WHAT SORT OF ESSENCE HAS TECHNOLOGY?

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Abstract

The question concerning the essence of technology is still relevant in the philosophy of technology. In the contemporary debate, many constructivist philosophers and sociologists believe this concept is an illusion, an abstraction or an historical misunderstanding, arising from methodological inadequacy in technological studies. However, many essentialist philosophers argue that without its essence, we cannot properly understand an effect that technology has made upon human, society or environment. This paper is a philosophical investigation of this crucial issue. First of all, while essentialists provide contemporary concepts of essence which are helpful in understanding technological phenomena, they cannot deal with technological evaluation at a satisfactory level. On the other side, while constructivists provide strong arguments against an essence of technology and technological determinism, they cannot dismiss technological essence completely. I'll propose a new concept of essence that takes advantages from both sides: a relational concept of technological commitment, which in itself is indeterminism and also covers evaluation issues.

Introduction

Since the emergence of the philosophy of technology, the concept of its *essence* has played an important role. Technological essentialism, a position referring to philosophers who declare themselves against instrumentalism and value-free neutralism in the conceptual understanding of technological phenomena, has argued that technologies, involve not only merely instruments or tools but have substantially deeper essence.

Heidegger's concept of "enframing" (Heidegger 1977), as well as Ellul's "Technique", a technological order (Ellul 1964) are the very first examples of attempts to argue philosophically for an essence of technology. While it is undeniable that technology involves many aspects of modern life, we not only live with technology but also live *within* it. So essentialist philosophers believe, more or less,

that technology dominates our relation to each other and the world. Technology is no longer our means but is an end in itself. Technology becomes an underlying structure of the modern way of life and we are now living within this movement of technological progress.

While the concept of technological essence provokes us to pay more attention to our life in a technological society, it also creates controversial issues. To conceive a man-made thing as an autonomous entity that is a determining force or has a causal power of its own is not easy to swallow. In three decades, technological essentialism and its relational concept: technological determinism (which is often understood as expressing the same thing) has led to heated debates in history, philosophy and sociology concerning technological studies. (Heilbroner 1967, Pinch and Bijker 1987, Winner 1993, Bimber 1994, Brey 1997, Feenberg 2000, Thomson 2006) Our discussion in this paper focuses on the second and third area in the contemporary scene. It is good to start with new and recent attempts to defend an essentialist position.

Three Kinds of Technological Essentialism

In general, recent concepts of technological essence share some agreements.

1) Technology is autonomous.
2) It is possible to free ourselves from technological constraint.

The first is an autonomous thesis: a core assertion of essentialism that technology has a substance; it has a life-of-its-own which (a) dominates our way of life and (b) its development or growth is often beyond our control. In other words, technology is not merely a means but also an end in itself. This thesis, which arose from first generation of essentialists, gives us helpful insight concerning the "effect" that modern technologies have made upon modern society and how it has considerably changed our modern life from pre-modern times. However, in order to avoid determinism, essentialists have to impose a second controversial feature, a possibility of a "free relation" between man and technology. According to

degrees and justifications on these features, essentialism can be categorized into three kinds, ontology essentialism, paradigm essentialism and moderate essentialism.

Ontological essentialism, or Heideggerian essentialism, admits that the endangering of modern technology is not its consequential social and environmental problems, but a threat to our ontological "condition", the way we understand ourselves in relation to the world. Technology, in the thought of Martin Heidegger and his followers such as Herbert Dreyfus, is not merely an instrument, but can be conceived ontologically as a world disclosure, *things-we-use* to reflect our level of "understanding of being" (Heidegger 1977, Dreyfus 1995, Dreyfus and Spinosa 1997). An old Japanese clay cup used in tea ceremonies represents a meaning of life in traditional Japanese culture, while a foam cup in fast food culture reflects a life of aggressive individualism.

