MORAL CODE: THE DESIGN AND SOCIAL VALUES OF THE INTERNET

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Robert R. Gertz
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Examining Committee Members:
Carol C. Gould, Advisory Chair, Department of Philosophy
Paul Taylor, Department of Philosophy
Joseph Margolis, Department of Philosophy
Joseph Schwartz, Department of Political Science
Jane Gordon, External Member, Department of Political Science

ABSTRACT

In the field of philosophy, the study of the Internet has mainly focused on the social responses to the technology or offered contending visions of the future forms of the Internet with little or no regard for the import of the technical features that contribute to these possibilities. Philosophy lacks a sustained investigation of the implications of the basic design of the Internet technology.

This dissertation lays out a philosophical framework for investigating the social and historical relations that result in the embodiment of specific interests in the technology of the Internet. Its philosophical basis, influenced by the thought of Karl Marx, Herbert Marcuse, and Andrew Feenberg, supports a social constructivist approach that includes theorization of the oppressive embodiment of hegemonic and exclusive interests in technology while rejecting the technological determinisms influenced by Martin Heidegger's philosophy of technology. After establishing that three pervasive social-political interests – accessibility, openness, and decentralization – directed the design choices that produced the fundamental structure of the Internet, I consider how these embodied interests have interacted with interests arising through the commercial commodification and the globalization of the Internet since the 1990s. Critically evaluating and expanding upon theoretical work in philosophy and other disciplines, I argue that the interests of accessibility, openness, and decentralization, while potentially oppressive when appropriated to satisfy the needs of commercial advertising and dominant social relations, avert the technological hegemony and exclusivity that has concerned philosophers. The result of these embodied interests is an

emancipatory ability to incorporate alternative interests and uses through dispersed collaboration and participation, which enables Internet technology to remain minimally coercive.

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INTRODUCTION

As a field of study, philosophy has not focused concerted attention on the technology of the Internet, as evidenced, for example, by the absence of an association or journal devoted to the subject.[1] Academic study of the Internet remains largely interdisciplinary. Scholars in a variety of fields have studied the basic design and social impact of the Internet. Historical accounts have concentrated on the embodiment of survivability, flexibility, and high performance in the design of the Internet, with much emphasis on the influence of the military and other early users on the technology. Computer scientists have written primarily on concerns with technological developments of the Internet and its implications. Within the field of law, issues of Internet regulation and governance have received the most attention, in particular by Lawrence Lessig.[2] And sociology offers interesting empirical studies about the flexibility of online identity; the work of Sherry Turkle is especially relevant.[3] There have also been some notable books with a strong bent toward philosophy, including Carol Gould's edited collection *The Information Web: Ethical and Social Implication of*

1. While there are no associations or journals uniquely orientated to the philosophical study of the Internet, there are societies and journals that have themes that relate to the study. For example, the Society for the Philosophy of Technology concentrates on philosophical and other disciplinary approaches to technology. Also, the Journal of Information Ethics deals with ethical issues in the information sciences, including studies of the Internet and other technology.

2. See Lawrence Lessig, *Code and Other Laws of Cyberspace* (New York: Basic Books, 1999). In this book, Lessig wrote about how the Internet can be used as an instrument of social control. This book was later updated and published as *Code: Version 2.0* (New York: Basic Books, 2006).

3. See Sherry Turkle, *Life on the Screen: Identity in the Age of the Internet* (New York: Simon and Schuster, 1995); Sherry Turkle, *The Second Self: Computers and the Human Spirit* (New York: Simon and Schuster, 1984).

Computer Networking, Hubert Dreyfus' *On the Internet,* and Andrew Feenberg and Darin Barney's edited book *Community in the Digital Age*.[4] While these books display a variety of theoretical approaches to the Internet in philosophy, they also show that philosophical investigation has mainly focused on social responses to the Internet and on envisioning future forms of social life without significant attention as to how the technical aspects of the Internet limit or expand these possibilities.[5] In other words, the field of philosophy lacks a sustained investigation of the implications of the basic design of the Internet. Furthermore, analysis of pertinent forms of technological oppression involving the Internet, such as the potential for the fetishism originally theorized by Karl Marx, has not been pursued by philosophers of the Internet.

In attempting to fill this theoretical gap, this dissertation draws upon discourse within a subfield of philosophy, the Philosophy of Technology, which emerged in the mid-1970s with the formation of the Society for Philosophy and Technology.[6] This subfield offers promising work on both the social and technical elements involved in the development of technologies. Building from conceptual approaches established in the subfield, this dissertation lays out a philosophical framework for investigating the social and historical relations that have resulted in the embodiment of specific interests in the technology of the Internet, and for considering how these interests operate in a

4. *The Information Web: Ethical and Social Implications of Computer Networking*, ed. Carol C. Gould (Boulder: Westview Press, 1989); Hubert Dreyfus, *On the Internet* (New York: Routledge, 2001); *Community in the Digital Age: Philosophy and Practice*, ed. Andrew Feenberg and Darin Barney (Lanham, MD: Rowman and Littlefield, 2004).

5. Sociology and computer science have taken the lead in theoretical work on the design of the Internet.

6. *Technology and the Good Life?*, ed. Eric Higgs, Andrew Light, and David Strong (Chicago: University of Chicago Press, 2000), 2.

commercialized and globalized setting. The philosophical basis of my study, indebted to the work of Karl Marx, Herbert Marcuse, and Andrew Feenberg, is a social constructivist approach that includes theorizing the oppressive embodiment of hegemonic and exclusive interests in the Internet. In particular, the work of Andrew Feenberg is tremendously helpful in explaining the ongoing process through which technology comes to embody and legitimize certain social values. My project elaborates on his work but also extends it into an area that Feenberg has neglected to develop—relations to technology based on the embodiment of egalitarian interests rather than oppressive and dominating interests that need to be confronted. In addition, Feenberg's work on the Internet has been limited insofar as he focuses primarily on the potential of the Internet for the development of community and democracy without significant attention to the ways in which the technology itself may be appropriated for or against these ends.

This study, after establishing that three pervasive social-political interests—accessibility, openness, and decentralization—directed the design choices that produced the fundamental structure of the Internet, proposes that these embodied interests, while potentially oppressive when they are appropriated to satisfy the needs of targeted commercial advertising and dominant social relations, avert the hegemony and exclusivity that concerned Marx, Marcuse, and Feenberg. The Internet is still a relatively new technology, so the study of the interests incorporated into the structure of its technology holds unique value because its development can still be shaped by the way its architecture is elaborated and how people integrate the Internet into their lives.

Chapter One introduces the philosophical underpinnings of my argument: that a technology such as the Internet is shaped by the social and historical relations within which it is created, and embodies those relations. I study Marx and his conceptions of objectification—the material embodiment of human interests, needs, and relations in made objects—and alienation, whereby the products of human labor are misconceived as things independent of the social relations involved in their production. The historical creation of the Internet exemplifies the process of objectification by engaging the interests of both its creators and its users in its development, emerging from and producing social relations. A Marxian position holds open the possibility of recognizing ourselves and other people in technology, and thus perceives the possibility of alternative technologies through less alienated forms of technological production and adoption. Marcuse built upon these ideas, developing a view of the politicization of technology and of the hegemony that subverts the realization of social participation in technology. Encompassing the theoretical work of these philosophers, while rejecting the technological determinisms influenced by Martin Heidegger's philosophy of technology, Feenberg affirms that technology is neither separate from nor indifferent to people or interests, including our social and political struggles; we can understand technology as incorporating a set of interactions with people and the world. Forms of control and oppression can be facilitated through a technology when the interests and values embodied in it are hegemonic or dominating. Current social and political discussions of the Internet need to consider these potential forms of technological oppression.

In Chapter Two, I demonstrate that technological advances alone do not explain how or why the Internet came to have its particular design. Alternative technological choices could have been made in the development of the Internet. During the design process, specific social relations directed major design choices that became fundamental to the structure of the Internet. I establish how these design choices incorporated the values of people in the scientific communities involved in the creation of the Internet, and reflected their particular social and political milieu. Specifically, the technology was designed to allow its early users to contribute to the Internet, to participate and interact in and on the system in a variety of ways, thus to become creators as much as users.

As my social constructivist framework proposes, the outcome of a technological design is not permanent, since debates and conflicts can arise as the technology is integrated into new social and historical contexts, potentially leading to the embodiment of new interests and values as well as various opportunities for technological oppression. Thus, Chapters Three and Four focus on the Internet since the early 1990s, specifically the continuing expansion of commercial interests on the Internet and the development of its global infrastructure. In these chapters, I continue to develop my philosophical framework by identifying and critically evaluating theoretical work in philosophy and other disciplines on the commercialization and the globalization of the Internet as they relate to forms of technological oppression.

Chapter Three concentrates on the commercialization of the Internet in relation to its potential control of interests. Examining the commodification of information and communication on the Internet leads to the conclusion that market values have the

potential to obscure other social relations involved in the technology. Such commodification exploits the interest of openness embodied in the basic design of the Internet and transforms it. This process introduces coercive possibilities to the Internet and the potential deformations of a predominance of exchange-value over use-value. I argue, however, that the incorporation of these interests, which certainly have hegemonic potential, does not lead to the eradication of the interests of openness, accessibility, and decentralization that allow for the incorporation of a variety of interests, including the continuation of noncommercial uses.

