **integrated circuits** led to the development of the **third-generation computers.**

The development of the early computers is significant as it demonstrated the synergy from the collaboration among the government, the military and the industry in doing innovation.

Early computers made it easier to manipulate, transmit, process, and store data. It helped in linking people, industries and governments together.

Early computers were replaced by modern, more advanced models. To-date, the impact of computers to society continues to be remarkable.

In order to transmit telephone and television signals in a global scale, **satellites** were developed. Satellites enabled global communication.

Sputnik 1 was the first artificial satellite. It was developed by then Soviet Union and was launched in 1957. This marked the beginning of the so-called **Space Age**. In the US, the military launched its first satellite, the **SCORE** or **Signal Communications by Orbiting Relay Equipment**, in 1958.

The development of satellites were initially done by the military for military purposes. Eventually satellites were developed by civilians for non-military use.

Syncom III was the first civilian telecommunications satellite. It was launched into orbit in 1964. It was developed by NASA and was used to broadcast the 1964 Summer Olympics.

Intelsat I or the '**Early Bird**' was the first commercial communications satellite. It was launched in 1965 and was developed by Hughes Aircraft Company (now Boeing Satellite Systems).

Later on, satellite technologies were further improved and developed. This enabled global communications, and the rise of television networks, and telecommunications companies.

Satellites allowed governments and companies to send information with privacy, reliability and timeliness.

THIRD INFORMATION REVOLUTION

The technologies of the first two Information Revolutions paved the way for more technologies and innovations which led to the **Third Information Revolution.**

The main technologies of the Third Information Revolution are:
- advanced semiconductors
- advanced computers
- fiber optics
- cellular technology
- satellite technology
- advanced networking
- improved human-computer interaction
- digital transmission and digital compression.

Semiconductors are the most significant technology that significantly increased the ability of storing, processing, and transmitting information.

Because of semiconductors, memory storage increased dramatically from **10,000 bits of information in 1978** to **160 trillion bits of information in 2017.**

Microprocessors were also rapidly developed. In the 1980s, a microprocessor contained around 10,000 transistors. In 2018, microprocessors with 6.9 billion transistors were developed.

The **fourth generation computers** were made possible by the development of **computer chips** that have hundreds of thousands of components.

The **fifth generation computers** used multiple processing units allowing the simultaneous processing of data. Supercomputers were part of the fifth generation. Advanced computers allowed easier and faster transmission of voices, photos, digital data and other forms of information. Processing and storage of data were made better and more efficient.

Cable television, telephone and telegraph use **copper wires** or **coaxial cables**. The problem with copper wires is that they are prone to attenuation and leakage. Also, copper wires and coaxial cables have limitations on the data that they can handle.

The invention of **fiber optics** addressed these problems. Fiber optics are extremely thin glass fibers that can carry information from one source to another.
It is faster in terms of transmission of information. **Copper wires** can transmit **hundreds of thousands of bits of information** while **fiber optics** can transmit **billions of bits of information.**

Transmitters and receivers are usually large, heavy and difficult to carry or move. The development of **cellular technology** solved the problem. Cellular technologies led to the development of cellular phones which made communication easier among individuals.

Cellular phones can also store and process data. Its widespread use started in the 1970s. Today, cellular phones are not only being used for communication but also for other purposes such as photography, music, videos, navigation, and eLearning among others.

Satellite technologies helped build the global communication infrastructure. They are being used for telephone, television, radio and even weather and climate equipment.
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Satellites enabled the global broadcast of events, shows, international teleconferencing, international phone calls and other forms of global connectivity.

Networking or advanced networks enhanced the connectivity and communication worldwide. The largest form of advanced network is the **INTERNET**. The use of the Internet is so widespread, more than half of the world's population is using it. There are at least 1.6 billion websites worldwide.

The **Internet** made possible the development of social media, online libraries, electronic mail, video calls, e-learning and e-commerce.

Today, the goal is to develop a fully integrated, high-speed, high-capacity network.

Initially, one key challenge in the use of computers is the lack of "**good human-computer interaction**". Previous models of computers were not user-friendly; they were complex to operate.

Today, with advancement in technologies and industrial design, major progress were made in terms of human-computer interaction.

The increase in the **data processing capacity** of computers led to the simplification of user interphase.

Today, computers are easy to use and also have become more affordable. This allowed the democratization of access to computers and even to other gadgets that use similar technologies.

In order to further improve communication, **digital transmission** was developed. It used digital signals instead of analog signals. **Digital signals** are more efficient and effective. The use of digital signals allowed the development of **digital compression** or the **lowering of the size of data or information.**

Digital compression allowed more data storage, which resulted to easier and faster data transmission.

Digital technologies are so ubiquitous nowadays. They are widely used and relevant in almost all aspects of human life.

The Third Information revolution resulted to the following:
- increase in the speed of information transmission
- greater capacity to transmit information
- more flexibility in the flow of information greater access to information by the people, institutions and businesses
- heightened demand for more new technologies or improvements in the current ones

IMPACT OF THE INFORMATION AGE

The Information Age has the following positive impacts:

1. **It enabled greater connectivity of people around the world.** Citizens in Japan or in Spain would know what is happening in Argentina or Australia. Overseas Filipino Workers in the Middle East can talk to their families in the Philippines because of online video calls.
2. **It made many aspects of day to day life more convenient.** In getting government documents, online portals can now be used. Shopping can now be done online. Job applications can be done online. Online education is now also possible.
3. **It created online communities.** Information technologies made possible the creation of online communities. People with common interests such as hobbies, expertise, and advocacies can now communicate, share ideas, and "meet" online.
4. **It made information more accessible.** Almost all information can be accessed through the Internet. Never in human history has so much information become so accessible at so much speed. However, it is important to validate the source of information and to critically analyze the information.

The Information Age also has the the following downsides:

1. **Many information are false and misleading.** Sharing and access to information in the Internet is difficult to regulate. This leads to proliferation of false information like 'fake news'. This can result to many serious negative social, political and economic implications.
2. **It allowed the conduct of crimes and illegal activities.** Information technologies were also used for crimes and illegal activities. Online sharing of dirty and pornographic materials, illegal trading, phishing, hacking and identity theft in social media, and cyber bullying became possible.
3. **It created a 'Digital Divide'.** Divide refers to the non-physical boundary between those who have access and are literate on information technologies versus those who are not. Those who

have access can take advantage of the benefits of the information age, while those who don't have access are further deprived of opportunities.

4. **It affected human's productivity and flourishing.** Many human skills are being replaced by information technology, hence workers face the constant threat of losing jobs. On one hand, many individuals are also addicted to online media, online games, and other online activities that take away time from having real human interactions.

REFERENCE

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