The Heideggerian concept of technological essence is "enframing", an order of things that exists for its own further ordering. Everything in modern society, the way of thinking included, is "standing reserve" or becoming a resource for technological ordering which shifts the ontological structure of the subject-object relation. An airplane can be conceived as "subject" of high efficiency transportation and passengers become only its "object", as cargo, to fill in. So, any relation to technological ordering are merely "pure relation" and we are now becoming "a part" of a system where nothing remains in human control except for growth for the sake of growth itself.

However, in order to defend their position against determinism and fatalism, ontological essentialists propose their indeterministic solutions in a more controversial way. They insist that technology is not our "fate". While we can expertly use technology without recognizing any ontological condition, we can also become aware of "a technological understanding of being." We can use our instruments while "remaining true to ourselves", and the danger of technology will become a saving power for us. With a transformation of our sense of reality, we can reorient our relation with technology and transcend a duality of technological pros-and-cons. Ontological essentialists call this a "free relation" with technology, being-with-technology without any constraints or attachments.

A second kind of essentialism is paradigm essentialism, as presented in the works of Langdon Winner and Albert Borgmann (Winner 1977, Borgmann 1984, Winner 1986). Modern technology, in

their view, has an impact on modern society, but not in a total and deterministic sense such as Ellul's concept of "Technique" or technological order. Technology is not "rule" or "law" of technological society, but is at best a "paradigm" or "way of life" of modern times.

Winner calls this "technological somnambulism": acceptation and acquainting of new technology that leads to transformation of our life activities. For Winner, "technology" can be understood as a "form of life", a concept he draws from Wittgenstein, which is represented in the language of our daily life activities. We often say for example "my mind is not *programmed* in that way" or we compare our mind with a computer without seeming odd. As cars, mobile phones, computers, etc, are very common things in our daily life, it follows that the innovation of technologies are not leading to alienation, as some futuristic novels (1984, The Brave New World) suggest. In order for new systems and inventions to function, human activities must be adapted to them. Thus, technology becomes our "second nature" and life without them cannot be imagined.

While we're all inescapably living a technological way of life, Winner suggests that we still have chances to persuade our free, creative, intelligent and self-governing acts. Green technology, participatory technology, or flexibility technology, to name a few, shall result from our "wise" choices according to those kinds of acts. But our problem is any knowledge we have now is not sufficient for us to disentangle ourselves from our "second nature" and create an alternative paradigm against technological somnambulism. For this reason, Winner purposes a "Luddism Epistemology: an experimental inquiry of life-unplugged that will provide us a new kind of information to reconstruct and reconnect ourselves with technology in new ways.

Borgmann agrees with Winner's concept of "technology as a form of life", which he calls "device paradigm". But Borgmann's primary concern is how modern technology relates to a good life. Modern instruments or tools, such as heaters, microwave ovens, are "useful" but not "good" things. They may simplify our tasks in some ways, but can also reduce us to mere consumers. Technology in device paradigm is essentially a fixed-function and context-separated commodity. Using microwave ovens in a modern kitchen, compared to hand-kitchen tools, is very fast and an easy way to "cook", but many activities and skills of food preparation are also diminished. These kinds of activities, such as "culture of

the table", for example, are believed to be "life-flourishing" and encourage a good life. In summary, good-life activities are excluded from the device paradigm.

Borgmann contrasts device paradigm with "focal things". A hearth, for example, is not just a device but the centre of a traditional house, a place where everyone in the house can experience life-activities together. Focal things cannot be separated from their world or context of use, others tools or natural environment, and also require some human skills. Even through a burdensome task, these kinds of skills are a practice of living. Gathering wood in the forest for the fire place in winter, preparing food by oneself, or running and walking in the morning are what Borgmann calls "focal practices", life-flourishing activities which brings meaningful living back within modern world.

In Borgmann's point of view (which is different from Winner's unknown future), to be "free" from the device paradigm is to live by re-engaging one's life with focal practices as much as possible. Taking balance of a device paradigm with practice of engagement, he believes, will "reform" our lifestyles, society or technological forms which shall support a better way of life.

