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Theory of Information and Communication

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4.1 Internet as a Medium: An Historical Perspective

Historical review of the concept of the Internet

In section 1.3, the origins of the Internet are addressed, tracing its roots back to the late 1960s with the development of ARPANET. This experimental network, created by the U.S. Department of Defense's Advanced Research Projects Agency (ARPA), connected universities and research centers, facilitating communication between them. ARPANET not only revolutionized communication technologies at the time but also laid the foundations for the development of interconnected networks designed to ensure the transmission of information even in partial failures. Subsequently, in the early 1990s, the World Wide Web (WWW) would emerge, driving the mass use of the Internet.

However, the focus of this topic is to explore the dimensions of the internet as a medium of information and how it has transformed social and cultural realities over the years. For this, we will draw on the works of author and professor Manuel Castells, such as *The Internet Galaxy: Reflections on the Internet, Business, and Society* (2001), *The Information Age: Economy, Society, and Culture* (2010), and *Networks of Outrage and Hope: Social Movements in the Internet Age* (2015). These works analyze the impact of the Internet on the economy, society, and culture, highlighting how the network has transformed human relationships and business organization.

Networks are ancient forms of human activity that have been revitalized as information networks driven by the Internet. Networks offer extraordinary advantages as organizational tools due to their flexibility and adaptability, crucial for surviving and thriving in a rapidly changing environment. Therefore, networks are developed across all economic and social sectors, functioning better than large vertically organized corporations and centralized bureaucracies, and competing favorably with them (Castells, 2001).

In essence, a social phenomenon of the human reality has been transferred to a virtual space. According to Castells (2001), the Internet is a communication medium that allows for, for the first time, many-to-many communication in chosen time and on a global scale. Just as the spread of the printing press in the West expanded information in its time, the Internet developed in a secure environment due to public funds and a research project oriented towards fulfilling a national interest mission. But it was an environment that did not stifle freedom of thought and innovation at its inception. However, it did so later, and the business world greatly benefited from this model, allowing for explosive growth in digital communications and the creation of new economic opportunities and e-business models.

One of the distinctive contributions of the Internet in its early stages was its transparency, both in its technical architecture and its social and institutional organization. Technically speaking, the flexibility of communication protocols allowed major backbones like ARPANET to connect with thousands of Local Area Networks. According to Castells (2001), this characteristic was influenced by:

- The open and free distribution of software, as well as the shared use of resources, were fundamental principles adopted by the early hackers. These principles facilitated the rapid diffusion of communication protocols between computers. The rapid expansion of these protocols would not have been possible without the collaboration and open distribution of software, becoming the codes of conduct of the early hackers. This approach was essential in the creation and development of the Internet.
- The interaction between scientific networks and hacker communities in universities. These collaborations were crucial for the development of the Internet, as universities became the common space where technological advancements were shared.

As a result of the open architecture of the Internet, users transitioned from passive consumers of technology to producers and configurators of the network. The free distribution of the source code and the interaction between scientific networks allowed for modifications of software and the development of new applications. This process led to a series of unplanned innovations, such as email. The adaptation of technology to users' uses and values transformed the technology itself. It was not a centralized design, but rather an emergent process from the bottom up, making users active participants in configuring the network (Castells, 2015).

By the late 1970s and early 1980s, the first virtual communities emerged through networks like Usenet, Fidonet, and Electronic Bulletin Boards. These communities developed forms of communication such as mailing lists, chat rooms, and multi-user games. According to Castells (2001), these communities were based on two shared cultural characteristics of great importance. The first was the value of horizontal and free communication, embodying the practice of free expression at a global level in an era dominated by major media groups and censoring bureaucracies. The second shared value, emerging from virtual communities, is what he calls self-directed connectivity—i.e., the ability of any individual to find their own path on the network and, if they cannot, to create and publish their own information, thus giving rise to the creation of a new network.

Although the Internet existed from the 1960s, it was in 1995 that it is considered the true "Internet boom" for people, businesses, and society in general. That year, the WWW consolidated, the network's architecture opened, and the infrastructure was ready for mass expansion. By the end of 1995, there were approximately 16 million users. The creation of the Mosaic web browser in 1993 and the commercialization of Netscape Navigator in 1994 were key milestones that significantly accelerated the spread of the Internet. Before these innovations, the Internet was difficult to use for the public, with limited graphic capacity and significant complexity in locating and retrieving information (Castells, 2010). The availability of browsers like Mosaic and Netscape made the web much more accessible and attractive to the public, thus facilitating its massive expansion.