The fourth chapter opens up the question of how the embodied interests of accessibility, openness, and decentralization have fared during the globalization of the Internet. There is no necessary permanence to the social relations embodied in the Internet. As social constructivism illustrates, the introduction of technology to new social groups instigates a process of interpretative flexibility, whereby the meanings of a technology can be freshly constructed and the interests embodied in the technology can be altered. Given my philosophical framework, an investigation of the theoretical treatment of the globalization of the Internet should recognize socially contingent appropriations of the Internet involving local interpretations and uses of the technology, including the effects of political and power relations on these processes. Utilizing select examples of new social groups struggling to appropriate the Internet to their needs and interests, I argue against theories that claim the Internet is wholly determined by the primacy of particular interests, such as the assertion that globalization produces a homogenization of Western cultures around the world. Critiquing the use of the technology in a number of societies, particularly political appropriations of the Internet

for both oppressive and emancipatory purposes, I argue that the continuing incorporation of new interests in the Internet has not eradicated the fundamental interests of openness, accessibility, and decentralization initially embodied in its design, just as those fundamental interests have not excluded newer interests arising during globalization.

Finally, this dissertation demonstrates the value of theoretical work on the technology of the Internet that avoids the bifurcation of the technical and social aspects, particularly by considering the role of human agency; that is, utilizing the emancipatory potential built into the technical code of the Internet can diminish the oppressive subversions of the technology. These issues, along with some additional topics for philosophical reflection, are considered in the concluding chapter of the dissertation.

While the Internet is potentially oppressive when its embodied interests are appropriated to satisfy the needs of targeted commercial advertising and dominant social relations around the globe, there are limits to power and control over the technology. The fundamental power of openness—to connect, collaborate, and freely communicate—threatens oppressive regimes and corporate domination. The result of these fundamental interests embodied in the Internet is an emancipatory ability to incorporate alternative interests and uses through dispersed collaboration and participation, which enables the technology of the Internet to remain minimally coercive.

CHAPTER ONE

INTERESTS IN TECHNOLOGY:

A FRAMEWORK FOR UNDERSTANDING THE INTERNET

What theoretical framework can clarify and enable us to analyze the social dimensions of technologies? Theories within the Philosophy of Technology offer promising work on the social and technical elements involved in the development of technology. In particular, the work of Andrew Feenberg is exceedingly helpful in explaining the ongoing process through which technology comes to embody and legitimize certain social values. Feenberg also suggests that the study of technology should be concerned with the ability or inability of users to choose how to interact with technology and how to pursue their own interests freely. He tends, however, to deal with technology almost exclusively as an oppressive force to be challenged, which prompts minimal consideration of the socially valuable interests incorporated in technology. This dissertation will conceptualize the emancipatory potential of the Internet alongside the oppressive effects of the dominating interests and institutional control that have been developing due to Internet commercialization and globalization. Along with criticizing the technological oppression of the Internet, I argue that concern must also be placed on protecting the emancipatory values of the Internet.

This chapter traces two philosophical lineages that influence Feenberg's theory, one lineage that is consistent with his theory and one that is not. Feenberg's ideas are rooted in a concept of technological embodiment based on Karl Marx's theories of

objectification and alienation, and are extended by Herbert Marcuse's reflections on the political dimensions of technology, especially his consideration of the prevailing technological rationality. Feenberg, however, further develops Marcuse's ideas through a critique of theories of technology influenced by Martin Heidegger, especially those that draw from Heidegger's essay, "The Question Concerning Technology." While Feenberg agrees with the Heideggerian notion that technology is not socially neutral, he argues against the Heideggerian idea of the relative autonomy of technological values. In doing so, as I will argue, he offers an alternative model of the relation between society and technology, explores social construction, and envisions a different path for technological change.

These theories of Marx, Marcuse, and Feenberg constitute the philosophical underpinnings of my argument that a technology such as the Internet is shaped by the social and historical relations within which it is created and, in fact, can be said to embody those relations. While technology itself may not be determinative of social and political relations, any given technology instantiates specific social practices. The philosophical position explicated in this chapter provides the framework for my examination of the social dimensions of the Internet in the chapters that follow.

Technology and Oppression: From Marx to Feenberg

Are paintings constitutive of the painter, that is, are paintings formative of her identity? If the painter were to describe herself to someone else, she might show her paintings as part of this self-description. The identification of the artist with her

paintings, both by her and other people, supports the idea that artistic creation has something to do with self-realization. Karl Marx developed a theory that self-realization is possible through material production, asserting that people express themselves in the products of their work, which display aspects of the people who make them.[1] From this we can surmise that identity is partly constituted by what we produce; the term he gave to this material manifestation of human identity is *objectification*. For Marx, the ability to objectify oneself through productive activity reinforces the worker's subjective character**.** We give our interests and values objective embodiment in products, some of which may be technologies. Thus, the objects we create enable us not only to create ourselves, but also to see ourselves, to know our interests and our values. Marx thinks that objectification is a process that should be supported and advanced in any social, political, or material system, allowing for an interrelation between the interests of people and the objects that they make and use.

Carol Gould writes, "For Marx, labor is an activity of self-creation, that is, an activity in which individuals create themselves or come to be what they are."[2] However, as she points out, this self-creation does not happen immediately or in isolation; instead, it occurs through interactions with other individuals. A woodworker can make a table to allow a small group of people to dine comfortably, and the table's shape, height, sturdiness, and material composition all contribute to this function. The

1. Karl Marx, "Estranged Labor," in *Economic and Philosophic Manuscripts of 1844*, ed. Dirk Struik, trans. Martin Milligan (New York: International Publishers, 1964), 106-119. Also, Karl Marx, *Capital*, vol.1, trans. B. Fowkes (New York: Penguin, 1976), 125-177.

2. Carol C. Gould, *Marx's Social Ontology: Individuality and Community in Marx's Theory of Social Reality* (Cambridge, MA: MIT Press, 1978), 41.

use of such a table indicates that the interests and needs addressed by the product are shared by many people. Thus, work does not simply produce isolated products; it both depends on and enables social relations. Products embody the social interests, needs, and relations of both their creators *and* users. Social structures are formed, reproduced, or transformed through the production and use of objects. People's products embody who they are, what they are doing, how others may align themselves with the activity of using their products, and how their work is itself partly shaped by the social relations in which they are embedded (and help to constitute). Since the work of objectification is also done with others, objectification is not only a relationship between subject and object but also between subjects.

Of course, self-realization as a form of social being is not the only result of labor. The product of work attempts to fulfill some need as well. While woodworking involves both self-realization and social realization, this craft also aims to produce something useful—a table at which to sit. Marx employs the term *use-value* to express the practical aspect of work-products, their value in meeting human needs. If a product is enjoyed by other people and their needs are thereby satisfied, the product has use-value. However, a product still embodies a laborer's unique way of satisfying needs: a table can always be built in different ways. A product that fulfills a need also objectifies the interests and solutions of those who make the product. A given product's design is therefore one particular way of identifying and satisfying human needs.

As Marx explains, in capitalist societies, people find material life organized through commodities, which are products of labor that have use-value and are

exchanged for other products or money (i.e., they have exchange value).[3] People generally exchange their labor for a special commodity, money, and then use that commodity to obtain other commodities produced by other people. With these exchanges involving money, the use-value of products of labor—the usefulness of an object or action—is separated from the exchange-value—the marketplace value of an object or action. When the relations expressed through products are characterized by their exchangeability in the marketplace, the exchange-value of products is abstracted from their particular use-value. The products of labor become valuable less for their usefulness and more for their ability to generate exchange. When people make products as market commodities, the value of those products is not set by their ability to be exchanged for other things. Thus, commodities are not seen as relationships between people, but are seen as relationships between things. This is what Marx calls *fetishism*, that is, when this relation between people is instead misunderstood as a relation between things.[4]

With fetishism, Marx argued, the objectification of uses, interests, and values through labor tends to be obscured and is not always recognizable. He used an analogy to explain the nature of this ambiguity in the social role of objects, a potential difference between what we perceive and what is:

> The impression made by a thing on the optic nerve is perceived not as a subjective excitation of that nerve but as the objective form of a thing outside the eye. In the act of seeing, of course, light is really transmitted from one thing, the external object, to another thing, the eye. It is a physical relation between physical things.[5]

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3. Marx, *Capital*, 125-154.

4. Ibid., 163-178.

5. Ibid., 165.

The analogy attempts to show that products, the results of human labor within a set of social relations, can be likewise misconceived as things existing without human participation, 'mere' objects rather than relationships. Marx calls this misconception *alienation*. In capitalist markets, alienation is further extended into fetishism, where the commodity itself is taken as bearing the value rather than human labor, the source of the value of the commodity. Human labor, human self-creation, and social relations can become hidden through alienation. The structures of production and the market can alienate people from the social relationships that objectification enables.

