ADDIS ABABA UNIVERSITY

SCHOOL OF GRADUATE STUDIES

DEPARTMENT OF PHILOSOPHY

THE POLITICS OF TECHNOLOGY: DISCOURSE IN PHILOSOPHY OF TECHNOLOGY

BY:

NEBIYOU ERMIAS ASFAW

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CHAPTER ONE

INTRODUCTION

This chapter attempts to introduce the thesis ranging from the study area to the specific notion that needs to be addressed. As the title of the paper suggests, the objective of the thesis is to scrutinize the nature of technology from a philosophical point of view. It is an attempt to discuss the phenomenon of technology. In this respect, therefore, the first section of this chapter will try to provide us to the conceptual framework for the thesis. It introduces us to some perspectives on technology. The second section of the chapter will discuss the main argument of the thesis. Finally, the third section of the chapter will set out the outline of the thesis and what we will be dealing within the subsequent chapters.

1.1 Conceptual Framework

In the course of our life, whether we realize it or not, human beings constantly cope with technology. Every aspect of human life is intertwined with it and, perhaps, it is considered to be one of the major driving forces of human history. The history of mankind, from the point of technological development, is distinguished into seven stages, ranging from the early Stone Age up to today's Electronic Age (McNeil, 2002). Therefore, we can say that technology is part and parcel of our lives. According to Kaplam (2004), when it comes to the twenty-first century, it has become hard to even imagine human life without technology. There is an inseparable connection between human life and technology. To put in Friedrich Rapp's words "to be human is to have a technology" (1981: 10).

Since technology is part and parcel of our life, we use the name "technology" in the texture of our life. However, despite our daily acquaintance with technology, we do not have a precise understanding of its nature. This is what Andrew Feenberg calls "the paradox of the obvious" (2010: 6). According to him, things which seem most obvious are also most hidden. Even though our life is intertwined with technology, most of us have little or no idea about the nature of technology. This might be because of the complex nature of technology. It has multifaceted characteristic feature. People have disagreed about its nature. Put it differently, there does not seem to be a consensus on what makes technology technology. One of the problems is semantic ambiguity. It has either been applied generally or to specific areas. For instance, as Carl Mitcham (1994) argues, the word "technology" is used by engineers and social scientists in two different senses. Whereas engineers primarily conceptualize technology as the making of technological artifacts, social scientists include a large number of elements, such as the making of material objects; their use; social significance of the design and production of materials; the role and impact of material artifacts, etc. (Mitcham, 1994). Therefore, in my view, our first task should be to come up with a working definition of technology.

Obviously, to tell all that technology has meant in the past, and all that it means to various classes of society in the present, would be different. The definition of technology in the past and today is quite different, because the characteristics of technology are dissimilar in different times (Rapp, 1981). In his *Analytical Philosophy of Technology* (1981), Friedrich Rapp rightly points out that technology should be understood within the historical context in which it functions. He further notes that "ahistorical definition of 'technology' is impossible" (Rapp, 1981: 24). With technological advancement, the characteristic feature of technology would also change.

There is an essential difference between traditional and modern technology. Jacques Ellul has a much more elaborate distinction between traditional and modern technologies. He pointed out that, "traditional technology is based on artisan skill; narrow and limited in its application; dependent on limited resources; local in its character; and spread slowly" (1964: 64-69). By contrast, modern technology is characterized by "automatism, rationality, artificiality, universalism, efficiency, indivisibility, self-augmentation" (Ellul, 1964: 79f). According to Ellul's distinction, it is hard to find what they have in common. Modern technology has a distinct and contrary character to traditional technology: it is a more rapid, pervasive, all-encompassing, highly specialized, and complex system. Therefore, technology means different things in modern times than in the past. In this paper, then, I shall use the term "technology" in its modern sense.

It is also believed that modern technology has an intense and wide spread impact upon all areas of individual and social life than traditional technology. It influences the concrete everyday world, social change, and the environment in general.

Perspectives of Philosophy of Technology

Let us consider different perspectives and corresponding arguments regarding the nature of technology in which scholars engage today. There are several approaches dealing with the nature of technology, namely, instrumentalism, determinism (substantive) and critical theory of technology.

i) Instrumentalism

The instrumentalist, or neutralist theory, of technology portrays technology as merely a means to an end. The central thesis of this theory is based on the commonsense understanding that technologies are "instruments standing ready to serve the purpose of their users" (Feenberg,

2002: 5). According to the neutralist, view technology has nothing to do with values. For those who make this claim, technology is neither good nor bad in itself; instead what counts is the way in which we use technology. In the book *The Meaning of It All* (1998) Feynman states that "whether the result is a good thing or a bad thing depends on how it is used" (p. 3). He illustrates this by taking an example from a Buddhist temple.

> In the temple a man said, "I am going to tell you something that you will never forget." And then he said, "To every man is given the key to the gates of heaven. The same key opens the gates of hell" (Feynman, 1998: 3).

According to this view, considerations of value are located in the intent of the use of technology rather than in the technology itself. Values are not inherent in technology. Thus, on this account, technology is an instrument that serves the purposes of their users for whatever political or social ends. This perspective portrays, as Feenberg writes, technology as something "indifferent to the variety of ends it can be employed to achieve" (2002: 5).

According to the instrumentalist view, technology is also deemed value-neutral because it does not have inherent ethical, political, or cultural values of its own; it is simply a tool.

> A hammer is a hammer, a steam turbine is a steam turbine, and such tools are useful in any social context. In this respect, technology appears to be quite different from traditional legal or religious institutions, which cannot be readily transferred to new social contexts because they are so intertwined with other aspects of the societies in which they originate (Feenberg, 2002: 6).

According to Feenberg (2002), the neutrality of technology is due to some universal rational character. This notion points that they are not relative. "What works in one society can be expected to work just as well in another" (Feenberg, 2002: 6).

This approach is probably accepted by majority of today's technology users. Nevertheless, critics of the neutralist view argue that this approach confuses technology as a process with technology as a product. They argue that instrumental view of technology is all about the partial picture of technology. It considers technology only as a tool, but it is supposed to include, by extension, human knowledge and other components required in producing and using such artifacts. As will be shown below, the determinist stance swings to the other extreme and portray technology's power as overwhelming.

ii) Determinism

The determinist, or substantivist, (the strong version of determinism) theory of technology claims that there are some forms of inner values in modern technology that affect the social sphere and the environment; hence technological artifact and system can never be value neutral. There are a variety of technological determinism, spanning "from positive description of an evitable or autonomous technological order based on certain laws to claims that technology is the dominant factor in social change" (Bimber, 1990: 2). According to determinists, "technology constitutes a new cultural system that restructures the entire social world as an object of control" (Feenberg, 2002:7). Determinism comes in "harder" and "softer" variants. The distinction between hard and soft determinism is decided in terms of technology's effects and its causes. Soft technological determinism argues that technology is one important force amongst others, while hard technological determinism contends that technology is the main or the only significant driver (Adler, 2006). Scholars subscribing to this view argue that technological processes are out of control, spreading its logic that is largely independent of human will and it leaves no room for human intervention. In this regard, one of the proponents of this doctrine, Martin Heidegger, pointed out that technology is "neither only a human activity nor a mere means within such

activity" (Heidegger, 1977: 21). Instead, it is self-governing. Thus, this approach preferred to condemn technology rather than applauding it. In short, according to determinists, technology "forms a culture of universal control. Nothing escapes it, not even its makers" (Feenberg, 1999: 3). Determinists, therefore, argue that technology has fundamentally transformed the human condition. However, anti-determinists harshly critique this approach by asserting that determinism fails to recognize a historical perspective of technological development and the effects of technology are entirely a function of social forces.

iii) Critical Theory of Technology

One of the most significant investigations with critical theory of technology is provided by Andrew Feenberg. Critical theory of technology, according to Feenberg (2005), combines insight from philosophy of technology and the constructivist approach. Feenberg attempts to fill the gap and the difficulty of the other doctrines of technology, basically of the above two perspectives. Accordingly, contrary to neutralist view or deterministic argument, critical theory of technology proposes that we should analyze technology at several levels as an alternative approach. But it also shares some characters with both doctrines. Critical theory of technology agrees with both approaches of technology regarding a few issues to some respect. Thus, it agrees with instrumentalism in rejecting the pessimism of determinism. Despite this point of agreement with instrumentalism, critical theory also rejects the neutrality of technology. Instead, it treats technology as non-neutral. This makes critical theory of technology similar with determinism. Feenberg argues that technology is not a mere collection of artifacts; rather technology is "the values and interests of the ruling classes and elites are installed in the very design of rational procedures and machines even before these are assigned a goal" (1991: 12). In spite of this similarity, critical theory asserts that the substantivists are not correct when they insist that the

only alternative to contemporary industrial civilization is a rejection of advanced technology. Critical theory argues that “technology is not a thing in the ordinary sense of the term, but an "ambivalent" process of development suspended between different possibilities” (Feenberg, 1991: 12). Therefore, critical theory insists alternatives about the nature of technology. It urges the possibility of new direction for technology.

As I have tried to demonstrate some of the core insights of each perspective, each also defends different views about the nature of technology. Among the three perspectives, probably the most accepted definition of technology, for a long period of time has been the neutralists’ view: technology as an instrument or means to an end. To be sure being a tool, tool is one aspect of technology. As a matter of fact, conceiving technology only as a tool can be traced back to the earliest humans, millions of years ago. Our ancestors have been using the tools of bone, wood, stone, and so forth for the purpose of hunting, gathering and agricultural lifestyle. And indeed, still human beings are using and will use technological products as an instrument to fulfill needs. That is why defining technology as an instrument remains common among most of us. As Val Dusek contends, this definition is “concrete and easily graspable” (2006: 31).

But, some scholars of technology (including determinists and critical theorists) stand squarely opposed to this instrumentalist view and argue that the image of technology that most of us accept is problematic. I agree with this assertion. Perhaps, it is quite true that we use technological products as a means to satisfy our ends. And again, technology might manifest itself in terms of artifact as an instrument. However, I claim that defining technology only as tools or instrument is narrow, misleading and restricted usage, because it does not represent and express the total picture of technology. It does not make sense to talk about technology only as a tool, while modern technology rapidly moving further away from simply producing a tool and it

encompass different inhabitants and embrace various activities. It is also about how people make and use the product; it is about how it influences and changes the world; and it is about the way of life. If this is the case, defining technology in a broader manner is mandatory to grasp the very nature of the technology. It should be analyzed very broadly in terms of what it encompasses: in terms of its places and in relation to society and nature.

Thus, "technology" is a term referring to a large system composed of various component elements and activities seek to satisfy human needs. It is a set of relations among individuals, different social institution, corporate actors, mechanical materials, apparatus, etc. Human beings are rational and active agent in the system. Humans play a decisive role in various ways. For instance, people participate in a system with different motives, including technical, scientific, economic, philosophical, psychological, political, and ethical roles. This implies that humans' engagement with these motives would give way to different issues. With technology different issues would be raised: moral, political, economic, technical, environmental, and so on. However, despite the varied nature of the issues raised within or alongside technology is diverse, this paper is limited to a discussion of the political dimension of technology.

1.2 Problem Statement

In this paper, I am arguing that technology, by its very nature, has political attributes. By this I mean, beyond the nexus between them, the origin, development and consequence of technology have political qualities. The politics of technology begins with the very designing process. Technological artifacts and systems are embedded with political qualities when they are produced. Put it differently, technology is inscribed with politics. But technology has also political attributes by virtue of its effect on society and environment. Kaplam relates,

"technology is designed to produce results that structure social relations, reinforce vested interests, and engineer human relations" (Kaplam, 2004: 285). Technology as a system influences and alters our social relation and arranges our collective lives in some kind of social order. It has significant roles in social processes.

The politics of technology, therefore, spans from the origin of technology to its implications. And also at stake is the character of the relationship between technology and the entire society. Thus, the primary purpose of this paper is to discuss the political dimension of technology. It is in this sense that the title of this paper refers to the politics of technology.

1.3 Organization of the Thesis

The thesis is organized into five chapters. Chapter One being the current chapter, as the title is suggestive of, it consists of the introduction of the thesis. The next chapter deals with the very nature of technology. Answering this question "Does technology have politics?" would depend on how one defines technology. Surely when technology is taken to mean an artifact, or where there is no clear demarcation between technology and artifact, it may be true that technology would not have politics. Therefore, the central notion in describing the political attributes of technology has also involved the very definition of the term. Due to this, in Chapter Two I shall discuss briefly the nature of technology as an overview including the question of neutrality. And I also illustrate the relationship between technology and politics in a greater detail.

Even though scholars working in the area of technology studies would agree about the political attribute of technology, they have disagreed about the basic character of the politics and made various reflections. Therefore, in Chapter Three I shall discuss and examine different reactions and philosophical perspectives concerning the politics of technology, namely, the view that takes

technology as autonomous, the intentionalist perspective, social construction of technology, actor network theory, and postphenomenological perspective of technology.

Chapter Four is devoted to an account of the practice of designing. Throughout, I will discuss the case of designing because of the attention given to politics during the course of designing process. There is surely a lot of politics in the designing process. Feenberg relates that "the design of modern technical artifacts is deeply and inherently political" (quoted in Veak, 2000: 1). This rightly indicates that the politics of technology have been located in the heart of designing. Accordingly, this chapter seeks to expose the politics of designing in the system of technology. To do so, it discusses the meaning, component and the characteristics feature of technology. The Fifth Chapter is about social media and its politics. Finally, there will be conclusion.

CHAPTER TWO

ON THE NATURE OF TECHNOLOGY: AN OVERVIEW

Since we are constantly participating in a technologically driven way of life, we use the name "technology" almost every day. The most important question about it becomes, what does it mean to say "technology"? Or what really do we know about the nature of technology? Asking such a question all in itself is significant, because most of us used it without any clear understanding of what the term technology might actually mean.

As I have said, in order to cope with technology, it is indispensable to grasp the proper nature of technology. Perhaps, stating precisely what technology is, is not an easy task. Sometimes it is difficult to provide a clear cut description of what is to be understood by the term. That is due to the fact that technology is by its very nature historical and refers to numerous concepts. However, even though technology is unfortunately a broad concept and difficult to encapsulate the nature of technology in a small compass, it is not impossible to give at least its essential characteristic features. The primary purpose of this chapter is, therefore, to present the proper interpretation and understanding of the nature of technology. Because, once we understand the suitable nature of technology, I hope we will learn how we deal with it.