However, the most profound evolution of the Internet in the first decade of the 21st century marked a significant change in how people interact online. The shift from individual and corporate interaction, such as the use of email, to the autonomous construction of social networks controlled and guided by users themselves was driven by advancements in broadband and the development of social software. This change facilitated the emergence of a wide range of distribution systems feeding the Internet networks, allowing social networks to become multifaceted platforms not only for establishing friendships but also for marketing, e-commerce, education, cultural creativity, media, and socio-political activism (Castells, 2015).

Up to this point, it can be marked that the exponential growth of the Internet in social life has conditioned the network society. This concept of the "**network society**" is central in Manuel Castells' work (2006) and refers to a new social structure emerging on the planet from the interaction between information and communication technologies, especially the Internet, and its appropriation by individuals, groups, institutions, and businesses. It is not a homogeneous society but a complex and diverse social model, with different consequences for people's lives depending on their historical, cultural, and institutional context.

Castells argues that the network society is characterized by flexibility, adaptability, and the ability to connect geographically dispersed nodes in complex networks. This contrasts with the hierarchical and centralized structures of the industrial society. The "network" in this context does not only refer to the computer network but to a form of organization that extends to the economy, politics, culture, and social relations. This implies:

- New form of organization: The network society is configured as a more efficient and adaptable form of organization compared to the hierarchical structures of industrial society. The flexibility of networks allows for the coordination of geographically and functionally dispersed actors, generating systems with greater responsiveness and adaptability to change.
- Network individualism: The network society does not imply individual isolation. Instead, it is characterized by a "network individualism," where individuals build their online and offline social interaction networks based on their interests, values, affinities, and projects. Online social interaction plays an increasingly important role in general social organization.
- Transformation of social relations: The network society deeply transforms social relations, giving rise to new forms of sociability and new models of interaction. Long-distance communication and the creation of virtual communities expand connection possibilities, but they can also affect face-to-face interaction in physical spaces.
- Impact on the economy: The network society is closely linked to the "new economy" or e-economy, based on information and knowledge, where e-business becomes the norm. Innovation and access to information

play a fundamental role in economic growth. However, this model also presents risks such as inequality and social exclusion.

- Political challenges: The network society presents new challenges for politics and governance. The globalization of networks makes it more difficult to control information and regulate global financial markets. The control and appropriation of communication networks become key elements for the exercise of power. Transparency and citizen participation are essential for democratic management of the network society.
- Inequality and exclusion: The network society can generate greater social inequality and exclusion, creating a "digital divide" between those with access to networks and those without. This differential access to networks impacts economic development, access to information, and political participation. Bridging this gap is presented as a fundamental challenge for the future of the network society.

The evolution of the Internet between 2000 and 2010 marked a significant shift towards decentralization and ubiquitous computing. During this decade, processing power began to be distributed across a network of interconnected devices, many of which were portable and purpose-designed. These devices could communicate with each other without requiring their own operating system, while computational power resided within the network itself. At the same time, there was a growing convergence between the Internet and wireless communication, allowing for the distribution of communication capacity through wireless networks and multiplying points of access to the Internet. This development, coupled with advances in broadband technology, facilitated the transmission of voice and data through packet switching, greatly expanding the possibilities of the Internet (Castells, 2010).

During this period, social networks on the web significantly transformed communication and social interaction, building on the tradition of virtual communities from the 1980s. Platforms like MySpace and Facebook revolutionized the ways people formed social relationships, establishing networks of directed relationships among people of all ages. For hundreds of millions of users under 30, online communities became an essential dimension of daily life, with an impact that continues to expand worldwide (Castells, 2010). This shift in the concept of the Internet consolidated its role as a central platform for social interaction on a global scale.

Internet in Social and Cultural Reality

According to Manuel Castells (2001), the culture of the Internet is deeply tied to the values and practices of the producers of this medium, who were also its first users. In this perspective, it is crucial to distinguish between two types of users: the producers/users, who provide feedback and actively participate in the development of the technological system, and the consumers/users, who use applications and systems without directly intervening in their evolution, although their collective use indirectly influences the system.