A third and final kind of essentialism in our discussion is moderate essentialism, a theory which was developed by Don Ihde (Ihde 1990, 1993). Instead of perceiving artifacts as world-disclosure, as ontological essentialism, Ihde focuses his attention on how *modes* of world-disclosure are made possible by artifacts. Artifacts and tools are our perceptive mediation to the world by two types of relations. One, embodiment relation, a "micro perception" in which artifacts "enhance" our perceptive capacities of outside world. An example is a telescope which magnifies our vision and brings about images of the world (larger or smaller) which we've never seen before. The other one is hermeneutic relation, a "macro perception" in which one's perception is "perceived" in specific context. For lay people, data from a spectrometer is something scientific that is not easily understandable. However, for an astrophysicist, this data obviously shows components of a star in a distant galaxy. In order to be understandable, any physical perception must acquire its meaning in appropriate context. Idhe points out that two relations co-exists, interweave and cannot be separated from each other in our lifeworld.

Thus, in Ihde's theory of technological lifeworld, technology is not a separate entity from its users and the culture in which it is used. In this sense, technology is "technology-in-order-to" as well as

"technology-in-use". While the former represents a universal structure of technology, the later shows a diversity of its localization. Ihde calls this "multistability": a pattern that shows how a universal intended technological innovation can be "stabilized" in very different ways in different cultures. For Ihde, multistability is just like a gestalt switch, and by its incommensurable feature, we cannot tell which technology is more effective. More importantly, a different form of technology is equally successful according to its own "technological pairing", whether an ancient way of sailing or a Western one. However, to avoid falling into constructivism, Ihde believes that technology possesses an essential feature, namely "technological intentionality". As a mediation to the world, technology inevitably frames and supports a particular type of action. For example, writing a text by Word Processor makes us less careless about contents but much more concerned with sentence arrangement.

One of the critics of essentialism, especially ontological and paradigm essentialism is Andrew Feenberg (Feenberg 1999, 2000). Feenberg criticizes Heideggerian's concept of free relation as merely attitude changing. In other words, having free relation with technology is not committing us to alter technological forms which, for Feenberg, is not a solution for an "environmental concerning" generation. The ontological concept of technology in their account seems too much abstract, monological and ahistorical, compared to new concepts provided by constructivism. For this reason, even though ontological essentialism calls for a re-examination of our deep understanding between ourselves and the technological world, it remains too romantic and has no place for a should-be-technology for the future or even for the present.

For paradigm essentialism, that is more "social critique" than ontological one. Apart from an unclear and experimental analysis of Winner's solution, Feenberg argues that Borgmann's theory restricts itself due to the incompatibility between device paradigm and focal things. It is too early to say that we cannot find any "meaning" in some modern artifacts or turn away from technological society to find out an alternative way of life. Feenberg's empirical studies suggest that some types of internet use, for example, a use of internet chat, by Aids patients, to discuss their problems which could not be directly spoken to a doctor face to face, can be considered as focal things. Furthermore, their activities through cyber communications altered the way they should be treated and cured. Feenberg points out that in

Borgmann's model, we not only face an impossibility of hermeneutic transformation in device paradigm on one hand, but also an ambiguity of alternative reformation of technologies in another.

While Feenberg seems to show his empathy to Idhe's theory (Feenberg 2003), Idhe acknowledges our world is *englobed* by modern technology, especially image technology (Ihde 1993). Comparing to multi-screens television in news station, while image technology enhances our "plural vision", we are unavoidably facing cultural diversity and conflicts with "the others". Our lifeworld appears to lose its "core" values and seems to have no universally standard norm. We are forced to choose or create one harmonizing identity for ourselves out of this pluralism.

In this perplexing situation, for Ihde, our critical issues should not be considered merely locally, but globally. From this point, his concerns unfortunately shifts to environmental crisis or social crisis to find a way to establish post-enlightenment means to maintain tolerance with each other and the world, instead of searching for alternative attitudes and paradigms, either ontologically or culturally. So, as is the case with other kinds of technological essentialism, moderate essentialism seems to be silent on an important question about technology: how can we, as users, evaluate technological forms and create a should-be-technology?