Thus, in this chapter, I shall present the most persuasive description of the nature of technology in a precise manner. It addresses and covers different issue ranging from the question concerning the neutrality of technology. Accordingly, in this chapter, we will consider issues like the meaning of the term "technology" such as technology as an artifact; as knowledge; and as a system; whether it is value neutral or not; and finally, we will consider the relationship between technology and politics.

2.1 Technology: What is in a Name?

With the advancement of modern technology, the concept of technology has increasingly become more widely used and hence complicated. Due to this fact, everyone has their own way of understanding the meaning of technology. Indeed, there is ample understanding of the nature of technology, but I will discuss three different ways of conceptualizing technology such as technology as an artifact, technology-as-knowledge, and technology as a system. Accordingly, in the first two sections, I shall provide the description of technology as an artifact and technology-as-knowledge. In the third section I shall discuss technology as a system in greater detail.

2.1.1 Technology as an Artifact

Human beings have been producing and using consciously different objects in response to some needs from as far back as the early Stone Age. Today, human beings continue to make automatic and more sophisticated machines. It is obvious that objects made by agents (human) are different from natural objects. Objects made by humans "can have physical properties that natural objects do not, and they are considered as means to ends" (Verbeek and Vermaas, 2009:166). These material objects which are made by human agents are called technological artifacts.

Artifacts are considered to be one mode of technology. It is taken to mean technology. Artifacts are "material objects such as tools, machines and consumers products" (Mitcham, 1994: 161). Carl Mitcham further points out that:

> Technology as object is the most immediate, not to say the simplest, mode in which technology is found manifest, and it can include all humanly fabricated material artifacts whose function depends on a specific materiality as such (Mitcham, 1994:161).

In general, this aspect of technology represents technology as a set of an artifact. "Describing technology as starting from objects tends to make technology appear neutral and puts the individual, as the user of objects, outside the object, which has control of the technology" (Svensson and Ingerman, 2010: 2). It excludes socio-technical system. (This aspect of technology has been criticized, as I shall discuss below).

2.1.2 Technology as Knowledge

There is a strong belief that technology is a body of knowledge devoted to creating tools. According to this aspect, technology is a form of knowledge involved in making, maintenance and use of technological artifacts (De Vries, 2006). The very etymological meaning of the term is in itself instructive because it implies technology as form of knowledge. Etymologically, the term technology is the combination of two Greek words. It comes from the Greek '*technologia*' which is an amalgamation of '*techne*'[1] meaning 'craft, 'art', or 'skill' and '*logos*' meaning 'reason'. As a result, it signified the involvement of certain knowledge or reasoned principles (skills) to achieve the appropriate result.

Although the very word "technology" connotes knowledge, it is essential to identify what sort of knowledge that technological knowledge incorporates. In his book *Thinking through Technology*, Carl Mitcham notes that technological knowledge encompasses different character from technical awareness of how to make or use artifacts to conceptual framework to explain them. He writes:

> According to a widely accepted analytic definition (which can be traced back to Plato), knowledge is justified true belief. True beliefs concerning the making and

[1] "Techne" in turn might have come from Geez terms such as "Kahn" "tekane" etc. (personal communication: Setargew Kenaw)

> using of artifacts can be justified by appeal to skills, maxims, laws, rules, or theories, thus yielding different kinds of technology as knowledge (1994: 194).

Mitcham attempts to analyze this aspect of technology or technology-as-knowledge largely focused on the relation and the role of the component of technological knowledge such as skills, maxims, laws, rules, and theories. However, this analysis of technological knowledge bears as to interpret technology as science more specifically to applied science, since science is considered to be a knowledge producing enterprise. As Mitcham states, "the idea of technology as applied science is clearly the received view among both engineers and scientists" (Mitcham, 1994: 197).

It is very clear that the need of scientific knowledge in the modern technology moves technology very closer to science (Rapp, 1981). However, despite the close interaction between them, science plays a dominant role in the development of modern technology. Technology-as-knowledge is to be distinguished from applied science.

Among others, the most common ways to distinguish technological knowledge and scientific knowledge (technology and science) is on the basis of their methods.

> Scientific knowledge is composed of an articulated set of observations, laws and theories. Scientific laws (which can be integrated into general theories) describes objective patterns of empirical phenomena or facts in nature and can be more or less true; technological rules prescribed course of action and can only be more or less effective (Mitcham, 1994:197).

There is also a difference between scientific knowledge and technological knowledge in terms of their basic problems and ends (goals). "The problems of science are cognitive ones solved by observation that results in the accumulation of information about the world." And again scientific

knowledge is said to aim at "knowing the world", whereas "technological knowledge aims at controlling or manipulating it" (Mitcham, 1994: 198).

The above mentioned essential features exemplify the distinctions between technological knowledge and scientific knowledge. Therefore, technology-as-knowledge refers to the awareness or skills involved in the activity of designing, producing, maintaining, and using technology. This characteristic of technology-as-knowledge recognizes that technology comprises more than mere artifacts.

2.1.3 Technology as a System

As has been briefly addressed in the first chapter, with technology, the first thing that comes in our mind is its instrumental definition: technology as a means to an end. We also, and rightly, associate technology with artifacts. Indeed, at times, when an individual craftsman who needs only to pay attention to his/her own skill and produces tools, it makes sense to talk about this instrumental representation. Today, however, we are very far and rapidly moving further away from such an activity as well as the portrayal. Modern technology extends its boundaries to embrace more various components and activities. I think this introduces change in our understanding of the conception of technology. Modern technology is by its very nature "complicated and multi-dimensional phenomenon" (Rapp, 1981: 2). By this I mean, technology is not a single concept, rather it encompasses various variables as a set of process. Therefore, in this section, the description that I shall provide about the nature of technology will reflect the particular theoretical standpoint that expresses this basic feature of technology.

Due to our immediate encounter with an artifact, many people associate technology with instruments or an artifact. However, technology is not only about an artifact or means to an end.

The word “artifact” is often inappropriately used as a synonymy to the word “technology”. The confusion between technology and artifacts might happen due to the absence of clear demarcation between them. Thus, a little more must be said about the distinction or the relation between technology and an artifact before passing to the discussion of the point “technology as a system”. As pointed out above, an artifact is one mode of technology. It is naturally the outward sign of technological processes (De Vries, 2005; Verbeek and Vermaas, 2009). The result: finished and semi-finished products of such a process, instruments like tools and machines are used for certain purposes as artifacts. On the other hand, technology is all embracing system which involves various activities and much wider than artifacts.

Even though technology contains an artifact, instrumental definition of technology that signifies technology only as a tool is too narrow and a mistake. It must be seen in a broader sense than this usage. The meaning of technology necessarily recognize all the stakeholders in the process. For example, it must be taken into account people that can be involved in the processes of producing artifacts. Therefore the best way to look at technology is as a ‘system’. At its most basic level, ‘system’ is a set of interacting or interdependent component forming unified whole. This shows that there are things working together as parts in the system. This system is a set of relation among things, individuals, different social institutions, corporate actors (such as business companies and government bodies, public interest groups), mechanical materials, machines and devises. For instance, Ethiopia is now constructing a hydroelectric dam project on river Abbay, what is called ‘*The Renaissance Dam’*. This project or the construction of the dam is a large technological system involving various actors and processes. These include different individuals (politicians, scientists, economists, environmentalists) and organizations (such as government, manufacturing firms, utility companies, investment banks, and so forth). Then, the designing of

the dam is developed based on the above consideration. Lastly, the result of this entire process exhibits itself in terms of technological product as an energy source used to generate hydropower. Therefore, the hydroelectric dam technology or the construction of this project refers to all the above mentioned components in the system. We should not consider or call the dam (the final product) as a technology. If we do so, it should refer to the entire system, not only the finished final product of the system.

Technology, then, is a term referring to a large system composed of various component elements and processes that seek to solve human problems (satisfy human needs) through various mechanisms. As Dusek has argued at length, technology is:

> The application of scientific or other knowledge to practical tasks by ordered systems that involve people and organizations, productive skills, living things, and machines. This is sometimes characterized as the "technological systems" approach to technology. The technological system is the complex of hardware (possibly plants and animals), knowledge, inventors, operators, repair people, consumers, marketers, advertisers, government administrators, and others involved in a technology (2006: 35).

Dusek's characterization of technology combines various elements together with suitable institutional arrangement. All these mentioned components and activities in the technological system are controlled and administered by management of technology. The management of technology links all the processes. According to Richard Li Hua (2009), management of technology is managing the component of the system such as knowledge and information; research and development; manufacture and operation; activities of the stakeholders; and the commercial component.

However, this attribute of technology as a system is also applied to other things. For instance, we labeled human body or university as a system. Then, the question would be what makes the system of technology different from others? Hence the need to restrict its usage by proving its unique character. Among the factors that distinguish the system of technology from others is its *telos*. Technology is teleological. The principal goal of technology is to solve human problem or to fulfil human desire by its final products (artifacts).

In a nutshell, in this paper, I am arguing that we have to understand the nature (meaning) of technology to the ways in which it demonstrate the total picture of technology and in which it is compatible with the concrete situations. To do so, we must begin to describe technology as a system. Weaving together all the components of technology with society and environment is indispensable. As Ellul proposed, "it is not worth as such to talk about a single component of technology, but rather, we must grasp the system as a totality" (Helena, Garcia & Mitcham, 2013: 74). In this paper, therefore, I shall adopt this usage: technology as a system of totality. Technology is not only about technical apparatus, skill or scientific knowledge, but rather, it is about the sum of all these elements.

2.2 Against Technology as Value Neutral

As I tried to discuss in the introductory part of this paper, there are people who endorse technology as value neutral. We called them neutralists. According to these neutralists, technological artifacts are a means to an end or they are instruments because they are, at least in principle, available for any applications: good or bad (Rapp, 1981). For that matter, the instrumental character of technologies, according to which it is a means to an end, is there. Technological artifacts (from a handmade simple tool to sophisticated automatic machine) are

somehow instruments made to satisfy certain human needs. But: Does it mean that technologies are inherently neutral or value free? Is technology is value neutral? Is this how technology function in real life? In order to reflect on these questions, it is helpful to examine the very meaning of the term "value". Value is classified in various ways such as absolute/relative, explicit/implicit, and so forth. However, usually value is of two kinds (Roger, 1995). Either a thing is valuable in itself (being a value), or a thing is having a value to achieve something else: which are called intrinsic and extrinsic (instrumental) values respectively. The former one is valued as an end while the latter valued as a means. If we accept values as an intrinsic and extrinsic, then the immediate question that arises is: Is technology value neutral either intrinsically or extrinsically?

The neutralists claim that technology is an instrument to fulfil needs. And simultaneously they argue that it is neutral. However, I think this is self-refuting, because, once technology is a means to an end, then it means it has instrumental (extrinsic) value. In this context, it is nonsense to say technology is value free.

Moreover, applying neutrality to technology has only twofold problematic implications. The first one is the problem of considering technology as an artifact. Here, in addition to what I already pointed out before, the neutralists failed to consider the question such as, how artifacts come about or what a cause is. Cause is the most important notion to the essence of one thing. One of the most celebrated philosopher in the history of philosophy introduced his doctrine of the four causes for the first time. Aristotle describes his doctrine of the four causes in his book *Metaphysics V2* in order to assert his philosophy of substance (Politis, 2004). This account is also operating in the nature of technology, as Martin Heidegger linked them to technology in his

book *The Question Concerning Technology and Other Essays* (1977). These four causes are: is what something made out of; the essential feature of things or the accounts of what it is to be; by means of what it is (agent); and for what end. What he called them the material, formal, efficient and final causes, respectively. These causes are important for understanding technological process. "The four causes are the ways, all belonging at once to each other, of being responsible for something else" (Heidegger, 2004: 37). Nevertheless, even though each one has played its own part, amongst others, the efficient cause "sets the standard for all causality" (see p. 37). The primary source of all these causes is the agent or the efficient cause. From originating the very ideas and selection of the matter which could be formed up to production of the final result, the role of the agent is significant. The one who made the final product imposed his/her values and intention for the purposes of which a thing is done. In other words, s/he used them extrinsically as a means. However, at the same time the producers do determine characteristic feature of the product. Producers make certain things possible and other impossible. Designing of that particular technological artifact stimulated or prohibited practice, belief and social configuration (Brey, 2005). For example, Rapp (1981) inquires: How can one be able to find a peaceful application of highly specialized military weapons? I think it is difficult. In contrast to an example suggested by Feynman (i.e., there are keys that open gates of heaven or hell). That is due to technological products have their own intrinsic value. Users of the products confront with them to this intrinsic value. Most of the time users are unable to separate this intrinsic value of the products from it. This implies that technological products have their own unique characteristic features and values which are imparted by the creator on them. Thus, technological products are inevitably served the intention of their producer. Ferguson points out that the product "makes demands upon those who would use it and transmits values to those who

embrace it" (Ferguson, 1974: 21-22). Therefore, technological products can never be value neutral instead they constitute values since they are inscribed with designers' tests and interests.

The second difficulty of representing technology as neutral is the problem of bearing technology only to users. Indeed, users play their own part in the system of technology. But, it overlooks the obvious fact that technology is made by human beings. The intentions of the users never guarantee the neutrality of technology since it encompasses the intention of the maker. As Joseph C. Pitt puts it, technology is 'humanity at work' (2011: 11). Technology is deeply imbued with humanity. Human agency is central to the system of technology in two different ways: making and using. Considering both human engagements in the nature of technology is necessary. Hence it is "about how people, more in particular engineers, develop these products, about how people use them to meet their specific ends, and about how this all changes the world as we know it" (Vermaas, Kroes, Van de Poel, Franssen, and Houkes, 2009: 1). Therefore, we have to consider humanity in general in the nature of technology. If humanity is considered, technological products are value-laden because they are inscribed with maker's values.

To sum up, "technology is not simply a means, but, has become an environment and a way of life" (Feenberg, 2002: 8). It can never be value neutral. Describing technology in this manner is a mistake since portraying it thus does not make technology compatible with concrete situation. Besides, such ignorance bounds our perception about technology to instrumental conception. Therefore, the best way to look at technology is as a system that involves various stakeholders to produce desired products, or to fulfill needs.

