Working Paper

Theoretical Review on Technology Mediated Communication: Influences on Social Structure

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Introduction

The 20th century witnessed the emergence of a nearly saturated medium penetration in human history. Silverstone (1999) pointed out in *Why study the media:*

> "Media are changing, have changed, radically. Our century has seen the telephone, film, radio, television become both object of mass consumption and essential tools for the conduct of everyday life." (p. 4)

This changing, or reality, to some extend, is enabled and equipped by the development of information communication technology (ICT), which is operationalized by a variety of medium formats, from mass communication facilities, such as radio and TV stations, to personal communication devices, such as personal computers, personal data assistant, and mobile phones. Similar to other communication technologies (e.g. printing and telephone) that have contributed their parts to human society along our history, ICT has brought some consequences to society, both known and unknown to us. The purpose of this essay, therefore, is to provide a theoretical review on major social theories dealing with such consequences.

Instead of focusing on the process of technology diffusion and adaptation to general public, which is articulated by the Diffusion of Innovation Theory, this review will look at how the innovation, implementation, and adaptation of ICT change the behaviors of the society as a whole. In other words, this review is to discuss what happens to the society during and after the diffusion of technology.

Accordingly, five theories dealing with such social effect will be discussed in the following sections. These theories are: Domestication of Technology Theory, Social Shaping Theory (SST), Constructivism (Social Constructivism), Apparatgeist Theory,

and World (Global) System Theory. After the review section, a brief summary will be provided to address the difference and commonality of these theories.

The Theoretical Framework

Domestication of Technology Theory

Brief History

In the early 1990s, Roger Silverstone, then at Brunel University at UK, introduced the concept of domestication to explain the general and symbolic consumption trend in modern society. In the mid of 1990s, further investigations based on this approach were conduct. These research efforts were applied and tested in the context of ICT consumptions. For instances, some studies done by Haddon and Silverstone looked the process on how the use of PC transformed from a tool for teleworkers or single parents to a technological device that used by essentially every body in the household. When certain patterns emerged, the Domestication of Technology Theory started to gain attention to social scientists who are interested in social consequences of technology. This theory is mainly developed and accepted in European countries in general and Britain in particular. Besides the context of households, the application of this theory can also be found in company and public policy context.

Main Ideas

Domestication is a concept dealing with how ICT becomes integrated into people's daily life, or how ICT "find a place in people's life" (Haddon, 2003, p.43). The major argument of this theory is to treat technological innovation as a process, not an event (Silverstone & Haddon, 1996, Silverstone, 1999, and Haddon, 2003). By process, Silverstone and Haddon mean that to discuss technological innovation and adaptation is not just to discuss the producing of technology. Instead, other factors including social,

cultural, economic, political, and individuals involved in the process should also be considered.

Haddon (2003) provides the basic assumption of domestication process (p. 45 – 48):

Assumption 1: When we analyze technology, the emphasis should go beyond the function of the technology. For an example, social symbolic meaning should be considered (e.g. identity, status, etc.)

Assumption 2: Technology adaptation is a process, in which the following steps take places.

- Imagination: Hearing about the technology (Early stage????)
- Appropriation: Actual purchasing the device
- Objectification: Using the technology. Users design ways in using the technology based on their own preferences.
- Conversion: The technology device becomes a part of the user's identity and daily life.

Assumption 3: The process of domestication reflects the overall tendency of technology adaptation: From public domain (e.g. work) to private domain (e.g. home).

Assumption 4: Individuals, both end-users and non-users, have influence on how the technology is used.

The process of domestication is a two-way process (Silverstone and Haddon, 1996). On the one hand, Silverstone (1999) believed that media, which to some extent are represented and facilitated by ICT, are so embedded in human's everyday lives that we can hardly talk about our home without talking about them. On the other hand,

Silverstone and Haddon (1996) opposed the role of technological determinism in the process of technological innovation and adaptation. They argued that other factors, such as social and economical dimensions, involving in the process provide crucial feedbacks to the design process of technology, which reflect the necessity of domestication and further promote the development of the technology.

Major Researchers/Proponents

Roger Silverstone
Leslie Haddon

Critiques

- Katz and Aakhus (2002) argued that domestication of technology theory is not really a theory because of its overall narrowed scope. Instead, it is just a perspective or a viewpoint in explaining how technology becomes a part of family life.