An Essence of Technology: Constructivist's Rejections

Constructivism agrees with essentialism that technology is non-neutral and value-laden, but their point of divergence is their rejection of the essence of technology. The constructivist's attempt to reject technological determinism is a rejection of technological essence altogether.

At first, the constructivists present an indeterministic understanding of technology in order to undermine the autonomous thesis that was widely accepted in philosophical discussions on technology. They propose democratizing technologies and giving it a normative relevance.

There are two types of constructivism: a strong constructivism and a weak one. A strong constructivism is "social construction of technology" (SCOT) (Bijker, Hughes and Pinch 1987), while a weak constructivism can be considered as "social shaping" (MacKenzie and Wajeman 1999) and "actors-network-theory" (ANT) (Latour 1992).

Considering first the strong position which now has a major impact on technology studies, SCOT can be seen as an extension of sociology of science to technology studies. With proper methodology intended to demystify "black box" of technological progress, Bijker and his colleagues (Pinch and Bijker 1987, Bijker 1993) insist that we can see development of technologies as a non-linear progress with multiple possibilities of outcomes. Technologies, rather than being a force leading to social change, are merely a products or results of agreement among social groups who are involved in technological controversies. In other words, technologies are not determinations of society, but it is social progress that determines technological change. A central element of SCOT is *interpretative flexibility*: an ability of relevant social groups to give their own meaning to artifacts or technologies in discussion. In this sense, not only do technologies lack any causal force, but they also lack any essence in themselves.

If Bijker is right, how can we explain the obvious "effect" of technologies? In their view, SCOT states that any effect in question can be understood within a technological frame, a paradigm-like conception, which arises after social controversy, is dissolved. At first, relevant social groups entered a technological controversy or conflict with their different interpretations upon one or another forms of artifacts. Sooner or later, SCOT persists, a conflict must be dissolved somehow and an artifact becomes stabilized in form and design. With a higher degree of stabilization, there is a higher degree of closure, the the less it is interpreted. In this way a technology becomes a "black box" and a determining paradigm of society.

A concept of technological frame is different from essentialist's notion of technological paradigm in two crucial points. First, it is not a fixed entity, as an essence of technology, but a dynamic and interactive one that possibly opens to any change in the future. Second, technological frame implies inseparability between technology and society. In the process of the social construction of artifacts, technology and society can be considered as "sociotechnical ensembles", or two sides of the same coin. For if there is no separate entity such as technology, how can it cause any effect upon another entity? Thus the efficacy of technology does not arise from any causal force within technology itself – an essence of technology – but is a phenomenon explainable only within a technological frame constructed by society.

Interpretive flexibility, technological frames and sociotechnical ensembles are not only conceptual refutations to essentialism, but also support SCOT to pursue more normative evaluations, and consider the democratic participation in technological choices (Bijker 1996). The social construction of technology involves choice interests or value judgments which are political matters. With this process, we can, in principle, make interventions to stabilize artifacts. But at the same time, SCOT reminds us, that intervention may not be so easy. Bijker speaks of two kinds of power which exists within sociotechnical closure: micropolitics of power and semiotic power structure. On a sub-network scale, micropolitics represents our ability to alter already-existing patterns of technology in our own ways, but the fixity of its structural meaning prevents us from doing that. As a car owner, rush hour or oil prices uncertainty is unavoidable, but we are still free to choose a proper time, occasionally, to avoid traffic jams. Under this condition Bijker suggests that SCOT shall pay attention to empirical studies of social conflict on public facilities projects; how groups involve in such conflict reach their agreement and reconsider themselves according to their negotiation. From his studies, Bijker insists that dynamic mechanism of SCOT is conceptually compatible with "strong democracy" (Barber 1984) in at least three senses. First, there are no prior assumptions (ideals of democracy or essence of technology). Second, two views agree that ends are archived by social interaction. And finally, relevant social groups' involvement has priority over elites such as politicians or technical experts.