In Marx's view, alienation has negative consequences. When a product of work is not perceived as related to its creator, the creator's process of self-realization through labor is compromised. The product of her work is interpreted primarily as a thing rather than as the objectification of interests and values, or as the product of social relationships. Work and worker become alienated from each other. However, insofar as production is always a social phenomenon, the objective form of social interests and values in products is never materially disconnected from relationships between people.[6] In other words, the social relations of production have an objective existence, regardless of our ability to see them clearly. It is not that the role of social relations in production is removed; rather, it is obscured. Alienation and fetishism deform the relations of values and interests that are created and shared among people through labor. In this context, human agency in the production of things becomes displaced and

6. My understanding of objectification and alienation was greatly assisted by Carol C. Gould's book *Marx's Social Ontology*, particularly chapter 2. I also found Alan Wood's work on objectification helpful in *Karl Marx* (New York: Routledge, 1981), 38-43.

the things we make are mistaken as entirely separate from us. This deformed understanding of relations hinders our ability to influence production because the social aspects of molding and varying products in order to serve our needs and interests are not apparent when products are taken to be outside the evolution of social interaction. In these circumstances, both creators and users of products do not recognize their own contributions to the value and development of products.

Technology is no exception to the process of objectification. While Marx primarily theorizes how capitalist relations control the technological means of production, Marcuse extends the Marxian viewpoint to further define and critique political and institutional aspects of technology.[7] What does technology objectify? As a human creation, technology incorporates the multitude of ends it serves as well as its social surroundings and historical context. For example, when technical instruments are designed in social institutions, the institutions operate under constraints, following certain social imperatives that influence choices about both what will count as a technological problem and what will serve as a technological solution. For Marcuse, technology, developed through the framework of fundamental social imperatives, embodies social formations, such as class and political structures, as well as features from its local environment.

Marcuse further explains that people adjust to the technology in a society, making decisions to incorporate technological advances into their lives.[8] Technology,

7. The primary text of Herbert Marcuse on technology is his book *One-Dimensional Man* (Boston: Beacon Press, 1964).

8. Ibid., 1.

along with serving as an instrument to efficiently achieve ends, also shapes concepts, representations, and ways of thinking about the world. The ubiquity of technology in a society, for Marcuse, changes what is considered rational within that society. The concept of *technological rationality*, as used by Marcuse, indicates the combination of social and technical reasoning into a single technological rationality, which then operates as what is rational in a society. Marcuse is concerned that technological rationality can lead to individuals giving up their private volition and critical forms of thought, which are superseded by passivity and conformity to a standardization of life with technology.[9] Under this prevailing rationality, people follow actions and lines of thought offered to them through technology without evaluating these choices. Marcuse argues that appeals to self-interest and autonomy appear as irrational in the face of technological rationality, which makes conformity seem reasonable and protest seem unreasonable. As he explains, technological rationality thus "extends to all spheres of private and public existence, integrates all authentic opposition, absorbs all alternatives."[10] Under these conditions, people perform tasks in accordance with the technological rationality in the society. Below, Marcuse points out the technology that has come to shape travelling along a highway, illustrating the conformity to a certain rationality:

> A man who travels by automobile to a distant place chooses his route from the highway maps. Towns, lakes and mountains appear as obstacle to be bypassed. The countryside is shaped and organized by the highway: what one finds en route is the by-product or annex of the highway. Numerous signs and posters

9. Ibid., 18.

10. Ibid.

> tell the traveler what to do and think; they even request his attention to the beauties of nature or the hallmarks of history. Others have done the thinking for him, and perhaps for the better. Convenient parking spaces have been constructed where the broadest and most surprising view is open. Giant advertisements tell him when to stop and find the pause that refreshes. And all of this is indeed for his benefit, safety and comfort; he receives what he wants. Business, technics, human needs and nature are welded together into one rational and expedient mechanism. He will fare best who follows its directions, subordinating his spontaneity to the anonymous wisdom which ordered everything for him.[11]

Technological rationality transforms the needs of individuals to those needs dictated to them by technology, creating attitudes and preferences in line with the technological rationality.

Marcuse argues that advanced industrial societies have become one-dimensional, societies without opposition. In these societies, technological rationality disallows the contemplation of alternative options, while leading to submission to external activity and authority. People adapt to technological changes uncritically, without considering the possible consequences technology can impose upon them. As Marcuse writes, “Independence of thought, autonomy, and the right to political opposition are being deprived of their basic critical function in a society.”[12] Marcuse argues that with the indoctrination of technological rationality "emerges a pattern of one dimensional thought,” and this one dimensional thought is “systematically promoted by the makers of politics.”[13] Technological rationality is not produced by

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11. Ibid.

12. Ibid., 1.

13. Ibid., 14.

technology *per se*, for technology is shaped by the instrumental ways of approaching the world and the reasoning of people in political power that undergirds the production of technology in a society and deems this technology as a given in what is counted as progress in that society.[14] Marcuse writes that technological rationality organizes "technical progress within the framework of domination."[15] For him, technology in advanced industrial societies is organized by people with the political power to have technology serve their very own interests. He writes, "Technological rationality has become political rationality."[16] It serves "to institute new, more effective, and more pleasant forms of social control and social cohesion."[17]

As Feenberg explains, Marcuse uses the term technological rationality to indicate "the most fundamental social imperatives *in the form in which they are internalized by a technical culture*."[18] People embedded in a social environment are encouraged to adapt to particular structures, goals, and choices when it comes to technology. Marcuse argues that technological rationality sustains the domination

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14. Douglas Kellner, in his introduction to *One-Dimensional Man*, suggests that Marcuse can be read as contrasting one-dimensional and dialectical thinking. For Marcuse, practices that conform to pre-existing structures and norms are one-dimensional, where as dialectical thinking involves the ability to abstract one's perception and thought from existing forms to other forms of perception and thought that negate the present states of affairs that oppress individuals and restrict human freedom. Dialectical thought posits another realm of ideas and imagination that serves as a potential guide for social transformation toward unrealized potentialities for a better life. Marcuse, *One-Dimensional Man*, xvi-xvii.

15. Ibid., xlviii.

16. Ibid.

17. Ibid.

18. Andrew Feenberg, "Can Technology Incorporate Values? Marcuse's Answer to the Question of the Age," (lecture, The Legacy of Herbert Marcuse Conference, University of California, Berkeley, November 7, 1998), italic in original. The text can be found at http://www-rohan.sdsu.edu/faculty/feenberg/marcuse.htm.

inherent in a class society. Domination refers here to the suppression of other values and interests outside the ruling ones through a uniform way of thinking about technology. He writes, "Domination perpetuates and extends itself not only through technology, but as technology, and the latter provides the great legitimation of the expanding political power."[19] From the Marxian viewpoint, then, one might say that Marcuse argues that technology is the objectification of a dominant rationality.

However, Marcuse does allow for the possibility that technology rationality can be transformed to serve something other than social control. He argues that it can be transformed to serve different ends, such as freedom, individuality, and creativity. He maintains that technological rationality can be harnessed to realize rather than repress human capacities. For Marcuse, transforming technological rationality involves confronting the practices in which "the basic societal institutions are developed, defined, sustained, and changed."[20] Since this practice is done by individuals, Marcuse claims that transformation must begin by individuals of a society breaking away from their one dimensional thought so that there can be critical analysis of the domination of technological rationality.[21] In order for this transformation to happen, technology cannot continue to be understood as value-neutral. Critical reflection on the values embodied in technology has to occur.

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19. As quoted in Andrew Feenberg, "The Bias of Technology," in *Marcuse: Critical Theory and the Promise of Utopia*, ed. Robert Pippin (South Hadley, MA: Bergin & Garvey, 1987), 237. The quote originally came from Herbert Marcuse's *One-Dimensional Man* (Boston: Beacon Press, 1964), 158.

20. Marcuse, *One-Dimensional Man*, 250.

21. Ibid., 250-251.

The kind of domination Marcuse is describing does not advance through force *per se*. It operates instead through the objectification of dominant interests in technology and through people's compliance with the structure of technology. This form of domination is further advanced through the conception of technology as neutral, that is, the belief that technology is a neutral tool. 'Neutrality' misrepresents technology as self-contained, interest-less, and always the same, no matter its place in time or its environment. With this misunderstanding, technology is only conceived instrumentally as an efficient means to realizing certain ends. Here, the fact that social uses and interests are embodied in technology disappears and technology is misapprehended as fully formed without social participation.[22] This mistaken perception, which amounts to a form of fetishism, obscures the potential for different technological experiences and the domination of the ruling interests advanced by technology, thus limiting people's involvement in the technological process and perpetuating a limited set of technological interests and values.[23] In this sense, technology subtly legitimizes the controlling structures in society and obviates opposition to them. Marcuse argues that when we misunderstand technology as neutral, we release it from responsibility for social and political impact, a point to which I will return.

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22. Ibid., 168-169.