2.3 The Interplay between Technology and Politics: Understanding the Nexus

Many people may presume that technology and politics do not and should not be related. And one may also wonder about the very title of this paper. But the reality of the situation would be that they usually do become related. The relation between technology and politics continues to be an important theme in the academic arena. But, what sort of relationship do they have? One reason for the purpose of this section is answering this question and to demonstrate the relation between them. The primary purpose of this section is to draw the nexus between technology and politics. In order to illustrate in detail the interplay between technology and politics, I will summarize and express in terms of comparison and their mutual interaction.

2.3.1 Similarities between Technology and Politics

Technology and politics have a lot of similarities. First and foremost, both are attributes of human nature. They are the exclusive property of human beings. The origin, development, and the consequences of both things are related to the very nature of human beings. Both are affecting the collective order of the society. Over two thousand years ago, the Greek philosopher Aristotle said that humans are political animals. It is true that politics is inherently human activity since it is referring to human interaction by reason which helps to distinguish humans from all the other animals out there. Thus, politics as understood in a broad sense, is the process through which we try to arrange our collective lives in some kind of social order. Like that of politics, technology also by its very nature influences the order of social collectives. Historically speaking, the influence of technology on social order can be traced back to the Copper Age.

> Copper tools, and weapons, thus become available only to the powerful, to those who were already wealthy, and had the effects of increasing their power and

> multiplying their wealth. It thus tended to create an elitist society in which the majority, who formed the lower ranks, were still confined to grubbing the earth with tools of bone and wood and stone (McNeil, 2002: 12).

This implies that during the Copper Age technological products creates class division in the society. This shows technology has a great role and consequences on the society. In today's world, the consequence of technological advancement in different areas and sectors has become greater than the previous. It influences all sides of our life. Our daily life depends on technology and technological products. For example, internet technology has become a daily tool for a number of people. We can see the role of technology on basic human needs such as food, shelter, and clothing. And again, it has also a great impact on health, education, economy, transportation and communication, and political sectors. For example, as I discuss below, technology influences the political arena. It is somehow clear that modern technology as a system becomes all-pervading in everyday life. There are plenty positive and negative impacts of technology on humanity. Among others, "it influences our culture and the environment, alter patterns of human activity, and influence and shape who we are and how we live" (Vermaas et.al. 2009: xiii). In general, it is a dominant shaping factor, especially in today's world. Therefore, they have a similarity in terms of the result they imposed upon the society and the environment.

The other similarity between technology and politics is structural. For instance, both are power oriented and allow some participant agents to determine rules and enforce the sanction in their organization. Power in this context refers to the ability to get other people to do what you want them to do or the ability to achieve certain outcomes against the will of others (Sarewitz, 2009). That is why technology is a system involves the interaction among stakeholders with different degrees and kinds of power. For instance, economists, engineers, scientist, politicians, organizations, etc. all have different degrees and kinds of power. And also both technology and

politics are bound up with the question of freedom, rights, liberties, democracy, social justice, diversity and our vision of the good life. And, at the same time they deal with the distribution of advantages and disadvantages, benefits and burdens of our social life. For example, the right to work; the question of agents in the designing process, and how technological benefits and costs are to be fairly and justly distributed are some vital issues in the technological system (Harbers, 2005). These characters more or less demonstrate the similarity between the two spheres.

2.3.2 The Mutual Interaction of Technology and Politics

The second way to express the interplay between technology and politics is their interaction. There is mutual interaction between technology and politics. Technology influences politics while politics in turn influence technology. Let us see how they influence one each other.

i) Technology on Politics

Since technology is the medium of daily life in modern society, every technological activity such as technological design, development, and decisions have everlasting impact on social life. It has also political impacts. Modern technology is becoming more and more important factor on the political scene due to its impacts on the entire political process. The impact of technology on politics can be hinged on the nature of change and its development. In the work of G. L. Herrera, for instance, we meet with the impact of technological change in international politics, basically on the international relation. In his account, political thoughts and practices have been influenced by technological change. Technological changes are altering the system of interactions among states. It affects states interaction in terms of speed, scale and intensity (Herrera, 2007). Take for example, some technological changes such as the rise of modern transportation and communication systems like railroads, air transport and computers, the internet network, etc.,

influencing the system of international relation. For example, the relation between states which rely on horses and sailing vessels changed to using modern transportation vehicles. This implies that technology makes the relation among states faster and easily manageable (Herrera, 2007). Similarly, the development of nuclear weapons and high-tech inventions reshape the interest and the goal of the actors in the international system.

Again, technological change challenges the political condition of the world in different ways. For instance:

> New information and communication technologies, such as mobile phones and the internet, have provided new infrastructural conditions, with distinct outcomes for systems of political communication and …the introduction of digital ICTs provides an occasion for significant change in how political culture is produced and consumed around the world (Howard, 2010: 13).

In the twenty and twenty-first centuries, particularly after the emergence of the internet, technology has had a prominent impact on our life positively and negatively. The internet has become integrated into the daily life of most individuals. Even though the majority of us use the internet technology for entertainment, chat and communication purpose, to get news and information, etc., it serves also for social and political activities.

First, internet technology has increased political awareness and participation in political activity. People used the web for political purpose by creating "social button" on the Facebook page (like, comment, share) and political blog in order to mobilize political action. It therefore plays a special role in contemporary political practice. For example, one can remember the role of internet and social media in the recent revolutions in the Middle East and North Africa and as

well as Barack Obama's Facebook campaign in the run-up to the 2012 presidential election. (More of this to come under the last chapter.)

Second, internet technology used to reinforce and spread different organizational capacity into everyone in every corner of the world. Take, for example the terrorist groups such as "e-jihadis," "cyber-terrorists," "dot-extremists," and "ISIS". They actively use internet for the terrorist activities (Howard, 2010: 14). ISIS terrorist group, for example, used internet or online technology to spread their political message and to celebrate their brutality across every corner of the world. This implies that technology is used to encourage political practices either positively or negatively. In general, the advancement of technology has a great impact upon political practice. That is why "technological concerns are central to political history, political theory and political action" (Evan, 2009: 297).

ii) Politics on Technology

Amongst the factors which are influencing technological progress, politics is the vital one. Politics influences technological design, decision, distribution and uses of technology. In general it affects the whole system. There are different factors that drive the development of modern technology. Among these, contest of development; economic and military competition between countries in need of high-tech products; stronger materials; higher buildings; and faster transportation have been essential drivers of technological progress. "This competitive nature of society and the incremental essence of technological innovation feed technology and power back on each other and are mutually enhancing" (Sarewitz, 2009: 309). For instance, during the Cold War, various technological products had emerged as part of the competition for global military and economic supremacy. Computer, for example, is a consequence of the competition.

Modern technology, as part of the society, has been developed within the society. It takes into account various factors that are important to its progress. Among others, its smooth functioning requires specific social condition, such as the compatibility of technological system with particular political situation (Kaplam, 2004). The development of certain technological systems usually takes place when it is becoming friendly with the existing political condition. For instance, in the democratic state, it is apparently difficult to plant nuclear power for violent purposes. Therefore, these reasons indicate that technology as a system is highly influenced by politics.

But, to go beyond these suggested facts, not only politics influence the development of technology. There is also politics within the technological system – politics is an element of the technological system. Among the elements of technological system, technological policy and management directly deal with the issue of politics. For instance take technological policy: it is the study of the relation between politics and technology. As Mitcham points out, it is referring to "politics in technology and of the political guidance of modern technology transcend narrow technical and economic interests and invoke the question of political life as a whole" (Mitcham, 1994: 107).

To sum up, there is a profound interaction between technology and politics. To summarize the relation in between: both share characteristic features, in terms of methods, goals, etc. Technology and technological change affect the political process. Politics is amongst the factor which influences technological system. And there are politics in the design of technological products.

The above-mentioned nexus of technology and politics, however, may not be exactly justified the occurrence of the politics of technology. Hence, the politics of technology go beyond this mutual interaction. Technology and technological practices have political origins and implications more than being an object of politics. The politics of technology begin with the very designing process. I will elaborate how technology or the designing of technology has political scripts in greater detail in the subsequent chapters. Besides, it has politics by virtue of its effect on the society. Thus, it shows that the politics of technology ranging from the broad generalization of the intermingling of technology and politics up to the context of designing.

CHAPTER THREE

DEBATING ON THE CHARACTERISTICS OF THE POLITICS OF TECHNOLOGY

For a long period of time, the neutralist perspective of technology has dominated an assumption concerning the nature of technology. According to this perspective, technology is politically, morally or culturally neutral. However, despite the neutralist perspective of technology still employed by a number of people and scholars as the main character of technology, to the contrary, there are scholars who have claimed the value-laden nature of technology. As pointed out in the first chapter of this paper, technology embeds different human values, including political, moral, or cultural values. From this point of view, as Winner states, "no part of modern technology can be judged neutral *a priori*" (Winner, 1986: 40).

Since technology is value laden, among others, it has inscribed political values. Politics is the essential attribute of technology. Therefore, in this chapter I will scrutinize the politics of technology and the debate concerning the character of the politics of technology. Exposing technology as political has offered a way of questioning the view that technology is neutral. And also, beyond debunking this instrumentalist's perspective, I argue that the notion of the politics of technology designates the nature of technology.

In fact, the subjects of politics have been part and parcel of the entire field of science and technology. That is why different scholars have carefully studied how technology becomes intertwined with politics. In the field, scholars, such as Karl Marx (1867, 1885, 1894), Lewis Mumford (1934, 1967), Herbert Marcuse (1964), Martin Heidegger (1977), Jacques Ellul (1964), Langdon Winner (1986), David F. Noble (2011), Andrew Feenberg (1995, 1999, 2002),

Bruno Latour (1992, 1996), Madeleine Ackrich (1992), Wiebe E. Bijker (1992, 2012) and probably others with which I am not familiar, for instance, discuss the politics or the political dimension of technology. These scholars studied the politics of technology from different standpoints and they reveal a different variety of reflections. Some of them argue that technology is inherently political; some of them conceive politics as the ascribed quality of technology; some also believe that technology is contingently political; and still others claim that technology may become an object of politics.

The primary purpose of this chapter is therefore to rethink and analyze the politics of technology. Accordingly, I will discuss these contrasting perspectives on the politics of technology[2]. To do so, I will present the deterministic perspective, the intensionalist perspective, the social constructivist perspective (SCOT), the Actor-Network Theory (ANT), and a postphenomenological perspective of technology

3.1 Perspectives in the Politics of Technology

Some of the theoretical perspectives which I am going to discuss in this section basically depend on the nature and the character of the interaction which take place between technology and the entire society. The inquiry into the relationship between technology and society helps us to understand the politics of technology. It is very clear that there is a strong linkage between technology and humanity. Undoubtedly, humanity and technology cannot be located in two different realms, instead needs to be understood in their interaction.

There is reciprocal influence upon each other. Therefore, rather than keeping humanity and technology apart, we should emphasize on their intertwinement. For instance, in this regard,

[2]. I am not concerned at this section to establish whether the views described are correct or not; the aim is only to set down the ideas of the perspective that has been expressed in the literature.

American scholar Don Ihde, in his book *Technology and the Life World* (1990), provides us with the phenomenology of the interaction between humans and technology. He says, "our existence is technologically textured" (see p.1) not only in terms of human confrontations with large technological products, but also in our day-to-day activities. In his book, Ihde distinguishes four such relations, which he labels "embodiment relation," "hermeneutic relation," "alterity relation," and "background relation". Each relation reveals its own essential feature. Nonetheless, the following theoretical perspectives of technology exhibit the nature of the relationship between technology and the entire society, further in different manner.

3.1.1 Technology as self-Autonomous

One of the basic features of technological determinism is the view that technology is autonomous (Bijker, 2010). As we have discussed, technological determinists usually considered technology as uncontrollable and determine the entire form of the society rather than as a product or integral part of the society. The term "autonomous" comes from two words. Auto means self; nomos mean law or custom. Therefore, conjointly it refers to self- governing.

> An autonomous technology means that technology ultimately depends only on itself, it maps its own route, it is a prime and not a secondary factor, it must be regarded as an "organism" tending toward closure and self-determination: it is an end itself. Autonomy is the very condition of technological development (Ellul, 2003: 386).

Technology is therefore conceived as something out of control, and changing under its own momentum. Jacques Ellul, one of the most prominent advocates of this position claims that "technique has become autonomous; it has fashioned an autonomous world which obeys its own laws and which has renounced all tradition" (Ellul, 1964: 14). According to this perspective,

technology acts independently of human beings. Technology is acting independently, in the sense that any kind of technological artifacts doing or behave without human intervention or with very little human control. Weinstein writes:

> there are two specific ways in which technology may be out of human control: (1) that technology creates needs which can be satisfied only by technology, and (2) that technology transforms people, their beliefs, habits and organizations to make them better adapted to the technology's requirement (Weinstein, 1981: 569).

Applying the term autonomous for technology suggest that it has a will of its own. Once the products created for certain particular purposes, they function and behave in its own mind without being told what to do by anyone. For instance driverless cars that can drive themselves safely by keeping a fixed distance from the side of the road, looking out for obstacles and reacting appropriately, and keeping a safe distance from the vehicle ahead are already in used. These autonomous cars and related artifacts navigate without human direct involvement. However, such a notion of will of its own and being uncontrolled overlaps with the concept of anthropomorphism or technological animism. Anthropomorphism is crediting of an inanimate entity with the consciousness and will of living beings (Sillar, 2009). In fact, this account is sometimes applied only to complex technology. Nevertheless, some determinists argue that even though technology is presented as an autonomous force, it is only so to some extent (semi-autonomous). In other words, they contend that technology does not have conscious or a will of its own. Accordingly,

> technological autonomous may refer primarily to the ways in which a technology is apparently under control for the purpose for which it is used can have unpredictable and cumulative knock-on the use of and ‘need’ for the technology.

> Such ‘repercussions’ are not direct and immediate consequences. (Chandler, 1995)

Therefore, technology is autonomous, as Winner claimed means, “the artifacts that we have invented to satisfy our material wants have now developed, in size and complexity, to the point of delimiting or even determining our conceptions of the wants themselves” (quoted in Ravetz, 1978: 642).

In general, autonomous technology is analogous to throwing arrow. Like that of an arrow that would leave the hand of the thrower, once a product was invented with certain characters for a particular purpose then, no one will be able to control it. The products are functioning and behave in such a way they are produced and will have directed towards specific kinds of practice. However, this account of technological determinism has received harsh criticism from various angles. Among others, the critique against autonomous technology claims that these characters of technology do not prove the autonomy of technology. Thus, it is insufficient to claim technology as self-autonomous depend on the above mentioned argument of determinism. Technological autonomy denies the logic that every artifact or device was at one time a human construct. A more radical criticism is that it disempowers the role of human beings in the development of technology.

