

# Revisiting the Early Discourse of the Information Age and Its Interplay with Humanity

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**ABSTRACT-** This paper examines scholars' discourses on the coming of the Information Age. It starts by discussing scholars who measured the emergence of the Information Age in the early 1960s. Machlup and Galbraith used economic indicators, followed by the exploration of network and knowledge sharing, which is a crucial process in the formation of the Information Age. Ellul (1964) paralleled humanity with technology as a "system," and Mumford (1966) coined the term "megamachine." These early arguments were pessimistic that humans were considered as inevitably confined by uncontrolled structures due to information and its byproducts—technology. However, in the 1980s, Nora and Minc considered the Information Age optimistically by introducing the concept of "Decentralization" to indicate the freedom of "choices" for modern people.

**KEYWORDS-** Ellul, Galbraith, Machlup, Mumford, Porat

## I. INTRODUCTION

To claim the coming of the Information Age, Fritz Machlup (1962) and Marc Uri Porat (1976) both provided evidence, by relying on official occupational classifications and statistics, that occupations in primary production and manufacturing sections were decreasing and the percentage of service and white-collar jobs were rapidly growing<sup>1</sup>. However, John Kenneth Galbraith (1967) and Peter Drucker (1969) addressed the same trend from a more qualitative standpoint and focused on the organizational and managerial arenas by proposing the advent of technostructure and knowledge workers in enterprise. Another explanatory stream, a slightly different Galbraithian, yet prone to a technology-determinism perspective, comes from Daniel Bell (1973) and Nora and Minc (1980) who emphasized the "tool" (i.e., computers and telecommunication technology) that drives the change of society.

Hence, we could learn from the Castell's example that past theories cannot be ignored; rather, they should be understood, elaborated and even to be reflected to come up with a new theory. Hence, the manuscript intends mainly to focus on organizing the early discourses relevant to the emergence of the Information age in the early 1960s. Meanwhile, the manuscript also converses with the those theories by illustrating modern technological devices such as

mobile phone and social media used by people; since now that we are not only in the Information age, as in the network era as well when almost everyone has his or her own (social) network.

## II. WHEN THE INFORMATION OF AGE COME

It is difficult to claim if we live in the Information Age, by referring to these economic indicators, as Fritz Machlup (1962) and Mark Porat illustrated. The question is: Are these economic indicators, such as occupational data, employment rate, and input-output calculations (or productivity), valid measurements to claim the coming of the Information Age. That is, can these conventional economic formulations grasp the essence of the characteristics of the Information Age, which might be a revolutionary shift from the industrial age in which the majority of situations are certain and predictable. Some researchers assess that computed classification of occupations and the rate of employment fail to provide reliable grounds. They suggest using "income per capita" as an alternative method to measure productivity in service (Stanback and Noyelle, 1990). Yet, here, what concerns us is: Are we living in a discontinuous age, as Peter Drucker stated? As Drucker argued, "the greatest of the discontinuities around us is the changed position and power of knowledge" and information (knowledge) is "energy for mind work (1968)". The main resource in the information age is the one in the human mind, which is intangible. If we are living in a discontinuous era, do we need to cast away, from government census, those old visible measures, as numerical data, and introduce new measurements to the new paradigm? If not, how can Drucker justify his assertion by employing empirical evidence? Does Bell's term "post-industrial society," which seems to be a continuum stemming from the industrial revolution, more appropriately approach the condition we confront than Drucker's concept of "discontinuity"?

Porat (1976) quoted in his book, *The Information Economy*, that Thomas Kuhn's notation as an introduction in *The Information Economy*. He raised a question: If we are required to have a new theory to illustrate the seemingly novel characteristics of the new era, did Porat also call for a new paradigm, like Kuhn, to explain the revolutionary age, Porat's interpretation of information economy, by using conventional economics' "input-output" matrices,

<sup>1</sup> Daniel Bell, though also stated his claim by referring to the proportion of Gross National Product and a larger share of employment is increasingly

in the knowledge field, his main examination was from a Marxism perspective, therefore, I would not classify him in the Machlup's camp.

disappointed us. Whatsoever, there are some hints that can serve as evidence that we are, to some extent, living in a discontinuous age.