23. Ibid., xlviii.

24. Heidegger's account is still a main topic for reflection and debate in this subfield. A few significant thinkers who have contributed to the substantive theory of technology are: Hubert Dreyfus, "Heidegger on Gaining a Free Relation to Technology," in *Technology and the Politics of Knowledge*, edited by Andrew Feenberg and Alastair Hannay, 97-107 (Bloomington: Indiana University Press, 1995); Peter-Paul Verbeek, *What Things Do: Philosophical Reflections on Technology, Agency, and Design*,

An alternative position to Marcuse's perspective on technological domination has been inspired by Martin Heidegger's influential 1954 essay, "The Question Concerning Technology" in a discourse happening in a subfield of philosophy, i.e., the Philosophy of Technology.[24] The contributions of Andrew Feenberg to the Philosophy of Technology arise, in part, through his critique of this Heideggerian approach.[25] Feenberg contrasts *substantive theories of technology*, which claim that the use of technology involves relations with the values that are embodied within the technology, with what he calls *instrumental theories of technology*, which claim that technology is neutral to its surroundings. Both Heidegger and Feenberg are substantive theorists of technology, positing that the very employment of technology has more consequence than its ostensible goals. Heideggerian theory maintains that technology itself embodies values, such as approaching the world and its people as resources for control and use. In Heideggerian substantive theory, this is what is called technology's *enframing*, that is, technology relating to the world as raw material to be manipulated and controlled. With this enframing of the world, technology conceals other potentialities of both objects and human beings: other ways of understanding and interacting with the world are suppressed and often go unnoticed. As Ian Thomson writes, technology's orientation terms underlying our technological refashioning of the world: no longer as conscious subjects in an objective world but merely as resources to be optimized, ordered, and enhanced with maximal efficiency."[26] The Heideggerian substantive theory, similar to

translated by Robert P. Crease (University Park, PA: Pennsylvania State University Press, 2005); David Edward Tabachnick, "Heidegger's Essentialist Responses to the Challenges of Technology." Canadian Journal of Political Science, 40, 2 (June 2007): 487-505; and Iain Thomson, "What's Wrong with Being a Technological Essentialist? A Response to Feenberg," *Inquiry*, 43 (2000): 429-444.

"increasingly eludes our critical gaze; indeed, we come to treat even ourselves in the Marcuse, affirms that technology embodies values, and that these values can be hegemonic. The values, however, are seen as integral to technology and not socially instigated.

Both Marcusian and Heideggerian orientations to technology are concerned with technological domination but they propose as alternatives different relationships with technology that lead to different solutions to the problem of domination. The Heideggerian substantive philosophy holds that technology itself orients people towards certain ways of living and the suppression of other options. From the theoretical vantage point of Marx and Marcuse, this theory of technology makes the mistake of participating in a fetishistic apprehension of technology as self-animated, relating the values of manipulation and control of the world and its people to technology itself rather than its social influences. Thus it is unable to give a grounded account of how technological domination takes place in varied ways that are shaped by social contexts. Such substantive theories of technology do not adequately pose the question of how

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25. Andrew Feenberg, *Transforming Technology* (New York: Oxford University Press, 1991), 5-7. The distinction is drawn from Albert Borgmann's *Technology and the Character of Contemporary Life* (Chicago: University of Chicago Press, 1984), 9. It would be a mistake to characterize Feenberg's study of Heidegger as consistent throughout his career. In his earlier books, Heidegger's perspective was over the years, Feenberg remains convinced that it leaves little room for the possibility of change and freedom in technological advancement. treated largely as a foil for a more constructivist approach to technology. And while this judgment of the Heideggerian theory on technology has become more nuanced and sophisticated

26. Iain Thomson, "What's Wrong with Being a Technological Essentialist? A Response to Feenberg," *Inquiry*, 43 (2000): 433.

anyone might escape technological domination; instead, they offer ways to cope with technological control.

According to the Heideggerian substantive theory, it is necessary to come to an understanding of the oppressive orientation of technology so that an alternative relationship with it can be conceived and then realized. In his book *What Things Do,* Peter-Paul Verbeek argues that this kind of technological reform "becomes possible when human beings reflect on technology."[27] He goes on to argue that "it requires an attitude of 'releasement' vis-à-vis technological artifacts, in which humans use them without letting them fully determine their relation to the world."[28] This approach does not suggest changing technology per se. Instead, it calls for an awareness of the way in which technology shapes our perspective on the world so that more nuanced choices can be made about its uses and its roles in our lives. It lays out a relationship with technology in which we can enhance our experiences with it by adjusting our approach to it, by reducing the influence the values of technology have on us.

Ultimately, the Heideggerian substantive theory suggests that we limit our participation with technology because attempting to manipulate technology to be a certain way prolongs our participation in the value of control that technology embodies. In this view, when we step away from modern technology, we remove the primary obstacle to recognizing other ways of interacting with the world. We can go as far as to

27. Peter-Paul Verbeek, *What Things Do: Philosophical Reflections on Technology, Agency, and Design*, trans. Robert P. Crease (University Park, PA: Pennsylvania State University Press, 2005), 95.

28. Ibid.

recognize that we help determine what role technology will have in our individual lives but we cannot change technology.

In contrast, Marcuse focuses on the potential for a liberated technology, where technology is transformed from a social project directed towards ruling interests to a new understanding of the freedoms technology can enable. From Marcuse's perspective, understanding technology as a social phenomenon enables a vision of the potential for social influence and participation in the structure of technology, and the possibilities of less oppressive forms of technology. Feenberg agrees with both Heidegger and Marcuse that technology has embodied values and that these values suggest a way of life. Furthermore, while Feenberg accepts the Heideggerian notion that this way of life often encourages manipulation and control, he theorizes technological oppression in an alternative way. Influenced by Marx and Marcuse, Feenberg asserts that social values directly influence the design of technologies and are incorporated within them, as I will describe below. He identifies the dominant interests and values embodied in technology as the *hegemony of technology*. Following Marcuse, he describes hegemony as power that is so deeply rooted in social life that it seems natural to those dominated by it. He also agrees with Marcuse that technological hegemony partly operates through the perception that technology is neutral and that its design could not be different than it is.

For Feenberg, like Marcuse, the Heideggerian recommendation that we change our understanding of technology to obtain a freer relation to it is not enough. Changing our perception is only a part of the solution. Active engagement with technology must also be part of the solution. Feenberg reads Marcuse as introducing politics into

technological analysis, writing that it is not only a "question of what technology is making of us; that question needs to be posed, to be sure, but we must also ask the political question of what we can make of technology."[29] This is to say that people can approach technology through their interests and goals with the aim of changing the technology itself. Feenberg writes, "Marcuse's argument can be rephrased in terms of the underdetermination of technology, which opens the possibility of alternative modernities."[30] Here, technology is understood as not fully determined by its technical characteristics alone; it requires social input. Arguing for an alternative understanding of technology and technological progress, Marcuse's reconstruction of technology necessarily involves critical public engagement "guided by their [the public's] own consciousness and sensibility, by their autonomy."[31] Technology is then reconceived as partly a product of social participation.

Marx, Marcuse, and Feenberg provide strong accounts of how technology and socio-political life are inextricably intertwined and mutually constitutive, and they offer responses to the problems of the socio-technological relationship. When trying to understand how technology can be changed and be open to embodying more interests, we must ask: How can various values incorporated in technology be challenged? How can technology come to embody different values? Feenberg's work is helpful in

29. Andrew Feenberg, *Heidegger and Marcuse: The Catastrophe and Redemption of History* (New York: Routledge, 2005), 99.

30. Andrew Feenberg, "Marxism and the Critique of Social Rationality: From Surplus Value to the Politics of Technology," forthcoming in *The Cambridge Journal of Economics*. A draft can be found at http://www.sfu.ca/~andrewf/marx%200and%20technology.htm.

31. Ibid. The quote originally came from Herbert Marcuse's "Re-Examination of the Concept of Revolution," In *All We Are Saying*, ed. A. Lothstein (New York: Capricorn Books, 1970), 280.

explaining how technology comes to embody certain values, and how such an embodiment is an ongoing process internalizing various social factors and potentially leading in many directions. His exploration of the social constructivist approach to technology clarifies the social processes of technological embodiment.

Feenberg and the Construction of Technologies

Feenberg, like Heidegger, develops a substantive theory that identifies values as embodied in technology, but proceeds from a study of Marx and Marcuse to understand technology as socially informed and concentrates on technological oppression as a social phenomenon; he considers the ways in which technological domination can be challenged. He distinguishes his approach by naming it the *critical theory of technology*. One of the problems with Heideggerian theories of technologies is that the set of values that the theories see as incorporated in technology is very limited: every technology is taken to embody the same values of manipulation and control. Feenberg uses social constructivism, which provides an alternative view of technological embodiment, to challenge instrumental and neutral conceptions of technology. Instead of characterizing technology as autonomous, constructivists analyze the evolution of a technology as the outcome of social action and practices, revealing the unique values incorporated into individual technologies. These studies support the argument against technology's supposed neutrality to its surroundings. Social constructivism shows that the design and development of technology are contingent upon processes of social interaction.