3.1.2 The Intentionalist Perspective

The intentionalist viewpoint or ‘intentionality in technology’ is another technological perspective which is arguing in favour of the political quality of technology. The intentionality of technology represents the intentionality directed at technological artifacts. It refers to the intentionality concerning the designers, users, or both humans and artifacts. Therefore, the term intentionality

of technology refers not only to the intention of designers or the one who produce the products, but also it involves the intention of the harmony of the product and human beings.

As we have discussed in the above, autonomous technology thesis states that technology is developing according to a logic of its own. However, the intentionalist perspective of technology contends that technology is not autonomous. Rather, according to the intentionalists, technology incorporates various human values. They "assume technology as it is to be deliberately designed for certain predefined ends" (Nahuis & Van Lente, 2008: 563). It allows a room for human autonomy. The intentionalists insist that elitist or group's values can be materialized in the design process and realized via artifacts. Therefore, technological products entail the materialization of different human values. Among others, they inscribed political agendas. In this regard, Winner relates:

> At issue is the claim that the machines, structures and systems of modern material culture can be accurately judged not only for their contribution to efficiency and productivity and their positive and negative environmental side effects, but also for the ways in which they can embody specific forms of power and authority. (Winner, 1986: 19).

This notion points to the political nature of technology. Intentionalists argue that some technological products are carrying with them certain political quality. Winner distinguishes two ways in which technological products can be political, namely: contingent and inherent. In his famous article "Do artifacts have politics", he states that:

> First are instances in which the invention, design, or arrangement of a specific technical device or system becomes a way of settling an issue in the affairs of a particular community. Seen in the proper light, examples of this kind are fairly straightforward and easily understood. Second are cases of what can be called

> "inherently political technologies," man-made systems that appear to require or to be strongly compatible with particular kinds of political relationships (1986: 22).

This discussion can be illuminated by different examples. Therefore, in the following section I will discuss briefly that the politics of technology occurs when human intention takes place through technological artifacts and that intentionality is materialized in the harmony of humans and artifacts called hybrid or composite intentionality.

3.1.2.1 Technologically Mediated Intentionality

Technological intentionalists reject the widespread conception of technology which treats technology as value free. They argue that technological products are imbedded with certain values or agendas. Therefore, technological artifacts mediate the intention of the one (maybe group) that produces the products. The design or the innovation of technological products involves different human intentions. With regards to the politics of technology "the intentionalist perspective draws attention to the forms of power and authority that technology developers materialize in artifacts" (Aunger, 2010: 562). As I tried to mention in the above, Langton Winner argues that certain artifacts have either inherently or contingently political qualities. Let us see them in greater detail.

a) Inherently Political

According to Winner certain technological artifacts have "inherently political qualities" and have inherent capacities to act. However, this does not mean that these artifacts are in themselves having political properties. "We all know that people have politics; things do not" (Winner, 1986: 20). Therefore, the artifacts are not necessarily intentionally political; rather they require specific social structure in order to function effectively. Some technological artifacts, he argues, are inherently political, since their very nature requires particular social arrangements for their

implementation. Amongst others, the atom bomb and nuclear power, for example, are inherently political artifacts. He noted,

> As long as it [the atom bomb] exists at all, its lethal properties demand that it be controlled by a centralized, rigidly hierarchical, chain of command closed to all influences that might make its workings unpredictable. …*this is* a matter of practical necessity independent of any larger political system in which the bomb is embedded independent of the type of regime or character of its rulers (Winner, 1986: 34).

This example clearly implies that some technological products are by their very design political in a specific way, since they require centralization of facilities, technicians, and security in order to operate as a system.

b) Contingently Political

The other way in which technological artifacts have political qualities is regardless of the intent behind their invention or deployment. This stance makes a claim about the "intention, design or arrangement of specific technological products becomes a way of setting an issue in the affairs of a particular community" (Winner, 1986: 22). Winner states the highway overpasses erected around long island, New York, by Robert Moses in the 1930s as an example and this example demonstrates that how technological design and decisions may have political dimensions. According to Winner Robert Moses builds them according to specifications that would discourage the presence of buses on his parkways. These buildings had overtly political effects: namely, to prevent lower-income people from easily accessing the beachfront playgrounds of the middle and upper classes (Winner, 1986: 23).

This example shows that designers deliberately produce artifacts for certain political goals. Therefore, certain artifacts have concrete social consequences that can be qualified in political terms, thus contingently political.

3.1.2.2 Cyborg Intentionality

As noted above, "intentionality is the core concept to understand the relation between human being and the world" (Veerbek, 2008a: 388). And it has long been considered to be exclusively a human attribute. Even humans and non-humans are distinguished by this essential element. The intentionality of technology that we have discussed in the above section also defined intentionality as uniquely endowed in human beings.

However, P. P. Verbeek develops Don Ihde's classification (the four relations mentioned in the introductory part of this chapter) of the relationship of human beings with technological artifacts and he proposes cyborg intentionality. "A cyborg is a border blurring entity, uniting both human and nonhuman elements" (Veerbek, 2008a: 387). This intentionality is the intentionality of the 'composite agent' a hybrid of humans and technological artifacts. According to Verbeek, this is no longer about human intention or a relation between humans and non-humans entities, rather a newly merged human/technology entities appear (Veerbek, 2008a: 391). Thus, humans and technology have formed as a single experiencing entity. I will discuss Verbeek's notion of hybrid intentionality when I discuss postphenomenological perspectives of technology. In general, the intentionalist perspective of technology holds that there is a strong linkage between human intention and technological artifacts.

3.1.3 Social Construction of Technology

Social Construction of Technology (SCOT) incorporates an approach commonly employed in the sociology of scientific knowledge in order to understand the development of technology. One tenet of the sociology of scientific knowledge called 'the principle of symmetry' is central to SCOT. The 'principle of symmetry' holds that "there are always viable technical alternatives that might have been developed in place of the successful one" (Feenberg, 1999: 10). This approach began its development in the early 1980s (Bijker, 2010). SCOT was developed by scholars like Bijker, Wiebe E. and Trevor Pinch as a theory contrasted with the theory of technological determinism.

> Borrowing and adapting from the sociology of knowledge, they argue that the social groups that constitute the social environment play a critical role in defining and solving the problems that arise during the development of an artifact…they point out that social groups give meaning to technology (Bijker, Hughes, Pinch, & Douglas, 1987:12).

Therefore, the most important impetus for the development of SCOT was the rejection of technological determinism. Advocates of SCOT argue that technological development and technological change cannot be analyzed as autonomous. And it does not determine human action. In contrast to technological determinism, according to SCOT, even though technology makes an impact on the entire society, it is an inherent element of the society. Thus, technology is created and shaped by social actors rather than some inner logic (Bijker, 2010).

SCOT has a number of fundamental principles that form its core: 'relevant social group,' 'interpretive flexibility,' 'technological frames,' 'closure and stabilization,' and 'mutual shaping' (Bijker et.al. 1987). Some of these concepts are the main characteristic of the approach of

empirical program of relativism (EPOR) which has produced several studies demonstrating the social construction of scientific knowledge in the 'hard' sciences and adopted by SCOT (Pinch and Bijker, 1987: 26).

One of the most essential concepts in SCOT is that of relevant social groups. Relevant social groups are generally heterogeneous. They can be "institutions and organizations, as well as organized or unorganized groups of individuals" (Pinch and Bijker, 1987: 30). According to Bijker and Pinch, relevant social groups are organized based on their collective approaches to various problems. They are the embodiments of particular interpretations: "all members of a certain social group share the same set of meanings, attached to a specific artifact" (p.30). They are distinguished by their shared or diverging interpretations of that particular technological artifact. In the SCOT social groups plays a key role in determining the meaning and function of technology.

The second element of SCOT is interpretive flexibility. SCOT scholars apply the concept of interpretive flexibility to technological artifacts to express the ability of an artifact to manifest various meaning in different social groups. Accordingly, they argue that technological artifact have different meanings and interpretations for various groups.

The other component of the SCOT framework is closure and stabilization. Just as technological artifacts have different interpretations in different social groups, there have been often conflicts or controversies between the relevant groups. The designing process therefore can experience a problem. Then, the main task in the process is to show that closure is achieved; how such conflicts are resolved; and the manner in which the artifact stabilizes in its final form. In order to come up with a final decision various closure mechanisms are enacted. There are two examples

of closure mechanisms to solve the problem associated with technological artifacts (Pinch and Bijker, 1987:44). The first mechanism is rhetorical closure which is occurring by asserting that nonexistence of problem or “the "disappearance" of problems” (see p.44). The second one is a redefinition of the problem. This mechanism occurs when “unresolved problems are redefined so that no longer poses problems to social group” (Klein and Kleinman, 2002: 30). However, it does not mean that these closure mechanisms are permanent; rather they occur repeatedly during technological development. Because new controversies or problems emerge with technological artifacts when new social groups may come up with different interpretation or reintroduce interpretive flexibility.

Theoretical frame is another component of SCOT. The theoretical concept of the technological frame of a social group refers to the ways in which the groups attribute different meanings to the artifact. Basically, it is used to explain the interactions within and between social groups that shape the artifacts; these technological frames shape and are shaped by these interactions (Bijker and Law, 1992).

And finally, the wider context. This is the sociocultural and political situation in which artifact development takes place. The wider context in SCOT demonstrates how the sociocultural and political situation influences the meaning of technological artifacts given to them by relevant social groups (Bijker et.al. 1987).

In sum, SCOT argues that technology is a process that follows certain above procedures. Thus, for SCOT “the developmental process of technological artifacts is described as an alternation of variation and selection” (Bijker et.al. 1987: 28) between designs.

However, SCOT faced criticism from different direction. Various scholars of technology criticize the SCOT. Langton Winner for instance, in 1993, published an influential critique of SCOT entitled "Upon Opening the Black Box and Finding it Empty: Social Constructivism and the Philosophy of Technology." In it, he identifies numerous limitation of this approach. One of the major criticisms against SCOT is arises due to its excessive emphasis on the production of technological artifacts and on agency. SCOT concentrate its attention and explains how technologies arise, and ignores the effects of the technological artifacts (Winner, 1993). As Winner suggests, one of the core elements of SCOT, i.e. the concept of relevant social groups (actors), has a problem. Considering society as composed of various groups, according to Winner, is essentially pluralist view. However, pluralist view of society in itself has its own limitation. This indicates that SCOT has similar limitation. It has given rise to a host of question:

> Who says what are relevant social groups and social interests? What about groups that have no voice but that, nevertheless, will be affected by the results of technological change? What of groups that have been suppressed or deliberately executed? How does one account for potentially important choices that never surface as maters for debate and choice? (Winner, 1993: 369).

Winner claims that even though SCOT failed to notice it, it is important to consider these issues once we deal with social groups. The other limitation of SCOT identified by him is that, SCOT disregards deeper and underlying causes of technological changes, such as cultural, intellectual, political or economic factors. The lack of moral or political standpoint in the approach is the last criticism forwarded by Winner. According to him, SCOT is simply descriptive.

The other critics against SCOT is forwarded by Stewart Russell with his letter in the journal "Social Studies of Science" titled "The Social Construction of Artifacts: A Response to Pinch and Bijker". In the paper, he identifies a number of weaknesses in the SCOT approach. Among

others, he criticizes the very methodology of SCOT which integrated some character of EPOR. According to Russel, "to transfer the concepts of a sociology of science to technology is to ignore basic differences between the two, as activities and as products" (Russell, 1986: 331). In Russel's view, it is inappropriate to transfer the theory of relativism into technology, because relativism is 'inadequate analytically' and 'unacceptable politically'.

Other scholars such as Sheila Jasanoff (2004), Judy Wajcman (1995), and so on also criticize the SCOT approach. However, although SCOT has been widely criticized as insufficient and narrow, it remains as one of the most prominent theories of technology in science and technology studies (STS).

3.1.4 Actor-Network Theory

Actor-Network Theory (ANT) is another approach of technology emerged within the field of science and technology studies in the 1980s. This approach is frequently associated primarily with the work of STS scholars Michel Callon, Bruno Latour, and John Law. They were the one to introduce and developed the very idea of the approach and set out the basic components of ANT in brief account.

ANT is also, like that of SCOT inspired by some concepts of sociology of science. As we have seen SCOT theorists argue that technological artifacts are the results of anomalies between various social groups. They draw a special attention to the role of the relevant social group in the process or innovation of technological products. ANT has followed this account of SCOT in developing the idea of social group. Michel Callon introduced the notion of actor network in order to describe the heterogeneous association of different social groups (Callon, 1987). Although the notion of actor network focuses on the associations, Callon insists, it does not

represent the usual framework described by the SCOT, namely relevant social groups. Instead, ANT broadens the concept of social groups; its emphases on the wider social context.

SCOT uses "social group" in a restrictive manner to represent primarily human association or human-among-themselves. However, beyond human association, according to ANT, the term "social" is used to refer the interaction of animate and inanimate entities such as plants, animals, artifacts, concepts, (which are excluded by the SCOT) and human as well. ANT's social approach does not limit itself to human individual actors, but extends the participants of the network to nonhuman entities. The network is defined by coming together of these heterogeneous elements to act as a whole. By doing this, ANT challenges different binary dualism or dichotomy. As Hans Harbers relates,

> the core of this theory is the principle of radical symmetry between human and nonhuman actors, which dissolves modernist demarcations between living, consciously acting, and communicative subjects on the one hand, and dead, deaf-mute, and merely instrumental objects on the other, that is: between culture and nature, man and machine, society and technology (Harbers, 2005: 15).

ANT rejects these demarcation or dualism based on the assumption that everything and everyone is essentially relational. ANT is basically scrutinizing about interaction. As the name actor-network is suggesting of, ANT attempts to investigate how networks come into existence and how heterogeneous actors form a whole network. It attempts to designate how material (things) and semiotics (concepts) networks come together to act as a whole. That is why ANT sometimes described as 'material-semiotic' method.

> Like other material-semiotic approaches, the actor-network approach thus describes the enactment of materially and discursively heterogeneous relations that produce and reshuffle all kinds of actors, including objects, subjects, human

> beings, machines, animals, 'nature', ideas, organizations, inequalities, scale and sizes, and geographical arrangements (Law, 2009: 141).