Social Shaping Theory (SST)

Brief History

Emerged as one of critiques to technology determinism, SST can be traced back to four research traditions originated in Britain (Williams & Edge, 1996): The Sociology of Scientific Knowledge (SSK) in the 1970s; The Sociology of Industrial Organizations in the 1970s; the Critical Studies of Technology Policy in the 1980s; and the Economics of Technological Change in the 1980s. In 1985, MacKenzie & Wajcman systematically proposed the SST, which not only addressed the issue of social impact of technology but also addressed the content of technology.

Main Ideas

SST scholars acknowledge the complexity of relationships between technology and socio-economic process (Williams & Edge, 1996). MacKenzie and Wajcman (1985) argued that instead of taking technology's social impact for granted, social scientists should think about the "unanswered question". That is what shapes technology so that it has the influential power to human society. To answer this question, MacKenzie and Wajcman suggested stopping treating at technology as a pure independent factor in its relationship with society, a view reflecting and represented by technological determinism. Although

To some extent, SST theory is very similar to the social constructivism, which will be discussed in detail in the next section of this essay. The boundary between the two is so vague that even social scientists specialized in these theories can not reach an agreement on whether these two theories should be merged. For an example, Brey (1997) argued that the social shaping approach was actually a *mild social constructivism* while Williams & Edge (1996) saw it a problematic approach in considering the two as one. This essay will discuss these two separately.

Trying to address the question of where exactly technology comes from (referred at the "black-box"), SST consists of the following major arguments:

- Technological innovation and development is a process involving the complexity of the socio-economic processes (Kubicek, Dutton & Williams,1997)
- Although technology is, to some extent, shaped by the society, there are some nonsocial factors, such as technical aspects of technology itself, involving in technological development.

- Because social factors play such important roles in the process, the nonsocial factors that determining technological development can be understood as "social biases" that "built into" technologies themselves.
- "Choices" enabled by social factors are central concept in SST, in terms of explaining how technology develop in a society.

SST discusses how technology can influence and be influenced by society. It actually proposes a dynamic relationship between technology and society. SST differs from the "technological determinism", which sees the adoption of certain technology is inevitable and requires certain social changes. On the contrary, SST studies support that "technology is a social product", which provide options to members of the society to make selections in the process of technological development, implementation, and adaptation. According to SST, this selection process is not merely determined by technological advantages. Instead, the proper option is selected based on "a range of broader social, economic, cultural, and political factors". Kubicek et al. (1997) offers the following examples in which society and technology mutually shape each other.

- ❖ Commercial strategies shape ICT development (CISC vs. RISC), resulting industry standard.
- ❖ IT networks shapes the operation of organizations.
- ❖ The overall power of shaping process is affected by the number of users who use the technology.

Major Researchers/Proponents

Robin Williams

Donald MacKenzie
Judy Wajcman

Critiques

Constructivism/Social Constructivism

Brief History

The paradigm of social constructivism can be traced back to the mid-1980s, proposed by Bijker, Hughes, and Pinch (1987).

Main Ideas

As mentioned earlier in this essay, social constructivism is very similar to the social shaping, from a broad perspective. Brey (1997) even argued that, rather than a stand alone theory, SST should be included in the social constructivism theory.

Scholars of social constructivists believe (Brey, 1997):

- The development of technology does not follow a linear pattern. Instead, technological development reflects a *contingent process*, through which technology develops in a non-fixed and non-logical pattern.
- Many *actors* (i.e. relevant social groups or individuals that can influence the process) play roles in the process of technological development.
- The roles played by these actors are decided by actors' social aims and motivations.
- Different actors strive to win the competition in determining the direction of technological development.
- Technology will reach a stabilized point (*stabilization*) in the society. This point is characterized as different actors interpret the technology similarly after many negotiations and interactions.

- In the stage of *stabilization*, technology functions differently within the society based on different actors' interpretations of the technology, a character label as technology's *interpretative flexibility.*
- Social constructivism can be further categorized into three perspectives: *strong social constructivism* (i.e.Technology development is a pure social construction, whose direction is fully determined by actors' negation and social interactions); *Mild social constructivism* (a.k.a. the Social Shaping Theory); and *Actor-network theory* (a.k.a constructivism: Technology development is decided by social networks consisting of actors, natural, and technological components).

Social constructivists view technological innovations as a socially shaped or socially constructed phenomenon, rather than a phenomenon determined merely by the advance of technology. In other words, scholars of social constructivism emphasize the role of culture and social context in the development of technology.

Major Researchers/Proponents

Bijker
Hughes
Pinch

Critiques

- Focusing on technological development, not social consequences.
- The strong social constructivism does not consider the influence of non-social factors of the process, such as natural or technological aspects.