Bijker has already showed *how* SCOT is compatible with strong participatory democratic means but he has not answered *why* it has to be democratic. In his analysis, Bijker sometimes speaks about this compatibility just like an "analogy" between each one, something that is not clearly committed that they are one and the same entity with two different features. But if we consider social and technical spheres as two sides of the same coin, we would assume democratic value to be an "intrinsic value" within an ensemble. If this is right, it also leads to the following problems. First, as we know, not all societies have democratic values, let alone possessing them intrinsically. Second, if interactions in the technical sphere inescapably lead to democratic values normatively, does this not suggest that democracy is an "essence" of a socio-technical ensemble? Does SCOT's attempt to refute technological essence implicitly endorse

some pre-existing ideology, such as democracy, to be itself an essence. This shifting of essence suggests that it fails to convincingly reject technological essence?

Actor network theory (ANT) is weak constructivism because it allows non-human entity, such as technology, to take part in seamless web of socio-technical changes (Latour 1992, 1995). As an actor (or "actant" in ANT own term), Bruno Latour points out that technology is non-human delegation: something to replace our labor and "reversed of forces". Electronic door closers, for example, establish a human and non-human association. While this technology is more efficient than a human doorman, we have to trade-off some habits or behaviors by hurrying up to pass the door before it returns to hit our face. A door closer is "programmed" or "pre-scripted" in someway by its designer, but when it interacts with human users, some difficulties occur. In response to an "antiprogramme", designers have to "re-script" the order to make an artifact work conveniently again. A pre-scripted and re-scripted relation happened along the way when inventions and society co-evolve. When one programme takes control over most areas of antiprogramme, we can eventually say that an association gets stabilized, even if some minor resistance still remains. For ANT, their preference is a mechanism of adjustment rather than reducing some essential features into either a technical or social sphere.

ANT defenders find normative evaluation of their theory in User-Centre-Design, a new research framework which relates closely to democratizing technology (Garrety and Badham 2004). However, ANT still faces some difficulties. In their framework we can clearly see that ANT pays more attention to pre-existing social structures than SCOT. According to their adjustment mechanism, the ANT model can approach greater variety of social structures than SCOT which is implicitly oriented to Western society. Studies of Latour and Akrich (Latour and Akrich 1992, Akrich 1992) show that in area of technological transfer, there could be user's "de-scription" of inventions in stead of designer's re-description. Just as readers "read" same text differently, users can adjust their use of instruments in their own way. Whether these adjustments are successful or not, it is not something intended by the designer. Our interest is that a de-scription-in-process does not exclude any possibility of owner-designer-politician involvement. In other words, they can also re-script for advantages for their side, and there is also the possibility that some might use democratic means to achieve their goal (such as a case of electricity in the Ivory Coast.), while

some other successful de-scription case might not necessarily involve democratizing process at all. In summary, even though ANT framework is compatible with a democratic ideal, but within their association-in-action, it does not guarantee that these normative values arise out of and orient socio-technical evolution in the way it should be. Again, we can't clearly see how these could happen without some democratic values which were "pre-existing values" (as in a case of SCOT) or "extrinsic values" as an end beyond a sphere of interactions.

Feenberg's Theory of Instrumentalization

As we have already discussed, one problem with the argument of constructivism is that it cannot completely dismiss some form of essence from their theory, and one problem with essentialism is that its concept of technological essence does not commit us to practical technological evaluation. While both sides have weak points on their positions, a question that may arise is how do we find another concept of essence that takes advantages from these two standpoints? Andrew Feenberg (Feenberg 1995, 1999, 2000, 2003a) proposes an answer with his own concept of essence: *an instrumentalization theory*. Based on Marcuse's critical theory, Feenberg says that while Marcuse, his mentor, admitted some technological restrictions upon modern society (which is called "One Dimension Society") (Marcuse 1968), he also acknowledged that these restrictions occurred in Western society at a particular time. This is important because it suggests an alternative way to respond to technology for those in other societies or other periods of time. Beginning with where Marcuse left off, Feenberg develops his own critical theory of technology with help from constructivists' insights.