ANT's essential feature is its focus on nonhuman elements. And it treats them as part of social networks. ANT assumes that all elements in a network can and should be explained in the same manner, whether these elements are humans or nonhuman (Bijker et.al. 1987). According to Latour, there is no principled distinction made between them. To put it in his words, "I do not hold this bias and see actors--some humans, some nonhumans, some skilled, some unskilled--that exchange their properties" (Latour, 1992: 236). This is called the principle of "generalized symmetry". As John Law states, "generalized symmetry states that the same type of analysis should be made for all components in a system whether these components are human or not" (Law, 1987: 132). As Philip Brey describes this further, generalized symmetry implies that:

> The whole distinction between physical objects and human actors, physical capacities and behavioural dispositions, physical processes and human actions, and physical laws and social norms or habits disappears: there is only an interplay of actants and their performances, which are all described in the same terms (Brey, 2005: 75).

All are actants that are able to act, mediate, and influence. The term "actants" is one of the central concepts in ANT and it refers to anything that has agency. Therefore, ANT describes both humans and nonhumans as actants.

In general, ANT is emphasizing on the interaction and network formation in the development of technology. It attempts to describe the process by which technological invention or systems come into being, or fail to materialize. For instance, according to ANT, "the workings of an artifact *are* the result of the activity of a heterogeneous network of entities that work to co-

construct the phenomenon" (Brey, 2005: 74). It also explores any technological changes and developments that occur subsequently (Bijker et.al. 1987).

Although ANT is rooted in STS, as it investigates socio-technical process, now it is considered to be a widely applicable theory of the social world. It has spread across a number of disciplines, for instance, it deployed in geography, anthropology, economics, history, literature, media studies and others disciplines. However, it does not mean that it has no limitation. ANT was severely criticized by different scholars. Some critics have argued that like SCOT, ANT remains descriptive and lacks moral or political standpoint. Harry Collins and Yearley Steven also accused ANT approach of symmetry principle.

3.1.5 Postphenomenological Perspective of Technology

The last but not the least perspective that I am going to discuss in this chapter is the post phenomenological perspective of technology. This perspective has been developed initially by Don Ihde. Ihde, in his work, especially in the book *Postphenomenology and Technoscience* discuss the very nature of postphenomenology. Later on, other scholars of technology expound it. Among others Peter-Paul Verbeek has elaborated the theory of postphenomenology in greater detail in his book *What Things Do*.

According to Ihde, postphenomenology is a modification of a philosophy of phenomenology. And it adapts certain aspects of pragmatism. To put in Ihde's words,

> Postphenomenology is a modified, hybrid phenomenology. On the one side, it recognizes the role of pragmatism in the overcoming of early modern epistemology and metaphysics. It sees in classical pragmatism a way to avoid the problems and misunderstandings of phenomenology as a subjectivist philosophy,

> sometimes taken as antiscientific, locked into idealism or solipsism (Ihde, 2009: 23).

Postphenomenology does, therefore, retain and emphasize one of the most important traditions in the history of philosophy called phenomenology. Phenomenology is "the study of "phenomena": appearances of things, or things as they appear in our experience, or the ways we experience things, thus the meanings things have in our experience" (Smith, 2013). However, Verbeek reinterpreted phenomenology as an analysis of human-world relations. Verbeek argues that

> Phenomenology thus overcomes the dichotomy between subject and object, humans and world, by replacing it with a mutual interrelation. Human beings are unthinkable apart from a relation to the world, which they continually experience and in which they realize their own existence. This interrelation is not a fact that could have been otherwise (Verbeek, 2010: 110).

This new interpretation of phenomenology implies that it breaks the gap between object and subject. Therefore, Postphenomenology can be viewed as a reformed phenomenology that attempts to overcome the radical separation of subject and object. It argues that subject and object constitute and co-shape each other.

How then, does postphenomenology comprehend technology?

Postphenomenology in the Philosophy of Technology

The postphenomenlogical approach of technology is developed as an alternative to the classical philosophy of technology and to overcome various questions concerning technology such as the existential question of the role that technology plays in human existence and the hermeneutical question of how technology co-shapes the access human beings have to reality (Verbeek, 2010). Therefore, postphenomenolgical philosophy of technology "finds a way to probe and analyze the

role of technologies in social, personal, and cultural life that it undertakes by concrete—empirical—studies of technologies in the plural" (Ihde, 2009: 23). In order to understand postphenomenological approach to technology, it is very essential to grasp concepts like intentionality, technical mediation and attachment which are core to this perspective.

How human beings relate to its world is an essential topic in the postphenomenological perspective of technology. The primary aim of postphenomenology is to "understand the "contact" between humans and the world: the experiences and actions in which they co-shape each other (Verbeek, 2005: 138). According to postphenomenology technical mediation plays a dominant role to describe the mutual relationship between human beings and the world. As Verbeek says,

> It suggests that mediation takes place in human-world relationships: when artifacts are used, they enable and co-shape relationships between humans and their environment. This implies that artifacts do more than mediate action. Action is only one aspect of the relationship between humans and their world, an aspect that becomes visible when approaching this relationship "from the human side", since action can be seen as the way humans can be present in their world. However, the human-world relationship can be approached from the opposite direction as well (Verbeek, 2005: 138).

Technological artifacts play an active role in the mediation of the interrelationship between humans and the world. They "can be the means by which "consciousness itself" is mediated. Technologies may occupy the "of" (*'consciousness of* ____) and not just be some object domain" (Ihde, 2009: 23). Thus "artifacts mediate ways of existence (subjectivities) and experienced realities (objectivities) not because people told them to do so, but because of the relation between humans and the world that comes about through them" (Verbeek, 2005: 140).

According to postphenomenology, artifacts do not only mediate the interrelationship between humans and the world, but also they evoke engagement of humans with themselves in their functioning. Therefore, artifacts mediate humans with themselves. “This type of mediation can provoke attachment to the materiality of things” (Verbeek, 2005: 143).Thus, artifacts stimulate peoples for engagements. “Attachment comes about when artifacts invite engagement with themselves, and at the same time creates scope for people to experience and interact with the world around them” (Verbeek, 2005:144).

To sum up postphenomenology emphasis on how humans and the world forms their mutual dependencies. And it holds that realities come about in mutual relations.

3.2 Concluding Thoughts

In this chapter, I have tried to demonstrate some core insight of different theoretical perspective of technology. With the advent of rapid and sophisticated technological development, the characteristic feature of technology becoming complex. And simultaneously our worldview about technology is also changed. That is why various perspectives of technology offer a number of interpretations concerning the nature of technology. As I have attempted to discuss, each of the above perspectives claims about the nature of technology and as well as its interaction with the entire society.

I treat all perspective of technology as they have incorporated politics, either directly or indirectly. They provide a room for politics. As pointed out, these perspectives used to explain the very innovation of technology; process of the development of technology; the consequence of technology; and also used to describe fundamental features of technology. Even though these perspectives discuss about the nature of technology in different manner, there is one core points

in which they gave an emphasis. They draw a special attention to agency (who acts, decides, participates) and emphasize the role of individual, collective and nonhuman agency. For instance, technological determinism argues that technology is autonomous. This theory is blind towards the role of human agency. According to this theory humans have no or little ability to act in the development of technology. To the contrary of technological determinists, to the SCOT, agency always depends on social processes. It gives a dominant role to collective agency what is called the relevant social group. The intentionalist perspective of technology, which directly connects itself to politics and makes a claim about the political quality of technology offer an agency to individuals (designers), collectives (powerful groups), and to the hybrid of human and products. Whereas, ANT and postphenomenological perspectives of technology argue for nonhuman and mediated agencies respectively. These notions points that agency is essential in each theoretical perspective. Then, "with agency comes politics, both empirically and logically" (Harbers, 2005: 15). I argue that the issues at stake, such as the participants, the distribution of agency, the role of agency (in activity, decision making) and so on has profound political qualities.

And again each perspective has to do with the essential features of politics, such as power and authority, freedom, justice, decision making, etc. For example, if technology is autonomous, then it is inevitable to raise the question of human freedom. Human power in shaping the form and the consequence of technological product is under question mark. The problem of power division is also occurring in SCOT and ANT. In these two perspectives, politics is contingent. These imply that the location of politics in technological development is varied.

In general, each perspective emphasizes different aspects of the politics of technology. Among these theoretical perspectives of technology, the intentionalist approach of technology,

particularly technologically mediated intentionality is more persuasive. In this paper I adopt this perspective to show the politics of technology in brief account. It has been built on concrete examples. I argue that technological products have embedded political qualities when they are produced. Designing is the most important activity in the process of technologies that plays a dominant role in the politics of technology. Therefore, in the next section I will discuss politics and designing.

CHAPTER FOUR

THE POLITICS IN DESIGNING

There are many forces that stimulate the development of technology. A human conviction in the "endless perfectibility" is the most pressure that motivates the improvement of technology (Kaplam, 2004). Humans are always striving to improve their living conditions. We believe that there has to be something better. This nature of human beings makes technology ahistorical and progressive. To use Hans Jonas's description of technology, technology is restless and always in movement (Jonas, 2004). According to him, modern technology is a process in rapid changes and advancement.

The advancement of technology plays a dominant role in human life. Technological products we use help us to shape the standard of our life. Especially, in the twenty first century, technology is considered to be of great importance in improving every aspect of human endeavor. Technological artifacts mediate human life in every aspect. As Verbeek states:

> When technologies are used, they always help to shape the context in which they fulfill their function. They help to shape human actions and perceptions, and create new practices and ways of living. This phenomenon has been analyzed as 'technological mediation': technologies mediate the experiences and practices of their users (Verbeek, 2008b: 92).

According to this notion, technology has played a dominant role to mediate humans with their environment and reality in general. That is why countries, companies, and even individuals embrace technology in order to advance their status in the world. However, the advancement of technology comes up with its complex nature and character. This nature of technology brings us to new and extended meaning. So, as already discussed in the above chapters, with the growing

complexity of modern technology, rather than to look at an artifact, it is helpful to conceptualize technology as the system.

As has been said so far, technology is a system that involves different stakeholders and activities to achieve certain objectives. Among the components, the system of technology involves the designing process. Designing[3] is at the heart of technological system.

Since designing is central in the system of technology, we should have to give a closer attention to the meaning of designing as well as its characteristic feature in greater detail. Perhaps, it is difficult to spell what we exactly mean by the term designing, because it is broad concept. Therefore, I am not going to discuss the total picture of designing (even if it is possible), rather my intent is just to provide you with some important theoretical frameworks about the nature of designing. Accordingly, in this chapter, I shall discuss the very nature of designing and its decisive role in the technological system. By doing so, I shall expose the issue of agents in designing process and the political characteristic feature of designing in the entire of technological system.

4.1 Designing

Technology influences and plays a special role in the society. Artifacts are the results of technological system, as we have discussed in the first chapter, the outcome of technological process exhibits itself in terms of artifacts. As Pitt (2011) relates, artifacts do not take the shape, attribute or the function they have been provided by accident. Rather they all are about the results of designing process in the entire system. If designing activity is a locus in the making of

[3] Certainly, the concept of designing is a broad and complex concept. For that matter, some designing projects may be performed by single designs and others require a large, multidisciplinary team of designers. And even sometimes artifacts are emerged spontaneously without designing process. However, since the primary emphasis of this paper is with technology as a system, our concern will be with the issue of designing in the entire system.

an artifact in the technological system, it is very significant to discuss the nature of designing in order to comprehend the politics of technology.

An investigation into the origin of words, however interesting in itself, can tell us a little about the very nature of designing. So, let us begin with the etymological meaning of the term design. Etymologically, the word designing comes from the Latin *'disignare'* which means 'to mark out'. Accordingly, it has been defined as a process of translating the object which is to be designed from an initial idea into finished artifacts to meet a stated objective. This process of designing consists different phases from the beginning to the end. Walter Vincenti (1990) defines design as a "set of plans and the process by which those plans are produced" (Vincenti, 1990: 7). He further points out that design,

> ...typically involves tentative layout (or layouts) of the arrangement and dimensions of the artifice, checking of the candidate device by mathematical analysis or experimental test to see if it does the required job, and modification when (as commonly happens at first) it does not. Such procedure usually requires several iterations before finally dimensioned plans can be released for production (Vincenti, 1990: 7).

Vincenti's words indicate that designing activity has incorporated a different set of steps. Similarly, scholars of technology, such as Simon (1990) and Pitt (2011), have attempted to capture systematic steps and principles of designing process. VDI (VDI Design Handbook 2221: Systematic Approach to the Design of Technological system and product, 1987) is another instance which sets a phase of designing process that contains seven steps. "These steps are: clarifying and defining the task; determine functions and their structure; search for solution principles and their combinations; divide into realizable modules; develop the layout of key

modules; complete overall layout; prepare production and operating instructions" (Kroes, 2009: 115).

Indeed, steps or principles in designing may be helpful to guide the design process and as well as to examine the success of the design. However, as we have seen, even though each of the above stances demonstrates the involvement of a number of steps in designing practice, with the growing complex feature of designing vis-à-vis technology, it is difficult to set objective principles and procedures for designing practice. Hence, the key notion here is, in short, designing is a process that contain several steps.

Usually there are two misleading assumptions about designing. The first one is limiting the task of designing only to make the product. Designing is not only for the purpose of innovation of artifacts as Peter Kroes relates:

> A design may be taken to be a blueprint for production: a description of all the physical (chemical) properties of a technical artifact that are relevant for actually making a token of the artifact type defined by the design. In this sense, a design is a complete description of all the parts and their relations (2009: 113).

However, it also involves two themes of technological engagements: making and using. From this point of view, designing is able to realize the desired function through description of technical artifacts and the description of how to use the artifacts. This shows that manufacturing the product is not where designing comes to an end. It also involves determine how the artifacts are to be used and how they relate to a broader system.

Second, designing is put forth as a method of practical action. However, even though designing in technological system is a necessary activity in the production of artifacts, it is misleading to interpret designing only as it is an activity of production processes. Therefore, as Pitt (2011)

relates, it is very important to distinguish the conceptual designing stage of the product from that of the production process in which the envisioned product is actually manufactured. The former one is referring to diverse technological activities and addresses issues such as why and what drives the innovation from a conceptual point of view. For example, issues concerning the primary objective of the product and how the product is to be used are considered in this phase. However, the second phase basically focuses on only how the products are manufactured. Therefore, it is necessary to include both attributes of designing when we describe designing process in the system of technology. Christelle Didier describes designing precisely by involving both characters as follows:

> The activity of design is the process by which ideas, objectives or functions take shape in the plans for implementing an object, a system or a service, aiming at attaining the objective or performing this function (Didier, 2009: 428).