Apparatgeist Theory

Brief History

The neologism of "apparatgeist" is coined by James Katz and Mark Aakhus in 2002 in their edited book*, Perpetual contact: Mobile communication, private talk, public performance.* Debuting in a book discussing personal communication technology (PCT), the concept of Aparatgeist deals with machine (i.e. apparatus) and spirit or mind (i.e. geist), as well as movement (Katz & Aakhus, 2002, p. 11). Accordingly, the concept of apparatgeist focuses on two aspects of technology: the design of technology and interactions between technology and users.

From a macro-level perspective of communication theory, the proposal of the apparatgeist theory enriches communication research and theories, which is categorized into four branches based on communication channels that are either non-mediated or mediated (Katz & Aahkus, 2002, p. 312):

1. Face-to-face communication (psychological perspective): interpersonal, cognition, persuasion, message design (early 20th century)
2. Mass Communication: psychological, sociological, and political perspective: uses and gratification, two-step flow, cultivation, spiral of silence theory (1940s' --)
3. Human-computer interaction: media richness theory, social presence theory, hyper-personal perspectives (1970s' ----)
4. Communication mediated by personal technology (1990s'---)

Main Ideas

The Apparatgeist Theory is developed to explain interactions between PCT and social needs, or to provide a "full understanding of PCT's role in people's lives" (Katz &

Aakhus, 2002, p.310). Different from SST, which applies a socio-economic approach, Apparatgeist applies a socio-logic perspective in analyzing the social consequences of PCT. Although Katz and Aakhus stated that technology has its own spirits not belonging to social factors, Apparatgeist does not stand side by side with technology determinism. Instead, according to this theory, human's decisions on technology development, social adaptations, everyday applications, as well as limitations of technology create the boundary of human behaviors in societies full of PCT. More specifically, Apparatgeist proposes five research areas (Katz, 2003):

- Function and social changes: The use of any technology, which may be modified by users from the original design of the technology, has its social consequences which will eventually lead to certain social changes.
- Values and sub-cultural norms of use and anti-use: Decisions on whether use or not use certain technology are based on certain social norms or consequences that are perceived by people who have the opportunities to make the decision.
- Folk theory and life meanings: The application of technology reflects social values.
- Social uses vs. functional needs: Besides technological functions that enable people to actually accomplish certain activities in daily lives, technology also has social implications beyond its original pragmatic functions.
- Public display and norms

Katz and Akahus (2002) suggested that the fundamental rational of Apparatgeist is perpetual contact. The concept of perpetual contact reflects the tendency of pure communication in human history regardless of culture. This tendency shows a

universally wanted communication pattern: People want to keep their identity as well as seek independence of place and time when communicate with others.

Critique on other perspectives:

1. Functionalist: Goal-oriented instrumental view, just see PCT as a way to achieve a certain goal.
2. Structuration: process driven

Major Researchers/Proponents

James Katz
Mark Aakhus

World (Global) System Theory

Brief History

The concept of world system was coined by Immaunel Wallerstein (1974) in his book about world economy from 1600-1750.

Main Ideas

Technology, to some extent, can be used to decentralize human society and shrink the concept of time and space. Innis (1972) proposed that communication, represented by time and space, play important roles in organizing government and human civilizations. He specifically argued that telegraph functioned as a tool that weakened the political control facilitated by postal services in the United States (Innis, 1952 p. 169). Nowadays, with the widespread communication technologies, people are asked, and sometimes required, to put their money, faith, and identity to abstract systems that they usually do not understand (Silverstone, 1999, p. 116), neither do they know to where they have sent the information. Silverstone further suggested that we are living in a global age, in which

the concept of space is blurred. Under such circumstances, previous concepts of space relations are not replaced by space-time relation.

Major Researchers/Proponents

Harold Innis (1894-1952): Innis was a Canadian political economist. Because of his argument on why communication should base on media, Innis is considered as Marshall McLuhan's mentor. Innis received his Ph.D. in economic and got involved in what and how communication might affect human society. According to Innis (1972), the control of communication system powered many empires in human history. Innis believed that time and space were two dimensions of communication system, with time reflecting durable media such as parchment, clay and space reflecting the less durable media such as papyrus and paper. In Innis's view, every empire in human history had used available communication channels, which was represented by whatever available communication technologies (e.g. clay, printing media, newspaper, radio, and telegraph), to emphasize its existence, to strengthen its power and religions, and to achieve its administrative goals that could be either centralized or decentralized. Olson (1989) categorized Innis and McLuhan's approach as technology determinism, which generally suggested that technology automatically have predictable impacts on society due to Innis's stance in treating communication technology as the driven force of history (Olson, 1989, p. 7). Although Innis passed away in the early 1950s and he did not witness the emergence of various electronic media, Innis did point out that media enabled by electronic technology would have huge impact on modern society. For example, Innis's predictions in the blurring concept of geography mapped Silverston's (1999) argument about the space-time relations as consequences of communication over electronic media.