The most discontinuous part is that in the Information Age, intangible resources and goods (i.e. Knowledge /information and ideas/creativity) dominate the economy more than tangible ones (i.e., physical goods). In the industry era, machines turn raw materials into products, both of which are tangible; but in Information Age, both materials and products can be intangible. Moreover, these resources in the Information Age cannot only be transformed into other physical forms, such as new machines or daily necessities, it can also be transformed into other intangible forms such as online games or myriads of articles on Internet blogs.

The problem associated with the above question is: Are conventional economic indicators valid for the measurement of productivity nowadays? It is difficult to determine the transmission of information and the ensuing productivity produced by the materialization of knowledge. For example, in online games, virtual goods can now be capitals and can be traded between players by virtual currencies or exchanged into real cash. Furthermore, there are thousands of players who make a living by earning virtual currencies and selling virtual characters for real money. Those people are called “gold farmers,” but their work is not a real occupation, and they do not have to be levied a tax by nations. In addition, how can they be classified into an occupational category? Maybe there will be one category created for them in the future, but how can the amount of money of this kind of exchange be estimated? There are still no official records to cover all of the trade records in all virtual worlds.

Furthermore, the information-based society is where intellectualism and ideas dominate the operation of the markets. Suppose we intend to quantify the value of these intangible elements; perhaps the most useful method is to measure patents as an indicator (output) of intellectual capital and economically valuable knowledge/information. Nonetheless, if one applies Machlup’s definition of knowledge/information, it cannot be knowledge/information if it is not transmitted to others and “the activities of the knowledge-recipient are technically always, but economically only in certain situations, part of the production of knowledge (information). They should be recognized as production of knowledge (information) in the economic sense if they are designed to increase the productive capacity of the recipient for future use” (1962). However, in the information age, almost every piece of information can be transmitted via Internet users in their will. Plus, the borderline between the information creators and recipients is blurred, not to mention if “they are designed to increase the productive capacity of the recipient for future use.”

Though Machlup failed to define knowledge (information) in a well-organized way, he cannot criticize for this because society has witnessed such a rapid change within a short time, due to the Internet, which is far from what the scholars in the 60s could have imagined. Additionally, human beings constantly have new ideas, forget others and sometimes consciously change their minds (Dolfsma, 2001). Knowledge (information) is being transformed as it

transforms production. Therefore, how modern people can capture the vicissitude of the information economy, which economist Robert Solow’s (1987) widely repeated quip declares: “You can see the computer age everywhere except in the productivity statistics.”

Another evidence of discontinuity can be examined from the conventional Marxism perspective on class. But this could also be void if the premise that the existence of class stratification is rejected<sup>2</sup>. To show evidence to support a discontinuity statement, Galbraith’s (1967) proposition of “techno-structure,” which is a group of various experts, such as managers, engineers, and planners who exercise control over the decision making of corporations, and Bell’s (1973) coining the phrase on “knowledge workers” both indicate the emergence of a new social class dominating the society by controlling their production tool — knowledge/information. However, these knowledge-based groups might serve as opposing evidence, asserting that there are no classes existing in the information age anymore because of the characteristic of the Internet: Kuhn, Porat (1976) quoted “Traditional vertical hierarchies are giving way to burgeoning horizontal relationships, often transcending social and national frontiers (UNESCO, 2005)”. That is, there will be no up and down hierarchies of power, rather, the equality the Internet brings might break traditional stratification and consequently lead to a more equal society without social classes<sup>3</sup>.