A broad similar characterization of designing with concrete examples produced by Maarten Franssen and Peter Kroes is:

> Designing a sociotechnical system will … involve designing specific roles and tasks for people to fulfill to match the hardware components, and also rules to define and regulate these roles and tasks. The road-transport system, for example, contains coordinating devices such as traffic lights; but, for such technical devices to contribute adequately to the overall functioning of the system, laws that punish those who ignore them are essential, as are police patrols to detect such cases. Maintaining the system, then includes not just checking that the lights still work, but also checking that drivers' estimates of the chance of getting caught when skipping the lights are still large enough, and that the fines are still high enough to deter them. Engineers may come up with sophisticated technical solutions for particular problems, such as special lanes for carpoolers to reduce traffic-jams; but, if the law forbids any discrimination among car drivers on public roads, the

> technical solution itself is ineffective, and the design should include an accompanying change of law (2009: 226).

Therefore, the concept of designing in the entire of technological system refers to series of an activity begin from the very initial postulation of ideas up to producing the finished artifacts, including how to use them. In general, the process of designing involves and takes into account issues such as the feature of the products (physical property including aesthetical character); its function (how it works); how the artifacts are to be used etc. Hence the primary purpose of designing is to realize the objective of the entire system of technology.

4.2 Where Do the Politics Lie? Designing and Its Politics

As we discussed above, designing is considered to be a process of consciously shaping an artifact to adopt certain properties and goals. Thus, an artifact has two dual natures: a physical nature and a functional nature. Describing the technological object as having a dual nature, Kroes writes:

> On the one hand, they are physical objects or processes, with a specific structure (set of properties), the behaviour of which is governed by the (causal) laws of physics. On the other hand, an essential aspect of any technical object is its function; think away from a technical object its function and what is left is just some kind of physical object. It is by virtue of its practical function that an object is a technical object (Kroes, 2001: 1).

Kroes adds, "we recognize the physical nature when we describe the artifact in terms of its size, shape, number of parts, color, weight, smell, and all the other properties that the artifact possesses" (quoted in De Viers, 2006: 20). The physical object of technological artifacts also includes the biological and chemical aspects.

The second nature of technological artifact is its function. They are designed to realize certain desired objectives. The functions of technological artifacts are the result of human intensions (De Viers, 2005; 2006). Thus, artifacts are inscribed with the designer's intent. According to Madelein Akrich (1992), the makers of technological artifact place in them 'scripts' or 'scenarios' to indicate certain specific forms of action.

> For some time sociologists of technology have argued that when technologists define the characteristics of their objects, they necessarily make hypothesis about the entities that make up the world into which the object is to be inserted. Designers thus define actors with specific tastes, competences, motives, aspirations, political prejudices, and the rest, … A large part of the work of innovators is that of "inscribing" this vision of (or prediction about) the world in the technical content of the new object (Akrich, 1992: 207-8).

Artifacts are made with an inscription of something to do something. "When users are employing the artifact for something, on the other hand, it means they are de-scribing or unpacking what has already been inscribed into it" (Kenaw, 2009: 978). It implies that designing process predetermine the function of an artifact. The politics of technology, therefore, begins with the primary purposes (intension) of the system of technology. What initiates technological innovations in the first place? In order to answer this question, someone may suppose that innovation targets, public service, utility and efficiency. As L. Winner puts it, designs are there "to enhance the power, authority, and privilege of some over others" (1986: 25). These intensions, wills, or motives of innovators are passed to materials through the designing process. Therefore, the fact that technological artifacts are designed to do something depends on their scripts as well as their uses, though the latter can at times go beyond the scripts.

The function of artifacts usually considered to be material. However, beyond material function (commonly known function might suggest) they have different agendas related to politics, morality, safety, security and etc. That is due to the fact that designs inscribing certain scripts into the artifacts. As Bryan Pfaffenberger writes:

> A design constituency (the groups and individuals who participate in the technological design) creates artifacts whose features reveal an intention to shape the distribution of wealth, power, or status in society. A design constituency also creates myth, social contexts, and rituals to legitimate its intentions and constitute the artifacts' political impact (Pfaffenberger, 1992: 282).

This implies that designing is not only for material task, but it also has a political and social purposes, since it has moved away from material objectives. Both material function and other social agendas were simultaneously brought into being. Therefore, some artifacts have dual functions.

As noted above in chapter two, in his classic article ''Do artifacts have politics?''(1980), Langdon Winner famously describes the development of the road system on Long Island, New York. According to Winner, the plan (the urban planning in New York (1930s)) was carried out deliberately by designing overpasses in a certain way: the bridges were built very low in order to avoid public transportation such as buses. Only private cars could go under the bridges, thus enabling the wealthier people (who could afford to own cars) have the access of public beaches, simultaneously, it was designed to exclude the buses which are supposedly used by lower class people.

Winner's example clearly indicates the politics of designing. However, even though this particular example might be historically incorrect (as there are serious contentions against it), it

still makes up a good illustration about how technological artifacts inscribe certain political agendas; today we see a number of technological products carrying hidden scripts. For instance, there are ample buildings designed with converging and diverging gates. We may assume that such buildings were constructed for aesthetic purposes; however, they are used to control the potential threats easily. Moving walkways (elevators) in buildings are designed to help users move more quickly while at the same time they could serve to "prevent people blocking corridors, especially in groups" and to control potential threats (Lockton, Harrison, & Stanton, 2010: 8).

Scholars of technology like Noble (1986) and Barker and Downing (1985) discussed many other examples. As Pifaffenberger (1992) states:

> Noble (1986) shows how managers hoped that numerically designed machine tools would deskill lathe operators and transfer process control from the shop floor to management. Barker and Downing (1985) show how networked word-processing technology has been used to erode the work autonomy of typists by monitoring the number of times per hour that a typist presses a key (Pifaffenberger, 1992: 283-4).

Other examples of politics in designing reveals by Latour (1992) and Sclove (1995):

> Latour (1992) discusses a hotel key, for example, has a heavy weight attached to it in an attempt to encourage hotel guests to bring their key to the reception desk upon leaving their room. Sclove (1995) points out that modern sofa with two or three separate seat cushions define distinct personal spaces, and thus work to both respect and perpetuate modern Western culture's emphasis on individuality and privacy (Brey, 2005: 63).

These examples clearly demonstrate that some technological products can have their own political inscription, affecting the social structure. Technological artifacts are "capable of

coercing individuals to behave in certain ways, may provide opportunities and constraints, may affect cultural belief systems" (Brey, 2000: 4).

The presence of the politics in technology and technological artifacts do not only depend on its very origin (designing), but it can also occur through its implications or impacts. It has a lot of social as well as political implication. Amongst others, let me present the politics of technological products with which most of us are familiar, such as computer system and search engines.

Among types of technology, information technology (IT) is playing a dominant role in human life and becomes a more significant part of human life. Computer system as part of IT used to store, retrieve, transmit, manipulate, or generate information. This function of computer system is known as information function (Brey, 1998). Since information is essential to human life, the majority of us commonly use computer systems and applications. However, how many of us do critically evaluate the role of computer systems, applications and practices? Are the designs of computer programs and information that they carry neutral?

Most users may answer this by saying yes because computer systems and information we found look neutral morally or politically. But in reality they are non-neutral. They have social and political scripts within or behind them. According to Brey, these systems have "social injustice, the formation of coercive power relations, and the curtailment of human freedom and autonomy" (Brey, 1998: 2). They play important roles in shaping or dictating decisions of individuals

Computer programs and applications are inscribed with biases and certain particular pre-determined power relations (Friedman & Nissenbaum, 1997; Brey, 1998). "Computers may, for

example, lead to unemployment and deskilling, introduce hierarchical power relations, or harm privacy" (Brey, 1998: 3).

Among the bias of computer programs, the major one is technical bias. As the name itself implies, it is usually the result of technical designing.

> Sources of technical bias can be found in several aspects of the design process, including limitations of computer tools such as hardware, software, and peripherals; the process of ascribing social meaning to algorithms developed out of context; imperfections in pseudorandom number generation; and the attempt to make human constructs amenable to computers, when we quantify the qualitative, discretize the continuous, or formalize the non-formal (Friedman & Nissenbaum, 1997: 335).

As we know a computer has multiple functions. However, it is designed to exclude and to disadvantage some users from using the functional feature of a computer system (Brey, 1998). The bias or exclusion of some users from using the function of a computer system is happening due to their designing; they require qualities or skills in order to operate and use them (Brey, 1998). Computer is an artifact which by its very designing requires certain computer skills. This implies that anyone who has no skill of computer exclude from using technology by him/herself. Even if they tried to use it, they (computer illiterates) again disadvantaged in terms of wasting time, energy, effort or resources (Brey, 1998).Therefore, the designing of computer related system points that the technical design of computer systems has a bias against some users. These exclusions or bias of some users of computer programs leads us to social injustice.

> Computer systems and surrounding social structures should therefore not just be designed to ensure equal access to prospective users, they should also be structured to minimize negative social impacts that are latent and unintended (Brey, 1998: 3).

This social inequality with regard to access to use and impact of computer directly brings us to the issue of "digital divide". The digital divide exists between literate and illiterate in terms of access to and usage of computer.

Moreover, the biases of computer programs do not only concern about its technical designing, though; it has also functional bias. One of the most important functions of a computer system is providing information. It is supposed to be organized and facilitate equal access of information to the users. Nevertheless, there are information biases in computer system. As Brey (1998) states, an informational bias is:

> … a design feature because of which a system unfairly disadvantages some of its informational stakeholders, which are individuals, groups or organizations that in some way have a stake in the way in which the information function of a computer system is designed (Brey, 1998: 8).

In fact, informational bias is not only found in computer system, but we also found it in textbooks, television and other devices in which information is transmitted by or stored in. Let us take for an example books; books sometimes contain information against certain individuals or groups in favor of others. That is why in the academic arena the concept of academic honesty has been introduced to eliminate bias of information in books.

Informational bias can occur in different ways. It can occur by its content of the information that is stored in (as noted above example). It can also occur through the way in which information (data) is organized by the system. Brey called the second form of bias "the organizational informational biases" (Brey, 1998: 9). This informational bias originates in the computer system through the data base system. This system is basically used to organize, store, transmit and

retrieve data. Among others, let us see, for example, how the World Wide Web system biases information.

As we know with the advent of the internet and World Wide Web (basically after web search engines were designed and introduced to search for information on the World Wide Web), digital information becomes accessible for everyone at every corner of the world. There are many different types of search engines made by different companies, such as Google, Yahoo, Yandex, Baidu, Naver and Bing. These are supposedly created to provide information to users. Each search engine has its own individual ways of organizing information. The majority of us used these search engines and computer programs to search information: to navigate different pages, news, maps, weather conditions, documents such as books, articles, images, video clips, audio recordings, etc. For billions of people around the world, the Internet and search engines become essential components of their everyday social and business lives. As statistics shows, trillions of online searches are made annually worldwide (Bughin et.al 2011).

Search engines work by storing information about numerous pages. When we query any information, we type the key words (the specified key word that we want to discover information) in search engine address bar or search bar, then the Web search engine sends out a "spider" in order to bring the wanted document. After the engine examines its index, it provides thousands or millions of Web pages results. Most search engines list the results by ranking them. If we want to use from the listed results, we hit the button.

The majority of us do not know whether the procedure of the search engine is normal or unbiased (Introna and Nissenbaum, 1998). We assume and used them as they are innocent and provide relevant information in accordance with our interest. The question is: How many of us

know or understand how search engines work? Are search engines transparent? Let us see the politics of search engine behind the scene.

Search engines work through technical mechanism and rules such as crawling, indexing, and ranking algorithm (mathematical computer programming methods which sort and rank search results). However, how these search engine algorithm works are concealed. As Mike Grehan (2002) states, "search engines keep their methods for crawling and ranking web pages very much as trade secrets" (2002:10). It is not disclosed in a meaningful as well as transparent manner. For instance, when a search engine returns a list of documents on the screen, it is presented in a line of ranks. The most important question is, how do search engines decide the pages which are the best matches? How they are they ranked? In order to answer this question it is very essential to study the technical mechanism of search engines. Introna and Nissenbaum (1998; 2000) were among the first to anticipate and effectively articulate the politics of search engine and its technical mechanism. They have argued that the particular search algorithms used in search engines are far from neutral, and are often discriminatory. According to Introna and Nissenbaum, technical mechanism which are applicable in search engine like crawling, indexing, and ranking algorithm are problematical. Let us see how these computer mathematical algorithms are biased.

After our query, search engines always return a list of pages on the screen what it decided the best matches. They (search engine companies) assert that lists in the screen are users' want and relevant to them. For example, Yahoo representatives maintain that "they list what users want, arguing that if users were not finding relevant information they would cease using Yahoo" (Introna and Nissenbaum, 2000: 55). Indeed, users may get relevant information and satisfied with them. But, as Introna and Nissenbaum argue, the process of search engines to provide the

result is almost inevitably biased and problematic. In the process of search engine, a "backlink" is one of the most important factors for determining the importance or the relevance of web pages. According to Introna and Nissenbaum, however, "the Backlink metrics blindly assume that backlinks reliably indicate a Web page's importance or relevance" (2000: 56). Because, they write:

> The spider usually starts its crawl from a historical list of URLs. Such lists favor documents that contain many links, such as server lists, What's New pages, and other popular Web sites. Spiders crawl the Web by automatically traversing its hypertext structure. They first retrieve a document, then recursively retrieve all documents referenced in it (Introna and Nissenbaum, 2000: 55).

This indicates that the spider of search engines does not treat equally all links. Rather, it targets pages that have many backlinks and pushes out other links that have small links. Due to this reason, different companies and institutions strive to get more backlinks through different mechanism and to be indexed in the display screen. For example, "many organizations actively cultivate backlinks by offering incentives such as product discounts, free software utilities, and access to exclusive information. Such incentives slant Web visibility toward those with the deepest pockets" (Introna and Nissenbaum, 2000: 56). Therefore, the process of indexing is problematic, technically speaking.