The predictions not only correspond to theoretical works but also shown its correctness represented by today's use of internet and mobile communication devices.

Paul Kennedy

Critiques

- Silverstone (1999) argued that the view of world system eliminate the existence of other or otherness.
- Katz and Aakhus (2002) argued that the world system theory, among other theories, fails in effectively "predicting future states" (p. 316).

Network Society

Brief History

Castells (2001) proposed that individuals are in fact reconstructing the pattern of social interactions, using new technology as a tool. The consequence of the reconstructions is a new form of society: the Network Society. The network society is different from the concept of virtual community, which claims different social interactions due to technological platform. Instead, the argument of network society considers both technological aspects and the social interaction patterns of human communication in the context of communication technology saturated society.

Main Idea

Meyrowitz (1985) argued that the electronic society, characterized by various electronic media, had made people become less aware of the concept of place. Meyrowitz (unknown) further argued because of technology adaptations, especially adaptation to mobile communication technologies, people have become "global nomads".

The consequences of the adaptation of communication technology have created a network society, in which people's sense of place get highly blurred (Meyrowitz, 1985).

More specifically, boundaries in society, created by distances that physically separate people from each other and literacy that intellectually segregate society into different groups, do not exist anymore due to the widely accepted electronic media. The impact of such saturated media environment has change the society in several unnoticeable yet significant ways:

- The blurring concept of space and time leads to more violations of existing social rules.
- The human society as a whole has become more and more homogenous in the sense of macro-level similarities among different culture systems.
- Individuals look more diverse within their own social groups in terms of their options in shaping their own identity.
- People are hard to get away from each other (this maps the perpetual contact concept proposed in the Apparatgeist theory)

Consequently, people in such a new nomadic society facilitated by new electronic media are experiencing a macro level integration and micro level segregation. People around the world are not connected with each other closely in a completely new way that is different from the nomadic history, which the human society had experienced thousands of years ago. Castells (2001) further suggested that studies on the mobile phones indicate people's interests in finding social patterns of the use of cell-telephony, which were represented by individualized interactions based on people's decisions on communication behaviors regarding time, place, and partners of the interactions.

In the networked society facilitated by electronic media, new social patterns emerge at multiple levels: Individuals use the network to maintain their unique identities,

groups use the network to achieve their goals through unprecedented reachability, political groups or leaders use the network to shape social attitude toward their preferred directions. The development of this network society, however, should not be merely decided by technological capacities within the society. Meyrowitz (unknown) argues that it is the responsibility of human society as a whole to determine how we use the powerful network so that the potential power of the network can become beneficial to the environment we live.

Another factor indicating the existing network society is the widely used internet. Following McLuhan's the "the media is message", Castells (2001) explicitly proposed that the network is the message. In his book, *The Internet Galaxy,* Castells reported that results from different empirical studies showed that internet usage (excessive usage not included) generally has positive impacts on its users' overall sociability. Because of the internet use, sociability on the internet should not be treated a substitute term of place-based community, upon which human social interactions is built locally. Instead, such interactions within the network society reflect global level interactions. Castells further argued that research on social interactions on the internet should consider effects of social factors enabling this type of interactions: the space, organization, as well as the medium's technological aspects. In fact, Castells sees "the internet as the material support for network individualism", a social pattern built upon the power of the communication technology.

Summary

Theories summarized above discussed the following concepts:

- Inside vs. outside (Domestication Theory)

- Physical vs. virtual (symbolic) space (Domestication, Apparatgeist, and world system theory)
- Perpetual communication (Domestication and Apparatgeist)
- Public vs. private (Domestication and Apparatgeist)
- Local vs. global (World System Theory)
- Social and individual considerations in technology innovation (Social constructivism, social shaping, Apparatgeist)
- Privacy (Apparatgeist)
- Identity (Network Society)

Although these theories take different approaches in describing interaction patterns between communication technology and human society, it is gradually becoming a consensus that the interaction reflects and should follow a long term and non-linear pattern. Theories reviewed above show two extremes in the way of how social scientists identify the pattern. One the on end is the technology determinism, which emphasizes the objectivity of technology and its unavoidable influences and consequences to society. On the other end, is the strong social constructivism approach in social constructivism, which simply treats technology as a pure social product. Other theories discussed in this review fall somewhere in the continuum.

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