For Castells, the culture of the Internet is essentially the culture of its creators. It is understood as a set of values, beliefs, and collective behaviors that guide the actions of its members and are institutionalized through norms and customs. Unlike ideology or individual representations, culture is a collective construction that transcends personal preferences and shapes the interaction of those who belong to it. In the case of the Internet, this culture not only shaped the medium but also drove its initial configuration, characterized by its orientation towards innovation, collaboration, and participation.

The culture of the Internet is structured in four overlapping layers, as mentioned earlier, each with significant implications in the early history of the Internet. The following are explained:

- **Technomeritocratic culture** is the culture of the techno-elites, a meritocratic community where recognition and authority are earned through contributions to technological development, open communication, and collaboration. This culture is based on the belief in the value of scientific and technological development as a key component of human progress. Peer review is a key feature of this culture; the relevance of a discovery is established through evaluation among the colleagues within the scientific community. Reputation is an essential element both for membership and rank within the community. Technological discovery, always

centered on computer programming within a networked environment, constitutes the supreme value of this culture.

- **The hacker culture** acts as a bridge between the technomeritocratic culture and the business projects that disseminate the Internet into society. It is characterized by its autonomy in projects, differing from institutional or corporate mandates. For hackers, freedom—especially in terms of access to and use of technology—is a core value, although many also defend their right to commercialize their innovations. In this culture, there is a strong sense of community, based on active membership in a community structured around customs and principles of an informal social organization. Within these communities, roles are clearly defined, such as the "tribe elders," who are the owners or maintainers of each project. Sanctions for rule-breaking manifest in forms like "flaming" or expulsion from the community.
- **Virtual communities** are characterized by the creation of social spaces in cyberspace where values, interests, and activities are shared. Initially, some virtual communities were formed by technically sophisticated users, such as ARPANET researchers, but with the expansion of the Internet, millions of users with limited technical knowledge also joined, contributing social innovations to the network. Horizontal and free communication is a fundamental value for network users, maintained from the early stages of online communication. Additionally, users share self-directed connectivity, meaning the ability for each person to find their own way in the network and create and publish their own information. Internet uses are functional and closely related to work, family, and everyday life of users. Email is the most common activity, and most interactions are tied to work or real-life personal relationships. Social activities on the Internet, although having specific effects, are an extension of life as it is.
- **The entrepreneurial culture** on the Internet is fundamental for the development of the new economy driven by the network. Entrepreneurs have transformed the business world by recognizing the potential of the Internet and creating new business models. In places like Silicon Valley, entrepreneurs have turned their innovative ideas into sources of income, while traditional companies have fallen behind due to their lack of vision. In addition to focusing on product quality and innovation, entrepreneurs also have a clear orientation towards the financial market, as it issues the final verdict on the success or failure of the company. The entrepreneurial culture is thus a culture of work, often characterized by work addiction. However, the main reward is external (money) rather than internal (a puritan ethic of personal self-improvement). Personal savings are less relevant than investment in stocks, and consumption is organized according to an immediate gratification model.

These four layers, interconnected, have contributed to building a dominant ideology in the world of the Internet, based on freedom. This freedom encompasses access to knowledge, creation, innovation, and participation in the network. An example of this is Bill Gates and Microsoft symbolizing or symbolized the entrepreneurial culture, at least in the early stages of the company; however, they were not producers of the Internet in technological terms (Castells, 2001).

The culture of the Internet is a culture built on a technocratic belief in human progress through technology, practiced by hacker communities that thrive in a free and open technological creativity environment. These communities are rooted in virtual networks dedicated to reinventing society and are materialized by capitalist entrepreneurs in the workings of the new economy (Castells, 2001).

Social movements are another significant impact that the Internet has had on society. These movements often emerge on Internet social networks, which serve as spaces of autonomy, largely outside the control of governments and corporations. A social movement always responds to a specific social sector (indigenous movement, neighborhood, rural, labor), which becomes an actor in a claim-making, and thus democratic, movement because its social demands can be politically represented, and its conflicts manageable (Sánchez, 2013). Internet and wireless networks function as digital communication platforms, allowing mass self-communication where the senders independently decide the content and the receivers. This capacity for self-communication is fundamental for the autonomy of social actors (Castells, 2015).