Besides technical bias, search engines are determined and influenced by certain social or political factors. They are designed to exclude certain search results contradict with local laws or political ideology. Like all forms of media, search engines also make choices (and in fact do make decisions) about which content to distribute and show to the public (Introna and Nissenbaum, 2000). This attribute of search engines exhibits itself through the results we found in different search engines. We will always get or find different results on different search engines about the

same query, because "each search engine has its own unique system" (Grehan, 2002: 10). For example, let us enter the key word "the role of U.S.A. in the emergence of ISIS" at Google and Yandex (the most popular engine in Russia). We will get different results (lists). This result implies that the result of search engines does not depend on relevancy; instead each search engine creates its data base depending on its ideological and political affiliation.

The other most important issue regarding search engines is the problem of ranking. Again in ranking, there is bias against less popular and small cites. As Introna and Nissenbaum writes,

> Most search-engine ranking algorithms use both the position and frequency of keywords for their heuristics: The more instances of a keyword, and the earlier in the document those instances occur, the higher the document's ranking. Other ranking schemes, like the heuristic used by Lycos, are based on in-link popularity. The search engine calculates the popularity score for a particular site by totaling the sites that contain links to that site. High link popularity leads to an improved ranking. As with crawl metrics, big sites determine the standard or threshold of relevance at the expense of equally relevant small sites (Introna and Nissenbaum, 2000: 57).

Most of search engine users cease to search more sites (pages) after they come to most popular or most cited pages. There are few users who page through more than one or more screens. Therefore, being ranked in the top 10-20 results played in the screen is the target of any organization. Due to this battle for ranking, a new discipline called "search engine design" has emerged. It focuses on how to design web pages for greater search engine recognition (Introna and Nissenbaum, 2000: 57). Introna and Nissenbaum states, "this discipline teaches design principles for optimizing a Web page's ranking principle" (see p.57). It also suggested that designers tend to trick the search engine algorithm in order to be ranked. Moreover, ranking web sites depend on popularity does not justify the relevancy of the web. Apparently, having many

visitors does not necessary indicate the relevancy of the site. Rather, it shows that search engines are market oriented by appealing to people.

It is therefore misleading to treat search engines as exist for everyone to provide an equal opportunity and access of information. Most of the time they give us selective data or documents to shape and manipulate our understanding. Search engines also function in an uncalled for manner because they are designed to recognize the history of the searcher. In this respect, users get less exposure to new ideas, news, or viewpoints. For instance, when you start to enter the key words in search engine address bar (box), it gives you options by customizing your past history before you just finish typing. Then you tend to hit suggested keywords. This shows that search engines discourage searching new things, not to mention the damage it causes to the privacy of individuals.

In general, the politics of technology and technological artifacts primarily depends on the very designing processes. Each of the above examples exhibits the role of designing in the politics of technology. However, even though these examples demonstrate the politics of technology, which in turn depend on designing and technological development, we may well wonder the role of designing process of technological artifacts in its proper functionality. I said this because, sometimes, the intention of the designers and the practice of users do not correspond. Indeed, there are exceptional cases in which mismatching between the designers intention and users' practices would happen. When users employ the artifacts in a different way, we call it an "accidental function" (De Vries, 2005: 16). Even though the relationship between designing and using is unpredictable, the occurrence of accidental function is limited. That is due to the designing process which also anticipates accidental function in a way that would bridge the gap between the context of design and context of use. Additionally, designing is not the decision

making of a single individual in the system of technology. It involves different agents. Let us discuss the role of agents in designing.

4.3 Agents in Design Decision Making

There are several factors and stakeholders involved in designing process**.** For example, it involves creativity in which aesthetic values are more important. However**,** among others decision making is an intrinsic feature of designing. As Kroes notes, "designing involves decision-making on different levels, at different stages and about different kinds of issues" (Kroes, 2009: 114). Decisions about how to define the objective; what performance criteria to use; about the structure of the object to be produced; about how the object to be used and how it could be relate to a system; and "the development of methods for measuring these performance criteria are often an integral part of the design process" (Kroes, 2009: 115). And even, according to the Accreditation Board for Engineering and Technology (ABET) description, "engineering design is a decision-making process" (Kroes, 2009: 114).

Who is included and excluded in the decision about all these technological designs and practice become the leading critical notion which brings us directly to the politics of designing. Who determines how technological things would be made? Who is empowered to decide about technological design and practice, the designers or the users or the experts or the layman?

In order to answer this question, it is helpful to consider the nature of technology. As we have discussed elsewhere in the paper, technology is a complex system involving various participants and activities. Designing is also part and parcel of the system. Even though designing is an element of engineering science, with the growing complexity of modern technology, it is not only the engineer's task to make decisions on designs. Instead it involves the effort of different

actors, including professional organizations, economic and legal institutions, government officials or politicians, public and private companies, scientists, engineers, technicians and so forth.

Designs are of course put forwarded or selected by experts. For example, let us take a large scale technological system such as power and military technology, communication, transportation, educational institution, production technology, etc. They are centralized and administered by the corporate managers and government officials who exercise the virtual right of ownership; by elected officials and market forces; by a small group of technically skilled people and business man who own them and can only have their own best interests in mind. Decision making in the designing process has been made by these elitists. The designing process is, therefore, the place where the various actors interested in developing technological products for their own benefits (Feenberg, 1995).

The other way around, although large scale technologies has played a special role in the socio-political structure of the society; the structural change in the economy, social, and political and other core areas of the society, in turn affects the designing process. Decision making in technological designing has sometimes been influenced by different social factors. "Designing starts with system requirement: a list of functional demands the system should meet" (Berg, 1998: 458). It needs proper social condition in order to function. Amongst others, compatibility with the concrete situation is the major one. Feenberg (2004) states, "design process always incorporates standards of safety and environmental compatibility" (2004: 219). It takes into account the cultural, political and the economic systems in designing process and users as well. Therefore, the designing of technological artifacts may be socially constructed.

This problem of agency in the decision making of designing process leads us to the practice of politics. Philosophers of technology like J. Ellul, M. Heidegger, H. Jonas, and others asserts, technology as totalitarian threats, due to the absence of equal access to make decision about designing and the entire system of technology in general. These "unequal distribution of agency implies unequal capacities for political action" (Harbers, 2005: 14). Since technological system affects the wellbeing of the society and does not involve them as one variable in decision making, the question of social justice is inevitable. That is why scholars such as A. Feenberg, L. Winner, Richard E. Sclove, and T. Smith quest for democratic technologies and user-center technological decisions about design, management and practices of technology, in order to accommodate the excluded and who lack the access of participation. Feminists for example, argue for the necessity of consideration of "silenced voice" and powerless actors (Oudshoorn, Brouns, and Oost, 2005: 85).

As we have considered so far, designing process in technological system has its own feature. Designing process might be produced and influenced by elitists and social factors. There is a debate between these two opposite ideas concerning designing. There are people who endorse this process of designing as reliable while others deemed as unjust. As a matter of fact, technological products have different characters. Brey (2005) states that some of them are considered to be authoritarian, democratic, unjust, deskilling, repressive, egalitarian, individualistic, masculine, feminine, etc. However, the primary objective of this paper is not to argue that whether decision about technological design is legitimate (rational) or not, instead it tries to demonstrate how the designing processes in the system have political qualities[4].

[4] Most of academic effort to show that technology has politics have usually meant negative (harmful) politics. In this sense, technology tends to be interpreted as a negative force. However, this way of describing technology is misleading because since the politics of technology emerged from the very script, it might have either positive or

CHAPTER FIVE

THE POLITICS OF SOCIAL MEDIA

5.1. Social Media and Politics

As already discussed to some length in the previous chapters, technology facilitates the relation between human beings and their environment. Technological artifacts mediate the association among them (Verbeek, 2005). According to Deutsch, with the advancement of technology, people started to engage in the sphere of politics than ever before (Deutsch, 1959). He points out that the development of technology does not only increase "the number of participants in the political game", but also "in some basic regards have changed the nature of politics itself" (see p.669). Predominantly the advent of internet technology and social media in particular played a significant role in altering the political system.

Surely, the internet has become a daily tool for an ever-increasing number of people in the world. It has various functions and people used it for a number of purposes. The majority of internet users of course use the internet in order to access information (including news); to keep in touch with friends and family; to express themselves (sharing personal information); and to entertain themselves. All these aspects are political in some sense. But it should be pointed out that technologies do also help to directs us to hook-up with political activities (Gil de Zúñiga, Molyneux, & Zheng, 2014). They further point out that,

> People can pursue their political goals online by forwarding e-mails, sharing opinions about politics and current events, expressing dissatisfaction with governments by commenting on government officials' social media pages, and

negative impacts. Therefore, we need to engage in the politics of technology in ways we take into account simultaneously both aspects.

> participating in online collective actions against certain policies (Gil de Zúñiga et.al. 2014: 2).

The introduction of the internet has facilitated participatory politics and political mass mobilization (Baker, 2009). It enables everybody the government and the public alike, to deliver self-published information. Individuals engage in politics by the mediation of the internet technology. For instance, it allows government officials (politicians) more accessible and closer to the public and simultaneously the public has an opportunity to contact directly with government officials. This service of internet technology implies that both parties (the government as well as the public) have an access to enhance their political participation. In general, the internet is described as an important tool to mediate politics. Moreover, along with the internet, social media platforms' play their part in shaping politics.

Social media deserves the lion's share of the credit for profoundly altering the political system of the world. There is a reason to assert the role of social media for changing the politics. Over the past decade, the world has witnessed the role of social media in episodes of major political transformations around the world. As Auvinen states,

> What do demonstrations on city streets in the Philippines in 2001, the election of Barack Obama as President of the United States in 2008, revocation of the results of the fraudulent elections in Moldavia in 2009, the M-15 movement with their camps and demonstrations in Spain in 2011, the so-called "Arab Spring" in the Middle East in early 2011, and the "Occupy Wall Street" movement that started in New York, also in 2011, all have in common? They have all used social media to help organise such protests and mobilise their responsible agents (Auvinen, 2011: 4).

These events indicate that social media have played a major role in driving major political events in the world. People used internet and social media as an alternative source of information to

gather political information and to involve directly in the political sphere through social media platforms.

The realm of social media is thus becoming an emergent political field. Internet technology is among the essential things which are influenced and shape various aspects of human life (Bargh and Mckenna, 2004). For example, it affects the economic, political, social, psychological aspect of our life. It is a thing we have to deal every day. It used to mediate almost all of our activities. In order to get different kind of information and documents; to learn and know something; to chat with friends and parents; to express our feelings and opinions; to entertain oneself; to buy and sell something; to organize a group and so forth, people used the internet as a medium. The central elements of internet such as social media and social web communities are preferred platforms for all these activities (Auvinen, 2011). Social media takes on many different forms, including social networks (Facebook, Myspace, LinkedIn), community media (YouTube, slide share), blog services (World Press, Twitter, Blogger), link sharing services; virtual community, etc.

Therefore, in this section, I will uncover the politics of social media or how it mediates politics. To better understand the politics of social media, we must move from ideological claims to empirical evidence. Therefore, I will present some empirical evidences, including the politics of social media in Ethiopia.

5.2 Examples of the Role of Social Media in Politics

As stated above, social media played a special role in major political practice in the world. Amongst others, in this section I will discuss the role of social media and its significance in

Barack Hussein Obama's 2008 US presidential competition, in Arab spring and the role of social media in Ethiopian politics.

5.2.1 Obama's 2008 Campaign and the Social Media

As discussed above, social media as part of information and communication technologies, are becoming important agents to influence social and political life. The internet has created a new landscape of social and political change (Bargh and Mckenna, 2004). It creates new form of political sphere and foster political involvement. Internet facilitates an easy and fast way for both the public and the politician to communicate with each other. Political participation has therefore gone online to some degree. This has been seen notably in the 2008 US presidential race.

In America, internet technology plays a dominant role in the country's political sphere. It does not only increase the political awareness of the citizen, but it also enhances "engagement in the political process itself" (Baker, 2009: 72). The 2008 US presidential race exhibits the greater role of social media in the country. It is considered to be the first social media election. Writing about the 2008 campaign, Auvinen relates that:

> Barack Obama's 2008 US presidential campaign has often been described as the first electoral campaign in which the use of social media had a decisive impact. The core of the web-based campaign was a well-designed, versatile and dynamic website, "my.barackobama.com" (Auvinen, 2011: 4)

Social media platform such as Facebook, Myspace, YouTube and Twitter have played a decisive role during the election. In this regard, numerous reports demonstrated that it allows candidates to communicate faster and reach voters in a more targeted manner. It does not only allow the candidate to communicate with voters, however, it also helps the voters to take part in: facilitates

an access to communicate directly with the candidates and to gather a wide range of information about them and their positions on issues (Auvinen, 2011). In addition Megan Baker notes,

> Myspace founder Tom Anderson recognized the potential power of social Networking sites as he said, "Myspace has a method of reaching people who are historically not interested in voting. A Myspace profile could excite their interests in ways they are used to. In the same way they learn about their friends, they could learn about a candidate." (Baker, 2009: 73)

In fact, "most aspects of the 2008 American presidential campaign were familiar from earlier campaigns" (Schudson, 2009: 5). However, unlike previous presidential election, it exploits the role of social media (Schudson, 2009). It was the first in which social media used effectively to win the election.

5.2.2 The Arab Spring and the Social Media

Similar to that of US presidential campaign, the Internet and social media in particular played a central role in shaping and facilitating the Arab Spring revolution in early 2011. From the very beginning of the cause of the uprisings to its critical stage, the role of social media was indispensable. Self-immolation of Mohammed Bouazizi was the initial cause of the protest. As Tina Xu relates, "he ignited not only his flesh, but the spirit of a revolution that would transform the face of North Africa and the Middle East" (2012: 1). Moreover,

> Yet, after the young vegetable merchant stepped in front of a municipal building in Tunisia and set himself on fire in protest of the government on December 17, 2010, democratic fervor spread across North Africa and the Middle East. Governments in Tunisia and Egypt soon fell, civil war broke out in Libya, and protestors took to the streets in Algeria, Morocco, Syria, Yemen and elsewhere (Howard et.al 2012: 2).