Trevor Pinch and Wiebe Bijker provide a good example of social constructivism in their article about the bicycle, which focuses on the competition between two primary designs.[32] One design bore a significant similarity to today's bicycles, with equal-sized wheels. The other design, known as the Penny Farthing, had a large front wheel and a small rear wheel. The former was relatively safe to ride but slower than the Penny Farthing. The Penny Farthing's design made it faster but less stable than the low-wheeled model. The first enthusiasts of the bicycle were young, well-to-do gentlemen who valued the thrill offered by the Penny Farthing's speed and dramatic appearance. The choices between the two designs depended on the preferences of different social actors.[33] Eventually, the popularity of the low-wheeled bicycle increased due to the introduction of air-filled (rather than solid rubber) tires, which reduced vibration and allowed for swift and stable riding. While the low-wheeled, air-filled tire bicycle model was initially considered less impressive, too cumbersome, and rather ugly by many users, it eventually became the preferred design.

The two different bicycle designs brought values into competition in a particular historical and social context. For example, some users valued the air tire model as a convenient and safe mode of transportation, while others thought it created traction problems and an unsightly appearance. While closure to the problem of alternative designs was eventually achieved, the outcome was at least as contingent upon these social factors as it was upon technological advancement, and these social factors

32. Trevor Pinch and Wiebe Bijker. "The Social Construction of Facts and Artifacts," in *The Social Construction of Technological Systems*, ed. Wiebe Bijker, Thomas Hughes, and Trevor Pinch (Cambridge: MIT Press, 1997).

33. Other social factors played a role in the bicycle's development—for example, the need for alternative forms of transportation and needs created by the structures of women's clothing fashions.

resulted in certain interests being incorporated into the design while other interests were not. As Pinch and Bijker's put it, social factors influence "the content of the artifact itself" and not merely external factors such as who uses it or where it is used.[34] The social constructivist approach to technology also demonstrates that a particular design represents one outcome among a field of technical possibilities reflecting the interests of socially relevant groups. As Marx argued, it is not only interests and values that are incorporated in technology, but also social relations themselves. Existing social relations shape the conditions for, as well as the consequences of, technological development. In these relations, suppression of other values and interests outside the ruling ones can lead to technological oppression. Social constructivism demonstrates that the form of a technology stems partly from the ways in which the values of different groups are or are not incorporated into its form.

The constructivist approach understands technology relationally as well as processually. In this approach, the design of a technology is incomplete until it is put into use, and its use continues the process of interests, values, and social relations being incorporated into the technology. The outcome of competing designs and redesigns is not permanent, since new debates and conflicts regarding a design can arise as the design is applied to new social and historical contexts. For example, while the automobile is now interpreted as a hazard to the environment, it was considered the "green" vehicle of the 1890s, more sanitary than horse-powered modes of transportation because automobiles decreased the production of waste, that is, manure

34. Pinch and Bijker, 42.

and dead horses.[35] Today, modes of transportation are once again being reinterpreted and refashioned. If and when closure to competing designs occurs is a historically and socially contingent matter, and is always open to renegotiation. Social constructivism also makes clear that the designs of technologies developed for certain uses are readily influenced by their users. Especially during the initial diffusion of technologies, users and technologies influence each other interactively. Feenberg illustrates this relationship between users and design in his study of the French Minitel, a communication network designed for exchanging information such as directories and train schedules.[36] Users transformed the system to accommodate the exchange of instant messages. Originally designed to allow more efficient access to certain pieces of public information, the Minitel was subverted by its users who reinterpreted it as a means of social interaction.

Langdon Winner has criticized social constructivism as reducing technology to its social conditions while ignoring the effects of the technology itself, and he is correct in asserting that social influence does not constitute *in toto* the development of a technology.[37] As in the case of the bicycle, it is clear that the designed object itself plays a role. Also arguing for the importance of the instrumentality of technology, Verbeek claims that the material conditions of technology are often obscured by

35. Susan Strasser, *Waste and Want: A Social History of Trash* (New York: Henry Holt & Co., 1999), 124.

36. Andrew Feenberg, *Alternative Modernity: The Technical Turn in Philosophy and Social Theory* (Berkeley: University of California Press, 1995), 161-165.

37. Langdon Winner, "Social Constructivism: Opening the Black Box and Finding It Empty," *Science as Culture*, vol. 3, part 3, no. 16 (1993): 427-452.

constructivism.[38] He explains that when a technology functions well without significant reconfiguration by users, little attention is focused on its material form; instead, attention is placed on what it does in use. If a technology malfunctions, however, there suddenly emerges awareness not only of its design but also of the importance of its material parts. Winner and Verbeek invite the more balanced view that technologies and human interaction co-construct products.

Feenberg combines the work of Marcuse and social constructivism to shape a powerful critique of the hegemony of technology. He advances beyond the work of Marcuse in suggesting that the process of technological design can be an occurrence for social negotiation. Feenberg is not as skeptical about people confronting the values embodied in technology as Marcuse. For Feenberg, it does not seem that society is dominated by one dimensional thought, so the values embodied in technology can be transformed by individual participation without first needing to overcome the technological rationality of the society, especially when considering the Internet as a technology that incorporates a diversity of interests. Feenberg argues for situated struggles with the design of technology, incorporating more diverse interests and values in its design, in order to overcome hegemony. While Feenberg theorizes about the political dimension of technology and the threat of oppression, he also argues that the reconstruction of technology is very possible. To assist in his work, Feenberg enlists the analysis of social constructivism, which illustrates that the design and social interests embodied in a technology can be renegotiated. In agreement with Heideggerian approaches, Feenberg acknowledges that technologies share the traits of the

38. Verbeek, *What Things Do*, 102-103.

embodiment of values, and he admits that Heideggerian critiques adequately represent some of these traits, such as control and manipulation. In contrast to Heideggerian approaches, however, Feenberg does not frame technology as solely and inevitably coercive. The culprit is, instead, the social forces through which a uniformity of values may be designed into a technology. The pervasiveness of a certain set of embodied values marginalizes other interests and exerts coercive influence on technological choices. Feenberg's work identifies the dominant interests and values embodied in technology. He pays special attention to two of these values: that technology is neutral and that a technology cannot be otherwise designed.

Influenced by social constructivism, Feenberg studies the design process and develops a method for identifying biases in it. As he points out, designing technology involves selecting a configuration from among many possibilities; designers build in potential for user initiative while also yielding to the guidance of social forces. The features of political-economic systems such as capitalism are incorporated into technical development, gearing it to the realization of such values as competition and profit.[39] Once introduced, technologies come to serve as material validation of the interests and values that have shaped their production. Feenberg calls this process of cultural enlistment the *bias of technology*. The more society employs certain technological devices and designs, the more legitimacy the interests and values that shape its development acquire. Feenberg labels these dominant design features the *technical code*.

39. Andrew Feenberg, *Questioning Technology* (New York: Routledge, 1999), 97 and 224.

Feenberg identifies two kinds of bias in technical codes: substantive bias and formal bias.[40] Substantive bias is based on the application of unequal standards when a single standard should apply; for example, the bias that some races have inferior intelligence. Substantive bias is most often associated with prejudice, for instance, explicit norms that discriminate between people of different classes, races, sexes, nationalities, etc. These norms are represented as factual judgments that attribute either abilities (merits) or disabilities (demerits) to more or less favored groups. Formal bias, however, is not associated with factual judgments and implies no unfair prejudice. Instead, formal bias involves a single standard being applied that excludes contextual considerations, that is, applying the same standard to all individuals under conditions that favor some people unfairly at the expense of others. For example, legal equality in the courtroom can be subject to a formal bias due to differences among individuals' ability to pay for legal representation. Another common example is an educational system that is in theory available to everyone equally, but is structured in such a way that it presents special difficulties for students from cultural backgrounds different from the majority. Formal bias can often be identified in situations where procedures treating everyone equally instead invite or deny groups with particular interests. In these cases, the challenge is not to the factual claims advanced, but to the cultural horizon under which those facts are defined.

To identify formal bias, Feenberg suggests, we must define the relevant domain of considerations to be taken into account when judging an action, an institution, or the

40. Andrew Feenberg, *Critical Theory of Technology* (New York: Oxford University Press, 1991), 180. Feenberg writes that he borrows his distinction between formal and substantive bias from Max Weber's theory of rationality.

design of a technology. The question to ask is what considerations have been overlooked. This enlargement of the cultural and critical horizon allows for isolated functional elements to be associated within the larger defining system. In the case of a culturally biased test, for example, it is necessary to demonstrate that discrimination functions within the test due to a context that favors the interests and values of particular social groups. As Feenberg writes, "Formal bias is the prejudicial choice of the *time, place, and manner of the introduction of a relatively neutral system*."[41] If technology is understood as a social phenomenon, the investigation of any technology requires attention to its historical social and political context.