Feenberg doesn't deny that there could be "romantic" solutions as essentialists proposed. But these solutions do not entail any changes in technological forms and they are all undemocratic in nature. Instead of a nostalgic return "back to nature", Feenberg's major concern is not only an alteration in artifacts but also a democratic means to do so. Here is where insights of constructivists enter, lay people and sub-groups who were previously marginalized by earlier socio-technical closures are empowered, in principle, to participate and intervene in a process of technological change. Let us consider the struggle of the handicapped for changes in street and pedestrian design. Perhaps no designers or architects have

previously thought that their works excluded the handicapped, but they had their consciousness changed as a result of this struggle for handicapped rights, which led to political change, and to a new socio-technical closure. In this sense, a technological change-in-progress is not merely *compatible* with democratic means, as some constructivists thought, but it is democratizing-in-itself. As opposed to the process of technocratic rationalization, Feenberg calls this democratic or subversive rationalization.

Feenberg's democratic rationalization involves instrumentalization at two levels (Feenberg 1999). In order to become instruments, at primary level, things must be instrumentalized in four common aspects. *Decontextualization*: To become technical objects, natural objects must be de-worlded from its original context. (A tree must become wood.) *Reduction*: Quality of technical objects is reduced to its primary aspects. (Wheels had only quality of wood: roundness.) *Automation*: Action of technical objects shall be considered separately from its reaction. (The impact of gun on a hunter's shoulder is not equal to an impact upon the world: killing animals.) *Positioning*: Users can position himself in order to gain more advantage from technology.

But primary instrumentalization, which is a universal and non-local feature of technology, as essentialists' technological essence, cannot function in its own right. It needs contextual and cultural installment, a secondary instrumentalization, which has another four aspects. *Systematization*: the technical object must be designed to co-operate with other technical objects and re-contextualize with the natural environment. *Mediation*: before they are used, technical objects must be mediated via social negotiations, ethics or aesthetics. *Vocation*: a hunter is not merely a gun-user but requires some specific skills, specific thoughts or attitudes that make him act professionally. These attitudes are defined collectively by the community which shares the same practices and commitments. *Initiation*: lay users who have a lower position in technical hierarchy can potentially initiate a new technological culture or at best a new technological transformation.

Is Feenberg's instrumentalization theory sufficient in its own? In the first place, Feenberg does not completely deny an essential and universal feature within technology, in the essentialists' sense, but he implies it: a primary instrumentalization is conceptually abstracted or constructed from a concrete secondary instrumentalization. So, in his theory, this kind of essence does not play an important part in

socio-technological change at all. Feenberg's examples of Teletel or Aids patients' case seem to suggest that. Along with his criticism of his essentialist counterparts, changing one's attitude or turning to alternative ways of life seems to play no significant part in subversive transformation. However, we should not ignore a simple lesson from ANT case studies, that secondary instrumentalization does not necessarily exclude an elite or power dominant groups from re-positioning themselves against subversive and democratic transformation that Feenberg suggests. Many studies also point out that computers and the internet do not always support democratic ideals as we think they can. We thus find a gap in Feenberg's theory that democratizing technology is not necessarily one and the same as democratizing society. Some technological transformations do correspond with democratic movements, as Feenberg suggests, while others are not. Now an important question arises: what do we really want, a should-be-artifacts or should-be society or culture? If our answer is the former, we can doubt Feenberg's anti-essentialist position because it obviously implies democratic values as a core of a should-be-artifact. But if the answer is latter, we can ask why Feenberg's subversive rationalization does not re-enforce or re-integrate with the ontological transcendental attitude or an alternative way of life. Our question remains as how?