The class issue is tied to Nora and Minc’s discussion about small computers and the concept “Decentralization,” which is more reasonable in describing Kuhn, Porat (1976) quoted the information age. They stated that unlike traditional hierarchical processing, computers now “relieve(d) the natural weightiness of the enterprise and administrations. Indeed, its procedures reinforced the center to the detriment of the periphery and the higher executive level to the detriment of the smallest units of management” and “From now on, data processing can be de-concentrated, decentralized, or autonomous: it is a matter of choice” (1980). That “it is a matter of choice” implies that there is, to some extent, freedom in modern society. Later, using computers as an aid for teaching, as an example, they illustrated how technology may modify human relations to knowledge. Nora and Minc demonstrated their standpoints about the information age from a micro-level and, hence, are different from others’ macro perspective. Though, compared to others, they were explicit technology-utopians, and their illustration was more applicable to the information age we reside in.

The paper focuses the discussion on whether the information age is a continuum or a discontinuity to the industrial age, but it has no inclination towards any polar extreme (strategically speaking, it might be safe to choose the third road!); however, the one thing that is sure is that we are now living in the information age, yet to some extent it is a continuous one, and to another extent it is not. But claiming the coming of the information age by providing single dimensional evidence, such as the change of occupational structure, is not enough, or it might risk the ability to fit in the possibly discontinuous aspects (discussed above) we are confronting. Therefore, it is imperative to examine the new society from multiple dimensions such as Nora and Minc’s

<sup>2</sup> There is controversial debate over the issue whether social classes still exist or not.

<sup>3</sup> It can be denied that digital gap is still a pervasive phenomenon in the world, but please allow me to dismiss the problem here.

view to address computerization in society.

### III. MODERN PEOPLE AS CONSTRUCTIVE LUDDITES

The majority of discussions about the impact of technology on humanity are pessimistic. Though not living in a technology utopian, part of modern people have exercised their power to seek emancipation from the iron cage.

The pessimistic discoveries include the idea that technology is less of an instrument than a form of life, and that it must be understood as a "system" (Ellul's word) or as a "megamachine" (Mumford's term). Michel Foucault also depicts our actual society as the realized utopia of the "Panopticon" of Bentham. The "Panoptic" modality of power that strives to make everyone visible seems to be omnipresent in modern societies (Achterhuis, 2002).

Mumford even claims, in *Technics and the nature of man*, that "instead of functioning actively as a tool-using animal, man will become a passive machine-serving animal whose proper function, if the process continues unchanged, will either be fed into a machine, or strictly limited and controlled for the benefit of depersonalized collective organized (Mumford, 1962)." Ellul considers that "modern technology began with the machine, abstracted principles from it, then outstripped it, became independent, and finally turned itself into a political, economic and social reality (Ellul, 1964)."

At first, the capitalist system was developed by a limited number of individuals, but the system inevitably became as vast, invisible, and omnipresent as the air we breathe. Technology is perceived by Luddites as a vehicle of power. "They experienced and understood the new technologies, not as neutral, but as a force that was inimical to their culture and way of life (Webster and Robins, 1986)."

According to Foucault, discipline is a "technology" aimed at how to keep someone under surveillance, how to control his conduct, his behavior, and his aptitudes to improve his performance, multiply his capacities, and how to put him where he is most useful (Foucault, 1977). The goal Foucault states for a disciplinary society is almost the same as the outcome that capitalism desires: maximize individual productivity. Nonetheless, the practice of discipline does not involve any apparent outside violence imposed by the authority, instead, it is a technique to entice active self-monitoring of individuals. For example, the design of "Panopticon" embodies at least two characteristics of capitalism: efficiency and minimization of costs. That is, it only needs one person to scrutinize an entire prison consisting of a large number of inmates; it is cheap and efficient. After a while, when the prisoners are disciplined enough to censor themselves automatically, even when there is no guard watching, they perceive themselves as being observed, consciously or unconsciously, and obey the rules.

Discipline is penetrating our society by incorporating capitalist ideologies into several social institutions (i.e., schools) that internalize many capitalist values such as punctuality, efficiency, competition, and compliance with authority into people's minds without any physical coercion. It becomes a noncorporeal self-discipline. Further, those who abide by the rules best win the highest grades or honor. Critically speaking, those institutions are preparing "healthy-minded" workers for capitalism by justifying the discipline as a cultivation to foster well-educated citizens.