Feenberg's identification of two kinds of biases in the technical code — substantive and formal—offers rich resources for investigating not only the limitations of a technology but also its involvement in social interactions and the extent to which a technology can embody values that support a variety of interests. His focus is on avoiding the threat of technological hegemony and technical bias, which diminish the ability of users to choose how to interact with technology and thus limits their ability to pursue their interests. Feenberg stresses the reality and importance of human agency in changing technology.[42] While many technical designs embody hegemonic values,

41. Feenberg, *Critical Theory of Technology*, 180.

42. Feenberg has been criticized for placing too much emphasis on small, local challenges to technological devices. His writings do sometimes seem to claim that a small success in challenging a value embodied in technology will lead to widespread investment and engagement in technological matters as a social project. It is important to remember, however, that Feenberg is challenging the design process and the way people think about technology as a culture along with their use of technology. It would be a mistake to limit the relevance of his work to local technological challenges. For more on this line of criticism, see Tyler Veak's "Whose Technology? Whose Modernity? Questioning Feenberg's Questioning Technology," *Science, Technology and Human Values* 25, 2 (Spring 2000): 231. Also see Tabachnick, David Edward, "Heidegger's Essentialist Responses to the Challenge of Technology," *Canadian Journal of Political Science*, 40, 2 (June 2007): 491.

Feenberg understands that these designs are also open to user initiative, and that there is reciprocity between social forces, design imperatives, and user initiatives. For example, specifications for buildings and automobile engines that respond to environmental concerns about energy efficiency and emissions incorporate user initiative as well as social forces. Another case is the translation of safety concerns into the development of seatbelts and automatic skid controls for automobiles. Feenberg observes that environmentalists who challenge technology to preserve nature and health should be able to recognize themselves in design decisions currently being made, and that such identification should reduce alienation and undermine the hegemony of technological rationality. Similarly, people connecting to each other over networks on France's Minitel or the Internet, engaged in introducing person-to-person communication to systems originally designed for data distribution, should be able to recognize their impact on these technologies as well as their capacity to destabilize design preconceptions. Social forces are not deterministic or totalizing. The technical designs that embody hegemonic values may also be open to user initiatives through social struggles for environmentalism, safety, or other causes that lead to a wider range of social interests embodied in the technology.

Conclusion

When technology is understood not as a force beyond our control but as socially constructed, it becomes clear that technology involves choice. Likewise, when technology is understood as a product of people's desires and values, it can then be

critically approached and actively engaged. In Heideggerian theories, technology encompasses manipulation and control, and a better understanding of technology results in distancing oneself from technology, a tactic that denies both negative and positive possibilities of technology. In contrast, the Marxian position that we are objectified in our technologies holds open the possibility of recognizing ourselves, other people, and social relations embodied in technology and thus perceiving the possibility of alternative technologies through less alienated forms of technological production and adaption. Building upon these ideas, Marcuse politicizes technology, identifying that technological rationality and political hegemony subvert the realization of social participation in technology. Building upon these predecessors, Feenberg affirms that technology is neither separate from nor indifferent to people or interests, including our social and political struggles; we can understand technology as a set of interactions with people and the world. He asserts that the first step in freeing ourselves from dominating forms of technology is living our lives as social beings with the knowledge that we intermingle through technology. When we realize that social values pervade technology, it becomes possible to question the dominating interests operating upon technological design, implementation, regulation, and social appropriation.

The Internet is an excellent case to which this framework can be applied. The Internet exemplifies the process of objectification insofar as it emerges from and produces social relationships, engaging the interests of both its creators and its users. As the next chapter will make clear, Internet technology, designed in a particular historical context and created by particular designers, incorporated both the social aspects of its time and the values of people involved in its creation. The production of

the Internet involved the interdependence of social relations and technical requirements.[43] In Chapter Two, I will argue that the most distinctive functional features of the Internet's architecture are accessibility, openness, and decentralization. Internet users can communicate horizontally at any time with many people at once, each building upon the communications of others. Internet architecture is open in the sense that users have the ability to view the structure of the technology and to shape its development. Lastly, data can take any number of routes to its destination, as there is no central hub to the Internet. This Internet design creates a minimally coercive system. Its basic structure allows users to manage their own system; everyone benefits from collective interaction while retaining as much local choice as possible.

As we will see in later chapters, while the Internet was purposefully designed to be influenced by social change—underdetermined to allow it to evolve along with technological innovation—the basic architecture of the Internet continues to reflect specifiable social contexts and use-values. Its development offers certain freedoms along with social challenges that both enable and constrain human activity. In addition to historical contexts, use-values, and social interests, the Internet technology can also embody political configurations such as class bias and political structures. While the relatively open design of the Internet may be able to serve social needs and interests, the political environment may come to subvert this architecture either from above or from within the technology. Among current social and political debates about the Internet, it is important to understand the biases of different interests as well as the

43. This latter component of the Internet is sometimes glossed over by theorists, particularly in social constructivist approaches. However, understanding the Internet's material and technical requirements plays an important part in interacting with and challenging the technology.

larger cultural horizon, especially where technical changes are concerned. Feenberg lays the groundwork for critiquing the technical code of the Internet, particularly insofar as it may integrate biases.

Since it is still a relatively new technology, a study of the values incorporated in the Internet is crucial, because its development can still be shaped by the way in which people integrate it into their lives and the lines along which its architecture is elaborated. While Feenberg's work assists in establishing the social impact of the embodied values in the Internet and his critical theory of technology provides both an explanation of the way in which values are embodied in technology and an approach to evaluating different technologies (so as to uncover these inherent values), his account of the hegemony of technology does not fully apply to the technology of the Internet.[44] Feenberg tends to represent technology almost completely as an oppressive force to be challenged. His consideration of potentially positive values incorporated in technology is minimal.[45] Yet there is nothing in Feenberg's theory eliminating the possibility that technology embodies values worth protecting because they are potentially socially valuable. Along with critique, then, it is useful to consider what can be done to secure the positive values of the Internet—accessibility, openness, decentralization,

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44. Feenberg has not done a sustained analysis of the design of the Internet and its social implications. His work on the Internet has concentrated on the technology as holding the potential for the development of human communication, community, and democracy. For further information, see the introduction to *Community in the Digital Age: Philosophy and Practice*, ed. Andrew Feenberg and Darin Barney (Lanham, Maryland: Rowman & Littlefield Publishers, Inc, 2004) and his talk "A Democratic Internet?", http://www.sfu.ca/~andrewf/demint.htm.

45. To be fair, Feenberg does occasionally gesture towards a more positive view of technologies. For instance, he writes that in the fields of medicine, architecture, and urban and environmental planning, technology is based on a significant degree of "life-enhancing values derived from a long history and a wide range of experiences…with narrow technocratic and commercialization." (Feenberg, *Heidegger and Marcuse*, p. 112)

choice—as it continues to develop and expand. The framework I have outlined for a theorization of technology will be applied to the Internet in the following chapters. By analyzing current social and political debates about the technology of the Internet, I will investigate the social context in which its evolution takes place. Studying both oppressive and liberating values embodied in its technological configuration and understanding the social factors at work in its technical development, I will argue that technological oppression is a social phenomenon that can be challenged through the destabilization of preconceptions about technological design as well as the agency of relevant social groups in the design and use of the Internet.

CHAPTER TWO

DISTINCTIVE INTERESTS IN THE DESIGN OF THE INTERNET

In Chapter One, I laid out a philosophical framework for investigating the Internet as shaped by social and historical relations that have resulted in specific interests being embodied in its technology, and discussed the possibility of the oppressive embodiment of dominating, hegemonic, and exclusive interests in the design of technologies. In this chapter, I apply this philosophical framework to the development of the Internet. I will argue that while the production of the Internet was advanced by certain technological achievements, considering only these technical aspects does not explain how or why the Internet came to have its particular design. I will establish that a variety of technological choices could have been made in the development of the Internet. During the design process, I argue, specific social relations directed certain design choices that became fundamental to the structure of the Internet. These choices incorporated the values of the people involved in the creation of the Internet and reflected a particular social and political milieu.

This chapter illuminates the interests that came to be embodied in the Internet, beginning with a short history of how the fundamental features of the Internet were developed. I then identify three distinctive interests—accessibility, openness, and decentralization—and discuss how each came to be embodied in the Internet technology. I situate my argument about the development of the Internet within the framework proposed in Chapter One. The philosophical ideas examined there,

influenced by the thought of Karl Marx, Herbert Marcuse, and Andrew Feenberg, support a social constructivist approach that clarifies the evolution of the Internet as a process contingent on human interactions and interests as well as open to the possibility of coercive technological oppression.

When I refer to the Internet in this chapter, I do not mean to suggest that the interconnecting networks that came to be known as the Internet were always named the Internet. For simplicity, I will use the term *the Internet* to refer to the networks that were directly involved in the creation of the Internet as we know it today.[1] Also, I do not strongly separate the Internet from the integrated applications that have become part of the way we experience the Internet as users. I include the personal interface and software, which has allowed multimedia access and display to become essential features of the combined system of networks, along with the World Wide Web application as a part of the Internet. In this chapter, I investigate the basic design of the Internet as it was originated and continues to be structured today.

A Brief Constructivist History of the Internet

The Internet is a communications system of interconnected computer networks and computers, consisting of domestic, academic, business, and government networks.[2] The first steps to creating what would become the Internet were initiated in 1957, after

1. For example, as I will discuss in this chapter, the networks called ARPAnet and NFSnet, while different in their range and purpose than the Internet, made significant contributions to what developed into the Internet and the interests that are incorporated in it.