The interaction between cyberspace and the urban space is crucial in social movements. Activists create spaces of resistance online, using these platforms to disseminate messages and amplify discontent. They also establish "media

camps" to collect videos and images from the protesters. The Internet revolution does not negate the territorial nature of historical revolutions; rather, it extends it to the space of flows, enabling wider and more decentralized communication and organization (Castells, 2015).

The protests in Egypt, which began on January 25, 2011, arose in response to a series of social and political oppressions and inequalities. The spark that ignited the demonstrations was the inspiration from the Tunisian revolution, combined with discontent over police brutality, lack of democracy, unemployment, poverty, and sexism. The additional spark came from a series of self-immolations protesting the rising food prices. The revolution reflected a deep social discontent, motivated by the desire for freedom and social justice, with university youth and poor urban sectors playing leading roles.

According to Castells (2015), the role of the Internet was crucial in the Egyptian protests, providing a space for dissent and a platform for mass self-communication. The call to action was initiated by Asmaa Mafhouz through a video blog that went viral on the internet, spreading quickly among friends, family, and activist groups. Online resistance spaces, together with social networks, not only connected individuals but also expanded each other's networks, increasing the capacity for mobilization and organization. The occupation of Tahrir Square in Cairo, "Friday of Rage," and the Egyptian government's shutdown of the Internet underscored the crucial role of technology in facilitating popular communication and resistance. The restoration of Internet access on February 1 allowed the protest to continue, showing that the disconnection was more a shift in codes than a physical disconnection. The composition of the protesters and the demands of the revolution reflected the diversity of discontent and the need for structural change in Egyptian society.

Another significant social movement in recent years with wide reach on the internet is the "Woman, Life, Freedom" movement in 2022, which emerged after the death of Mahsa Amini, a 22-year-old woman who died in police custody in September 2022. Her death was reportedly due to a beating by the Morality Police during her transfer to a detention center. The protests that followed Amini’s death led women to take to the streets to protest against the regime's use of force. This movement quickly gained momentum and spread to other cities, challenging conventional norms and showing innovative spatial practices, such as impromptu classes and public disobedience to the mandatory hijab through symbolic acts, including burning scarves and cutting hair in the streets. The use of social networks in the protests was crucial, despite government restrictions on major social media platforms like YouTube and Facebook, social media played a key role in organizing, spreading information, and mobilizing support during the 2022 protests (Izadi & Dryden, 2024).

Instagram, although often accessible through VPNs, became the main platform for sharing images, news, and videos during the protests. The dissemination of videos showing Mahsa Amini losing consciousness and collapsing after her arrest, as well as videos of police violence, was crucial in mobilizing people. The combination of digital media and online social networks allowed for the rapid spread of protest scenes, particularly those showing confrontations between the Morality Police and the protesters (Izadi & Dryden, 2024). The act of cutting one’s hair, initially as an act of mourning and protest, became a symbol of defiance against government control over women’s appearance and an act of solidarity, with many livestreaming their haircuts on platforms like TikTok or Instagram. Despite significant pressure for social change in Iran, the government’s response has been a harsh crackdown on the protesters, including detentions, assaults, and executions.

On the other hand, the **economy** has experienced a significant impact thanks to the Internet, which has driven exponential growth in electronic financial transactions and global commerce. This advancement is reflected in the creation of electronic stock markets like Nasdaq, which operate without a physical location in space. Additionally, futures markets such as Eurex in Switzerland-Germany, Liffe in London, and Matif in France have become entirely electronic. Furthermore, networks of brokers and stockbrokers, like Instinet, have facilitated some of the world’s most important transactions, while companies like Charles Schwab have transitioned towards a predominantly electronic model. The integration of technology in stock trading is also evident in the New York Stock Exchange, which has explored creating a hybrid exchange, both electronic and physical (Castells, 2000).

This change in financial markets has generated a new type of economic transaction where speed, complexity, and instant reaction are essential. Company valuations are increasingly traded in purely electronic ways, without the need for a physical space. This implies a growing dependence on predictive mathematical models and advanced algorithms, activated by high-speed Internet connections. This transformation not only changes financial markets but also has a profound impact on the global economy, altering investment dynamics and how businesses operate in a globalized environment (Castells, 2000).