So, how does social media contributed to the movement? The answer will be clear. People used social media platforms such as Facebook, YouTube and Twitter in order to organize (man protests) and spread the news about the event to every corner of the world. It was "one of several stories told and retold on Facebook, Twitter, and YouTube in ways that inspired dissidents to organize protests, criticize their government, and spread ideas about democracy" (Howard et.al 2012: 2). This indicates that social media were heavily used to conduct political practices. They used Facebook to schedule the protests, Twitter to coordinate, and YouTube to tell the world (Storck, 2011). Individual activists used social media platforms as tools for organizing and generating awareness of political mobilization. For instance, bloggers used social media to propagate revolutionary ideas. And, it was effective to stimulate the uprising. As Howard, P. N., Duffy, A., Freelon, D., Hussain, M. M., Mari, W., & Mazaid, M. notes,

> There were conversations about liberty, democracy, and revolution on blogs and on Twitter often immediately preceded mass protests. In Tunisia, for example, 20 percent of blogs were evaluating Ben Ali Vs leadership on the day he resigned from office (January 14), up from just 5 percent the month before. Subsequently, the primary topic for Tunisian blogs was "revolution" until a public rally of at least 100,000 people took place and eventually forced the old regime Vs remaining leaders to relinquish power (Howard et.al 2012: 3).

Ultimately, social media played a greater role for the success of political uprising across North Africa and the Middle East.

5.2.3 The Politics of Social Media in Ethiopia

Human Right Watch notes, access to the internet and social media has grown in Ethiopia with the development of telecommunications and ICT. Accordingly, the number of internet users gradually increasing than ever before. For instance, at the beginning of 2005 internet penetration

in Ethiopia was below 0.25%. However, in 2014, according to Internet World Stats, 1.9% (1,889,850 populations) of Ethiopians are connected to the internet. Among this segment of internet users, as the Human Right Watch report (2014), most of them are concentrated in the urban areas. Many of them access through mobile cell phone, government and private organization, work places, academic institutions, internet cafes, etc.

Even though the existing rate of internet users in the country is marginal and limited to a small number of individuals, many people have started to integrate internet and social media in particular in their daily life. Social media offer new and unique benefits. It provides a chance for users to produce and publish information. People used internet and social media not only to access or gather information but also to generate and publish their own knowledge and personal experience. These functions of social media encourage and facilitate direct participation in the political sphere. It provides for self-expression and promotes mutual understanding. It enables rapid formation of networks and demonstrates our common goal across other (gender, culture, race, etc.) differences. It connects people, their ideas and values, like never before. This participatory character of social media creates a wider opportunity to engage in the public discourse. It also enhances the ability to undertake collective action like political demonstrations and campaigns. In general, social media would effectively mediate political engagement and create alternative spaces of participation in the political sphere.

There is an assumption which bestows internet and social media with the power of emancipatory qualities. Baker argued that "as for the internet, it is not only the access to information that should be considered, but on computer networks and their potential for empowering citizen" (2000:72). As the name suggested, social network sites involve power which relies on a network or interaction among the participants. It is consists online communication, interaction and

organization. Interpersonal relationship is created and maintained through different social network sites. Interactive exchange of different political feeling and opinions, ideologies, news, agendas, and experiences would be conducted through the internet. Having this exchange may help to form and organize a political action. It also creates some sorts of communities called web communities.

Although social media has a great emancipator quality, the presence of social media in Ethiopia generates two different implications. On the one hand, it comes with emancipatory qualities. On the other hand, the presences of social media become a means of oppressing.

In the history of social media in Ethiopia, Ethiopians begun to engage in extensive discussion about politics and other issues in the early 1990s, when an Ethiopian email distribution network called EDDN was formed (Megenta, 2010). Later, in 1997, websites such as cyberethiopia.com and ethioline.com was established to networking Ethiopians (see also; Megenta, 2010). These websites inspired individuals to create more personal page. One of the most important political website was "Dagmawi". In recent years, a number of political websites are increasing. Along others, the political blogosphere, in particular, plays a significant role in writing about Ethiopian politics. To put more, individuals used social media platforms such as Facebook to form a political group (community) and campaign. Millions of voice for freedom; Ethiopian Youth National Movement; Solidarity Movement for a New Ethiopia; "let our voice be heard": Ethiopian Muslims' voice against government's interference in religious affairs; the "Beka" revolution on Facebook and Tweeter; and 'Because I am Oromo' are among the communities formed on social media and Facebook.

These facts indicate that Ethiopians also like other society in the world have strong links with social media as a political mediator. However, the relationship between politics and social media in Ethiopia has got different character.

In Ethiopia the public as well as the government employed social media as a mediator in order to engage actively in politics. One of the most important functions of social media is giving common people (those who have similar agendas) the means to express their dissent. Both the government and the public (to some extent) enjoy this opportunity. Social media served as a forum for political discourse and political action.

With the growing importance of social media in the political sphere, recently the government of Ethiopia began to participate in social media. Government officials' and Ministers exposure to the public through the social media has increased in the recent years. Some high-ranking government officials and ministers have also joined social media platforms. One of the most notable examples of government official who joined social media is Foreign Minister Dr. Tedros Adhanom. He has above five hundred thousands of followers on his Facebook page and more than nighty nine thousand followers on Twitter. Other officials have also Facebook and Twitter account. Ministry of Culture and Tourism; Ministry of Finance and Economic Development; Ethiopian Ministry of Justice; Ministry of Industry; Ministry of Federal Affairs; Ministry of Foreign Affairs; Ministry of Labour and Social Affairs; and Ministry of Transport and Ministry of Agriculture are among ministries that are active on Facebook. In addition, some governmental organizations are also present on Facebook.

The government uses social media for a number of purposes. The government uses it in order to push its political agendas including spreading information to its supporters; to communicate

directly with the public; and to enhance the culture of political participation. Similar to the government, opposition parties, bloggers with critical voices, and individual living abroad use social media for political purposes.

For example, the campaign against the Ethiopian singer Tewodros Kassahun (Teddy Afro) musical concert by the sponsorship of Bedele Brewery (a local subsidiary of the Dutch beer maker Heineken NV) was facilitated by social media platforms. According to Tigist Geme (2013), the backlash against Tewodros arose because of his glorification of Menelik who committed ethnic cleansing against southern nation of the country and due to his labeled of these Menelik's wars as 'a holy war' during he made an interview with one of local Amharic magazine, Enqu (Geme, 2013). The campaign was implemented with a hashtag "Boycott Bedele," asking beer drinkers to ditch Bedele and pressure to withdraw the sponsorship. The campaign was spread across the country through a social media platform (Facebook, Twitter), and gained more than forty thousand supporters on Facebook within a few weeks. This activity pressured Bedele to withdraw from the sponsorship. Finally, a yearlong national tour was cancelled.

Even though all social media users were not engaged in and happy with the campaign, it was amongst successful campaigns. It is considered to be as one of the most successful and emancipatory campaign among the participants.

As already discussed, few known politicians and individuals use social media platforms for political purposes. These indicated that the government and even the public are actively engaged in social networking websites considering as an emancipatory tool.

As previously noted, the introduction of internet and social media in particular enhance and facilitate the new direction of political participation. Both the public and the government used the internet and social media platforms for different relative purposes. The government recognizes the power of social media and attempts to use to spread its political agendas. Opposition parties are equipped with social media in order to challenge the government. Among others, the Unity for Democracy and Justice (Andinet), Semeyawi Party, Ginbot 7 Movement for Unity and Democracy, and Medrek parties are active on social media. And the public uses it to engage in politics in various ways.

With the development of political engagement equipped with social media platforms in Ethiopia, with the growing of online political expression and participation of the dissent, the government begun filtering and censoring the sites. Since 2006, especially post 2005 election, with the growing number of writing about the politics and the election in particular; when social media platforms employed to report major political incidence in the country and reflected dissidents' voices, the government began to monitor social media in the country. Basically, it starts "when it first blocked blogs and web publication run by its opponents and dissidents" (Megenta, 2010:27).

Today, the government of Ethiopia, by paying more attention to the role of social media and its importance for the opponents and dissidents, continued its efforts to filter and monitor the internet and social media. The government employs different mechanism to surveillance and to intimidate and deter using social media platforms for political activities. Among others, the government uses blocking, hacking and using monitoring techniques in order to meet its objective, namely to crackdown online political discourses and activities particularly those challenging the government (Davison, 2015).

The government is actively involved in filtering and monitoring the internet. The government blocks different websites in the country. The government has curtailed access to information by blocking websites that offer any critical analysis against government or about any political activities in the country. Websites of opposition groups, media sites (ethiomedia, abbay media, ecad forum, ethio freedom, Ethiopian review, satenaw, zehabesha, tenaadam, etc.) and blogs (assimba, ethiofitih, ethio reference, enset, ethiopiawinet). And also international websites which are dealing with human right such as, Human Right Watch, Committee to Protect Journalists, and Reporters without Border are inaccessible in the country.

In addition, the government used hackers and software which are able to sensor and shutter the websites. The Ethiopian government uses different surveillance software; technological products such as spyware in order to silence independent or dissenting voices. According to Human Right Watch (HRW) reports (2014), "*They Know Everything We Do": Telecom and Internet Surveillance in Ethiopia*, the government of Ethiopia has been working with several European firms to expand surveillance practices in the state. Earlier, in July 2015, after an Italian company called Hacking team, which supplies intrusion and surveillance tools, we witnessed that the government of Ethiopia used to buy spyware called Remote Control System (RCS) from this company. HRW report details the spyware would allow a government controlling the software access to activity on a computer or phone, and other devices.

The government of Ethiopia not only blocks websites and social media networks and keen on using spyware technologies to monitor and control social media but it also arrests those who publish information critical of the government (bloggers). For instance, in 2014, "Zone 9" blogging group were criminally charged under anti-terrorism laws (Davison, 2015).

These indicate that though the internet penetration in the country is very low, it attracts government attention very much, not only to use effectively online political engagement, but also to control and filter online political activities in the country and particularly to demolish the power of society and opposition movements equipped with social media. Being omnipresent of government surveillance in the country oppress citizen of the country. The government's surveillance practices cause considerable self-censorship. Individuals refrain from online political participation; forced to change their real identity such as changing their personal information like name, age, sex, address, etc. and using alleged information and anonymous name. Therefore, using social media in Ethiopia for political purpose due to the strong range of surveillance becomes a source of fear and oppression.

CONCLUSION

As we have seen throughout this thesis, several topics that examine the politics of technology or the nature of the relationship between society and technological artifacts has been explored. As pointed out very well, with the growing linkage between human beings and technological products, human beings always strive to produce new things in order to improve human conditions or to enhance the wellbeing of human nature. Our tendency is to just develop and create more products. We are unwilling to discuss technology. If we do, our discussion of technology most of the time is restricted to the benefit and the impact of technological products. We do not ask questions about the very nature of technology. That could be the case due to the tendency to consider technology is taken for granted as a mere instrument. However, with the advancement of technology, our thinking about it should be shaped in the light of the growing nature of technology.

It is very obvious that, today, technology is becoming part and parcel of human beings. Technology embodies human values: it shapes our culture and the environment, alter patterns of human activity, and influence and shape who we are and how we live. In general, technology creates the structures of sociopolitical life. Therefore, as Martin Heidegger (1977) posits, we shall be questioning technology in order to have free relationship to it. For instance, we can ask philosophical, moral, political, scholarly, and technical questions by raising issues such as what is technology? How should we act vis-à-vis technology? Our awareness about the nature or meaning of technology depends on answering these questions. Therefore, as a user of technological products, rather than blind adoption and using technological products, it is very essential to ask the what, why, how, where, when questions and so on (focuses on technology) to have suitable relationship with it.

Amongst other philosophical questions, the 'what' question is pivotal. What is technology? Do we know the very nature of technology? Let me leave these questions for all of us to consider, if not to answer them once and for all. As actants (to use Latour's term) individuals, organizations, and the state do have strong relations with technology. I argue that our relationship with technology is problematic due to lack of clear understanding of the proper nature of technology. The general uncritical stand we adopt when using technology appears to have exacerbated alienation of one form or another. The communal values that have made life meaningful for many of us have been attacked by the same technology we worship for making life simpler.

In the introductory part of this paper, I said that the primary purpose was to uncover the nature of technology. If we understand the meaning of technology and its hidden attributes, we can eliminate the impacts of technology and retaining our free relationship with technological system. However, the task of exposing the meaning of technology is not easy. Because, the significant attribute of technology is concealed. Andrew Feenberg (1991) called this feature of technological artifacts 'technical code'. He states:

> Technical codes include important aspects of the basic definition of many technical objects insofar as these too become universal culturally accepted features of daily life. The telephone, the automobile, the refrigerator and a hundred other everyday devices have clear and unambiguous definitions in the dominant culture: we know exactly what they are insofar as we are acculturated members of our society. Each new instance of these standard technologies must conform to its defining code to be recognizable and acceptable. But there is nothing obvious about this outcome from a historical point of view. Each of these objects was selected from a series of alternatives by a code reflecting specific social values. (p.88)

According to Feenberg, "Technical codes define the object in strictly technical terms in accordance with the social meaning it has acquired" (see p.88). The material function of a technological product tricks us. We conceive only the functional meaning of technology. But, there is a concealed intent in the designing of technological artifacts.

Many of us tend to stand on the surface, and hence unaware of the hidden attribute of technology. Our normal (the image that most of us accept of) understanding of the meaning of technology in human life is instrumental. However, this assumption is misleading; we have to go beyond this assumption and examine all the processes behind artifacts. We have to take off the blindfold of technology. Put simplistically, in order to have open and free relationship with artifacts we have to open 'the black box' or at least we have to understand this nature of technology. We should attempt to look what is inside.

However, still, we may well wonder about the possibility of examining universal convention. Reason: most of us consider technology as something to be sacred (unquestionable). Instead of thinking of technology and the problems which have been created by technology we want to critique ourselves. Of course, I do believe that technology is highly and deeply interwoven with humanity and it is even impossible to think humanity without technology. But, the most important question is whether the technology that we are following is rational? Our answer will be definitely either yes or no. If it is rational, our answer will be yes and then we are going to examine the rationality of technology. And if our answer will be no (i.e., following technology is necessary but not rational), our attempt will be to rationalize it. So, whatever the answer is, we are going to deal with the rationality of technology. The examination of technology is essential to understand the proper nature or meaning of technology and to have open relationship with technological products. Therefore, uncritical adoption of technology must be coming to an end. I

do not wish to deny for one moment the importance of technological products. However, technology is something to be encouraged with examination. We have to examine ourselves (our relationship with technological products). Let us fool ourselves no longer.

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