2. J. R. Okin, *The Information Revolution: The Not-for-Dummies Guide to the History, Technology, and Use of the World Wide Web* (Winter Harbor, ME: Ironbound Press, 2005), 90-92.

the Soviet Union launched into space the first man-made satellite, Sputnik 1.[3] To the government and military leaders of the United States, Sputnik 1 signaled a gap in technological advancement between the United States and the Soviet Union. In 1958, the United States Department of Defense formed the Defense Advanced Research Projects Agency (DARPA) to quickly advance research in technology.[4] Originally, DARPA was to focus its research on space-related military technology. However, in 1958, the National Aeronautics and Space Administration (NASA) was also formed and research in space technology was moved under that organization.[5] DARPA was then redirected towards the pursuit of scientific and technological research in an effort to advance the field of study in areas related to issues of defense. DARPA was a small agency without its own laboratories. The Director of Defense Research and Engineering in the Department of Defense supervised the director of DARPA. The director of DARPA, in turn, managed several project offices, each with a director and project managers who initiated and oversaw research and development which was

3. Janet Abbate, *Inventing the Internet* (Cambridge, Mass: MIT Press, 1999), 8-9; Thomas J. Misa, *Leonardo to the Internet: Technology and Culture from the Renaissance to the Present* (Baltimore: Johns Hopkins University Press, 2004), 248-249.

4. The Defense Advanced Research Projects Agency (DARPA) was originally named Advanced Research Projects Agency (ARPA) in 1958. In 1972, ARPA was renamed DARPA when it was given the status of a separate agency within the Department of Defense. It was then renamed ARPA again in 1993, to signify a renewed commitment to research that would benefit both civilian life and the defense industries. In 1996, ARPA was renamed DARPA again. For simplicity, I will refer to the agency as DARPA throughout this dissertation, except when quoting directly from a source where the agency is referred to as ARPA. I will also refer to the network that the agency was creating as ARPAnet throughout this dissertation, even though it was temporarily named DARPAnet at times. For more information, see Abbate, *Inventing the Internet*, 225; and DARPA's official website (http://www.darpa.mil/arpa-darpa.html).

5. Christos Moschovitis, Hilary Poole, Tami Schuyler, and Therea Senft, *History of the Internet: A Chronology, 1843 to the Present* (Santa Barbara: ABC-CLIO, 1999), 43-44.

contracted out to academic and industry institutions.[6] The first project offices were involved in researching missile defense, materials sciences, and behavioral sciences.

The goals of DARPA were influenced by the administration of Lyndon Johnson, which encouraged the use of Department of Defense funds "to support basic research in universities" so that scientific and technological research could become strengths of the nation.[7] The Johnson administration specifically wanted research to be aimed at goals beyond missile development. In 1962, through a new Information Processing Techniques Office (IPTO) under its purview, DARPA began funding computer science research toward the goal of advancing scientific and technological research for defense-related purposes. However, since the launch of Sputnik signaled to the Johnson administration a need to strengthen research generally, the Department of Defense supported research that applied beyond defense-related areas, as long as the research could be related back to issues of defense. Considering the formulation of goals for the IPTO, Hafner and Lyon write that "one readily apparent characteristic of the agency was that its relatively small size," which allowed the personality of the members of its community to permeate the organization.[8] For example, the first director of IPTO, Joseph C.R. Licklider, created several goals for IPTO that focused on advancing computer science research without much regard for defense.[9] He instructed

6. Abbate, *Inventing the Internet*, 36.

7. Ibid.

8. Katie Hafner and Matthew Lyon, *Where Wizards Stay Up Late: The Origins of the Internet* (New York: Simon and Schuster, 1996), 22.

9. Christos Moschovitis, Hilary Poole, Tami Schuyler, and Therea Senft, *The Internet: A Historical Encyclopedia—Chronology* (Santa Barbara: ABC-CLIO, 2005) 30.

his scientists to research time-sharing, a system allowing one mainframe computer to support simultaneous use by numerous people connected to the mainframe through individual terminals. In those days, computers were very large, taking up whole rooms, and computers needed constant maintenance to keep operating.[10] The expense and space requirements of a computer resulted in few personal computers. Time-sharing was a way to connect terminals to a computer so more people could have direct access to it. A network could be created that would connect people together across geographical distances and allow them to communicate through different computers that had unique capacities.[11] The goals of creating computers that could easily facilitate human interaction, serving a diversity of human interests and needs rather than strictly defense-related interests and needs, became part of the goals of IPTO.[12]

In 1969, Lawrence Roberts, who had joined IPTO as the assistant director three years earlier, became the director.[13] At this time, the primary interest of the IPTO continued to be the advancement of computer science, leading to the development of a network that could bring researchers together and foster a community of skilled computer scientists to cooperatively build on each other's research in order to advance computer science.[14] This network was aimed at interactive computing and maximizing

10. Hafner and Lyon, *Where Wizards Stay Up Late*, 26.

11. Moschovitis, Poole, Schuyler, and Senft., *History of the Internet: A Chronology, 1843 to the Present*, 37, 53.

12. Christos Moschovitis, Hilary Poole, Tami Schuyler, and Therea Senft, *The Internet: A Historical Encyclopedia—Chronology* (Santa Barbara: ABC-CLIO, 2005), 30.

13. Roberts was invited to work for DARPA and refused the offer initially to stay at his position at MIT. It was only after DARPA's director reminded MIT that their lab was heavy funded by DARPA that Roberts agreed to join the agency. Abbate, *Inventing the Internet*, 46.

14. Abbate, *Inventing the Internet*, 46.

computer science research. While researchers at IPTO thought that advances in research would serve defense interests, it was considered a secondary interest. IPTO research was aimed at creating a system that would allow computer resources to be shared between computers located in different areas of the country. By 1970, IPTO had made progress on connecting four computers across the United States—the University of California at Los Angeles, the University of California at Santa Barbara, the University of Utah, and the Stanford Research Institute.[15] This first network that connected these different sites was named ARPAnet.

The theory of technological rationality developed by Herbert Marcuse suggests that people embedded in a social environment are encouraged to adapt to the structures, goals, and choices of the ruling members in that environment. Technological rationality indicates the combination of social and technical reasoning into a single rationality, which then stands as what is rational in a society. As Marcuse argues, in advanced industrial societies, technological rationality is the diffusion of the political dominant rationality and produces a uniform way of thinking about technology that tends to suppress other values and interests outside the ruling ones. In turn, this technological rationality is embodied in the framework of technology itself. Considering the early years of IPTO makes it clear that the social environment in which the Internet development began allowed for goals and interests beyond the dominant ones. As I have shown above, the Department of Defense goals for IPTO were primarily related to defense research; the advancement of scientific and technological research beyond

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15. Moschovitis, Poole, Schuyler, and Senft., *The Internet: A Historical Encyclopedia—Chronology*, 39.

defense issues had support from the Department of Defense only if researchers could argue that their work related in some way to the primary goal of defense. Nonetheless, the research of the IPTO was primarily aimed at the advancement of computer science, with little concern about defense-related matters. The commitment of the researchers to build interactive computers that incorporated the needs and interests of humans continued to be an important goal of IPTO during the time of Roberts' management and afterwards. Additionally, the scientists of IPTO were interested in advancing the field of computer science and bringing together a community of researchers. To be clear, the scientists of IPTO were not against defense; their goals incorporated defense research but their primary aims were towards the broader goals of computer science above. Therefore, the dominant goals and the goals of the scientists at IPTO were not fully convergent. Nonetheless, the goals of the scientists were not suppressed in the development of the Internet. In fact, their interests were influential and instrumental in its development. Thus, the kind of technological oppression that concerned Marcuse, where the interests of technology only served the dominant rationality, had not emerged at this point in the formation of the Internet.

Roberts faced a problem with the IPTO project of building a large, multi-computer network in order to share data and avoid redundant work: it had not successfully been done before.[16] A major problem with multi-computer networks was that connections between computers were easily lost. At that time, communications networks were dominated by circuit switching technology, the technology commonly used in the telephone industry. Circuit switching assigns a separate, dedicated circuit

16. Abbate, *Inventing the Internet*, 37.

for the duration of any communication between two points, such as a phone call. Circuit switching was also the convention in computer networking.[17] Unfortunately, this system was unreliable for computer networking because constant repair work had to be done on the circuits and the connections between computers were often lost.

The researchers in IPTO were consciously seeking a more robust and efficient technology. After a 1967 computing symposium, where Roberts presented the large network project and heard formal and informal responses, he began to understand how the network he needed to build could function better through a new kind of switching technology.[18] A series of papers written by Paul Baran, a computer scientist working for the RAND Corporation, described what he called "hot-potato routing," a way of transmitting information that could enable a distributed network of connected data transfer. [19] This technology came to be called "packet switching." Baran had developed the system to address concerns about the survivability of networks during war, so he incorporated high levels of redundancy, as well as plans for important parts of the network to be built outside of populated areas. [20] Roberts was less concerned about

17. Comer, Douglas E. *Internetworking with TCP/IP*. Englewood Cliffs: Prentice Hall, 1991, 56.

18. Among the presenters was Roger Scantlebury of the National Physical Laboratory of Britain, who presented a paper about networking and, with other colleagues, informally discussed Roberts' project with him. Moschovitis, Poole, Schuyler, and Senft, *The Internet: A Historical Encyclopedia—Chronology*, 37.