Technological Commitment

Now, I'll present the conceptual reconciliation between constructivism and essentialism which is against Feenberg's subversive rationalization, I'll call it "subversive reformation" and its possibility relies on a new concept of technological essence. On the Essentialists side, we have a substantive and non-relational concept, something which is technologically a priori, and which lies beyond any cultural complexity. While on the other side, constructivists speak about a constructed and relational concept of essence, a conceptual generalization of actual technological practice and progress, something which is embedded in the complexity of culture and open to change. My own proposal is a possibility of an essence of technology, one that is substantive but also relational in nature. Taking inspiration from Martha Nussbaum's concept of "human capabilities" (Nussbaum 1992), for instance, the human "skill" to invent and use instruments is found universally; nevertheless it is rooted in a certain context. In every culture, people invent and use some tools, simple or complex, in their own way. These various

capabilities as tool-inventors or tool-users are undeniable common features of human ability. Let us examine a few.

(a) We can not dismiss using technology: Considering the fact that technology is fallible, we can change from one type of technology to another, but to avoid using any tools or technologies at all seems impossible for us.

(b) We cannot use technology privately: We can own device or instruments individually but can not use them privately (while nothing prevents us to do that, such as using a car as plant-base, but that does not count as car-using and that thing is not called "car" any more.) Definition of tools or devices (car, mobile phone, television, etc) are not separate from how they were used, and are collectively set up within the boundary of interactive and interpretation of one group or society.

As a tool inventor/user, we are committed to the common features mentioned above, which open the possibility of a new substantive and relational concept of essence, an essence that is not of "things", as the essentialists suggest, but of something we commit together interactively when we use one thing or another. This is not an "agent of change" type of essence, nor an abstracted generalization type, as the constructivists suggest. I call this kind of essence "technological commitment": a condition which inevitably draws us, as tool-users, to participate in the process of technological change.

Conclusion

A new kind of essence, technological commitment, agrees with essentialism that technology has a "force of orientation" or "intention" in itself. But, as constructivism points out, it is not a determining factor and will vary according to complexity and constraints in each society or cultural context. Introducing and accepting one technological form in one's own community, one is forced, consciously or not, to adapt oneself to new habits or patterns of living. But the fact remains that technology is a fallible thing. Whatever technological domination takes place, it will lose its force if that technology malfunctions or breaks down. However, our commitment to technology as a tool-user won't let our life go on without one or another kind of technology. So if "old" technological forms decline, other "new" ones must arise in the form of technological choices. Owing to the fact that technology is also a social thing, in

one society there must be a dominant, widely accepted and centered technology, as well as alternative, communally accepted and marginal technologies. In ordinary circumstances, when a dominant form works well, there are clear boundaries between different forms of technologies. However, in "decline" situations, these boundaries seems to disappear; and alternative technologies come to the forefront, accordingly alternative ways of life as presented by essentialists can enter and present themselves as new technological choices. I would like to call this: subversive reformation.

Finally, some may object that "decline" situations are a rare occurrence, and hence technological commitment is not a concept necessarily worth considering. I do not deny that "decline" situations rarely occur, but in our "normal" situations, for example, in the case of our environmental or energy crisis, I think we do not have to wait for the decline situation in order to begin our search for new technological forms. This cannot happen without some consciousness of technological commitment as I mentioned earlier. It is right to say that our acquaintance with technology may overwhelm our technological commitment, but it is our deep commitment with technology, a relational concept of technological essence, that gradually calls for "awareness" rising and beginning a search, globally or locally, now. So, our issue is how we can create a "shared space" of technological choices where we can extend, as far as possible, the boundary of centered technologies to include the marginal ones. Conceptually, this "shared space" is not only open for experimental, alternative technologies to compete with the mainstream, but also brings them into the evaluation stage on a wider context, where its outcome remains varied based upon what is considered as "good things" for each society. However, we must take note that this process of evaluation must be cautious about social determinism (the belief that only democracy is right) or alternative determinism (the belief that only alternative technologies are right), if we are to guard against constructivism or essentialism falling into another kind of determinism again.

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