Moreover, the panoptic machine in the information age, which is evolving into another variant, further intensifies the magnitude of surveillance. As Webster and Robins assert, the individual "is seen, but he does not see; he is the object of information." It is an integrated system of surveillance/intelligence and discipline control. The electronic grid is a transparent structure in which activities taking place at the "periphery"—remote working, electronic banking, the consumption of information or entertainment, tele-shopping, communication — are always visible to the electronic "eye" of the central computer systems that manage the networks (Websters and Robins, 1986).

These pessimistic views seem to consider technology and the megamachine as a monster that would devour human nature and autonomy. Notwithstanding, in the utopian perspective, as Richta assumes, what is desirable from a humanist viewpoint has virtually been realized by technology (Ellul, 1964) and is too extreme to depict the society we live now. Human autonomy and freedom are sacrificed to some degree by virtue of technology, but, to some extent, human beings are not disciplined to the extreme of robots. Though megamachine is omnipotent and omnipresent, human beings still find their own way to seek emancipation, instead of launching a revolution, as Marx predicted. Rather, modern people employ soft methods to deal with the formidable system.

It is claimed that modern people are now living in an "iron cage" as Max Weber indicated—the bureaucratic organizations and are controlled by machines. In addition, as mentioned above, we are disciplined by many social institutions to obey social rules (mostly imbedded capitalist ideologies), however, technology, though a culprit to blame for exploiting and paralyzing humanity, can be used by people to fulfill their inherent desire such as autonomy.

Though many workers are constricted by a small workspace, with technology, such as a computer with the Internet and an iPod, they can still get some autonomy for privacy. For example, colleagues in the same section office are able to complain about their supervisors who sat nearby, without being "heard." With an iPod or a portable MP3, people can indulge in any emotional atmosphere they want by listening to their favorite songs without being disturbed or disturbing others.

Furthermore, although human beings are now trapped in the enormous capitalist system, some find their strategy to resist the system, which unconsciously results in a compelling change in the enterprise. In the music industry, for example, a decade ago, consumers had to buy an expensive album, even though s/he only wanted one song. However, the internet makes things cheaper or even free; the revolutionized appearance of Napster made peer-to-peer music sharing possible, which forced the music industry to change. In addition, the emergence and popularity of iPod in the early 21 century is another driving engine for the music industry to satisfy consumers' need to pay per song, instead of buying the album. Even though another form of capitalism is still operating here, it exemplifies consumers' potential power to change the environment.

There are also multiple examples illustrating people's active pursuit of freedom. People who are shy or suffering from a social phobia, in real life, can have rich interpersonal interactions in virtual worlds such as online role-playing games. People who hope to swap their gender can fulfill this desire by playing, with ease the opposite gender in those role-



playing games. People who are frustrated in their workplace or school can have a sense of achievement when they exercise their imaginative ability in *Second Life* (another online game) to create a lot of innovations in virtual life. People who cannot afford to have a physical shop can have virtual shops making money via online websites like eBay. These are social practices that social agents make to the construction of social reality.

Another dimension tied to the practice of discipline in society comes from Fromm's argument. He contends that "the loss of identity then makes it still more imperative to conform; it means that one can be sure of oneself only if one lives up to the expectations of others. If we do not live up to this picture we not only risk disapproval and increased isolation, but we risk losing the identity of our personality, which means jeopardizing sanity (Fromm,1950). Fromm's claim that people are obedient due to the fear of losing their identities makes sense in his era. His view is becoming skeptical in our age in which identity is flow, as postmodernists advocate. Again, the pervasion of the Internet can well illustrate the claim. The Internet can simultaneously function to reinforce self-identity and create other identities (i.e., virtual identities).

As Goffman (1956) stated, there are various settings/stages for people to perform in different roles; the Internet is an alternative world to open up unprecedented possibilities for people to present "themselves." Moreover, unlike limited social settings, people can choose in the physical world, there are more options for people to play and reinforce their real identity via several interfaces such as social media, including Instant Messaging, MySpace, and Facebook and more that offer interactivities with acquaintances in real life. Additionally, people can choose to perform on a brand new stage or a new "life" by playing all kinds of avatars in online games, which allows them to present a myriad of "selves" without surveillance. The performance of people playing avatars in online games is another example to illuminate the statement that some critics hold that we are not living in the realized in a panopticon, as Foucault<sup>4</sup>.

Mulgan's depiction of the telephone serves as further evidence that technology can facilitate the realization of human nature. "The telephone, ostensibly a tool of hierarchy and centralized control, is instead used to forge informal reciprocal relationships which can 'deliver' in ways the formal system cannot (Mulgan,1991). Stemmed from the statement, he further explained by quoting Milgram's illumination that "the extensive nature of informal network in industrialized societies by mapping out the chains of acquaintance which linked the people of the US, showing that between four and seven links joined any person with any other, a reflection of the dense relations of a 'civil society' of voluntary and professional associations, trade unions, churches and corporations spread across the country (Mulgan,1991)."

Although Ellul and Mumford are always often mentioned together in numerous bodies of literature about the impacts of technology, especially the negative ones on humanity, Mumford is not as pessimistic as Ellul. As Swer claims, "Mumford's call for a reconstruction of human relations and the redirection of technical forces rests upon the belief that once the mechanical ideology that lies behind the modern

megamachine has been exposed for what it is, and a more humane, life-centered idolum has been substituted for it, then the modern technics will lose its political power (Swer, 2004)." In other words, unlike other pessimistic scholars, Mumford seems to have a somewhat positive expectation about the liberation of human coexistence with technology, by proposing the term "life-centered technology (Mumford, 1965)."

#### IV. CONCLUSION

This paper firstly examines Machlup and Galbraith's measuring the coming of the Information Age by using economic indicators. Then it continues to discuss the emergence and definition of invisible goods production-information/knowledge, a crucial process in the formation of the Information Age. After that, the paper connects the Information of Age with humanity. As was discussed, Ellul (1964) paralleled humanity with technology as a "system," and Mumford (1966) coined the term "megamachine." These early arguments were pessimistic that humans were considered as inevitably confined by uncontrolled structures due to information and its byproduct—technology. However, in the 1980s, Nora and Minc considered the Information Age optimistically by introducing the concept of "Decentralization" to indicate the freedom of "choices" for modern people. Modern people could be creative Luddites who, instead of destroying the machines (computers) make us slaves and alienate us, make use of the machines in a constructive fashion, that is, to serve our utmost end – their inherent nature is to make interconnection and community. When it comes to "Luddites", Webster and Robin (1986) considered that only a "Luddite way of seeing can begin to query the conventional wisdom which presents technological innovation as social and neutral ...By analyzing 'Luddites'...one should know 'Luddites' reject to extract technology from social interactions (1986:4)." Though we are fettered in the iron cage physically, we can still enjoy of freedom and autonomy anytime we want.

#### CONFLICTS OF INTEREST

The authors declare that they have no conflicts of interest.

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## APPENDIX

### THE SIGNIFICANCE OF THE PAPER

History is essential to understand a specific academic field. There is no exception. Nonetheless, scholars who are interested in the Information Age only pay attention to Frank Webster or Castells, M. who formulated their theories from 1990 to nowadays. The majority of people who study in the academic area consider that only by reading Webster's and Castells' work can allow them to fully comprehend the complete ideas concerning Information Age. However, if people intend to get familiar with theories related to modern Information Age, it is necessary to understand how those pioneer scholars in 1960s such as Machlup, Galbraith and Mumford thought and how their viewpoints were formed, evolved and transformed. History does matter. Accordingly, although this manuscript seems like a review of almost all early discussion concerning the emergent of Information Age, this manuscript bears significant value of delineation and articulation of the wisdom pertaining to Information Age.