19. Baran wrote papers describing a network that could be operated through various distributed networks and various transmission protocols. (Paul Baran, *On Distributed Communications* (Santa Monica, Calif.: Rand Corporation, 1964)). Baran was worried about the possibility of a cold war nuclear attack that could possibly destroy communications in the United States. The launch of Sputnik I motivated his research. Baran wrote papers on a decentralized, redundant network, and these papers became influential in the development of a communications network created in DARPA. The type of network Baran invented in these papers would become known as packet switching. For more on this subject, see Hafner and Lyon, *Where Wizards Stay Up Late*, 54-77.

20. In 1967, Roberts recruited Baran to advise the ARPAnet planning group on distributed communications and packet switching. Abbate, *Inventing the Internet*, 39.

network survivability and more interested in the high-speed transmissions and adaptive routing that packet switching appeared to offer.[21]

Packet switching makes it possible to route messages through many different computers; there is no dedicated circuit or centralized hub.[22] Each computer on the network acts as a server and a client. Packet switching subdivides a digital data stream (it can be text, voice, video, or other data) into smaller packets of data that are directed to their destination by the best available path through interconnecting networks of computers. Each packet contains information identifying its destination, source, size, and the order in which it was sent. When a packet reaches the first computer available on the distributed network, that computer identifies its final destination and determines the best route to that destination. The packet is then sent along this path, being treated the same by other computers it encounters on its way to its destination. When packets reach their intended destinations, computer software extracts data from the packets in the correct sequence and then converts the data back into its original medium—text, images, sounds, or video. Packet switching utilizes circuits more efficiently because data packets from many different sources can be co-mingled within a single circuit and the entire data capacity (referred to as bandwidth) of that circuit can be in constant use. If individual packets arrive damaged or corrupted, the technology is designed to automatically send a request from the receiving computer to resend the data.

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21. Abbate writes that Baran's technical features directed at a survivable network during times of war was later implemented by other networks developed by the Department of Defense after the development of ARPAnet. Abbate, *Inventing the Internet*, 226.

22. Ibid., 17-20.

DARPA had the funds to test Baran's packet switching technology on its own network. Packet switching promised to use the network more efficiently and allow it to more easily recover from equipment failure. The risk was that it was an untested technology. Implementing it on a large-scale network reflected the commitment of DARPA to creativity, experimentation, and research. As Abbate writes about the choice to use packet switching for the ARPAnet, "If it worked, the payoff would be not only greater efficiency and ruggedness in the ARPAnet itself, but also a significant advance in computer scientists' understanding of network properties and techniques."[23] DARPA successfully developed a packet switching network and that system remains the way data travels over the Internet today.

With the decision to use packet switching, IPTO faced another challenge that came out of the goal of fostering research through a networking system: figuring out how to expand participation by connecting networks that used different internal hardware, operating systems, software, and technical designs. This was crucial if more networks were to connect to the ARPAnet. The designers of the ARPAnet worked on integrating a common set of rules that would allow the networks and the computers on the networks to communicate with each other without crashing the system. These rules were called protocols. In 1983, all the networks connected to the ARPAnet switched to the Transmission Control Protocol and Internet Protocol suite (TCP/IP), which enabled diverse types of networks to successfully carry packet data.[24]

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23. Ibid., 39.

24. Leiner, V. Cerf, D. Clark, R. Kahn, L. Kleinrock, D. Lynch, J. Postel, L. Roberts, and S. Woolf, "A Brief History of the Internet," http://www.isoc.org/internet/ history/brief.shtml (last revised on August 4, 2000).

A main characteristic of the TCP/IP protocols is the separation between information transmission over the network and information processing by the computers at the ends of the network. The protocols incorporate two functions: on one hand, the TCP protocol handles construction and unloading of packets of data and, on the other, the IP protocol routes individual packets.[25] Once a packet arrives at its destination, the information is synthesized by the software on the receiving computer. The TCP/IP protocols were written to avoid relying on the network for anything except the transfer of data across it, assisted by intermediate computers or nodes that provide enough computing power for the network to transmit the data.

This kind of separation of information transmission and information processing was important to researchers when they first started working on protocol standards in 1967.[26] Roberts had received feedback from researchers at Ann Arbor, Michigan, about their reluctance to support a network that would require additional information or computing power from their machines in order to function. Thus, the separation between transportation of the data and synthesizing of data, designed into the protocols of TCP/IP, became one of the essential principles of the Internet.[27] According to this principle, the interconnecting networks of the Internet transport data to their ends (the computers that will process the data) without giving preference to one kind of data over another kind of data. This principle of the Internet is sometimes referred to as the end-

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25. Moschovitis, Poole, Schuyler, and Senft, *History of the Internet: A Chronology, 1843 to the Present*, 91.

26. Moschovitis, Poole, Schuyler, and Senft, *The Internet: A Historical Encyclopedia—Chronology*, 37.

27. Bernard Benhamou, "Organizing Internet Architecture," *Esprit*, (May 2006): 4.

to-end principle.[28] No information has priority over other information. This characteristic of the architecture of the Internet also allows individuals to develop many kinds of software that will synthesize data. The adoption of the TCP/IP protocols was instrumental in allowing networks and computers around the world to join the Internet.

The approach of social constructivism investigates the evolution of a technology as the outcome of social action and reveals the unique values incorporated into individual technologies. Social constructivism illustrates that technology is not neutral to its surroundings and that the design and development of technology are contingent upon social input and interaction. The design of the TCP/IP protocols indicates that researchers involved in the development of the Internet were interested in the network being accessible to a variety of computer technologies and software. It also indicates that they were interested in giving as much control and choice as possible to the computer users connecting to the network, thereby seeking to make the network protocols as non-coercive as possible.

Given that the network system was being funded and built by the Department of Defense, it is reasonable to assume that the interests incorporated in the design of the protocols might concentrate on security of data or on the ability to discriminate features of the data being transferred over the network and received by the computers connecting to it. But as in the case of the packet switching system selected by IPTO, the agency was interested primarily in research that advanced computer science. The protocols developed by IPTO made the network responsible only for the transmission of data without the ability to discriminate between different kinds of data being

28. Hafner and Lyon, *Where Wizards Stay Up Late*, 227.

transferred. The protocols also allowed for the kind of open and diversified network that would satisfy the interest in collaborative research. This further supports my argument that the oppressive forces of technological rationality, the suppression of interests beyond the dominant one of defense, had minimal relevance at this time in the development of the Internet. In line with the social constructivist approach, the protocols of TCP/IP embodied the social interests of inclusivity and choice, which were interests of the computer scientists at IPTO.

The Department of Defense and DARPA gradually relinquished control over the ARPAnet during the 1980s.[29] In 1983, the Department of Defense decided that the extent of the networks connected on the ARPAnet raised a security concern.[30] The network was then split into two parts - the MILnet for military information and the ARPAnet for civilian use.[31] In 1986, the National Science Foundation (NSF) built and implemented a faster network, the NSFnet, to allow more connections to the ARPAnet.[32] In 1990, APRAnet was decommissioned by the Department of Defense, and all information that had been routed through the APRAnet began to be handled by NSFnet (which was now referred to as the Internet because it was a network of interconnecting networks). According to DARPA, the network problems that drove its research had been solved.[33] In 1990, the network expanded its reach beyond the

29. Abbate, *Inventing the Internet*, 181.

30. Hafner and Lyon, *Where Wizards Stay Up Late*, 249.

31. Lorenzo Cantoni and Stefano Tardini, *Internet* (London: Routledge, 2006), 28.

32. Moschovitis, Poole, Schuyler, and Senft, *History of the Internet: A Chronology, 1843 to the Present*, 145.

33. Hafner and Lyon, *Where Wizards Stay Up Late*, 255.

government, military employees, and the specific group of university scientists and graduate students who had been its core users, connecting first to universities throughout North America and then to facilities in Europe.

Up to this time, commercial interests had been prohibited on the ARPAnet because the network was to be used only for research-related work by academics, scientists, and bureaucrats. While having the National Science Foundation handle the Internet allowed for better service, the accessibility and growth of the Internet was still limited because the foundation was a government agency whose facilities and computer networks could not be subsidized by private commercial operations.[34] Only those affiliated with the government or a university could access the Internet and no commercial network providers could sell access to the Internet. Instead, these commercial providers would have to build their own networks without being able to utilize the Internet. In 1992, U.S. Representative Rick Boucher of Virginia sponsored legislation to allow NSF to develop computer networks for any use that allowed more expansion and participation on them,[35] permitting use of the Internet for purposes beyond research and education.[36] Responsibility for various aspects of the system was more widely distributed, eventually including participation by the Bush and Clinton administrations, public and private bodies outside the United States, university administrators, Internet service providers, computer vendors, and users. Commercial

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34. Moschovitis, Poole, Schuyler, and Senft, *The Internet: A Historical Encyclopedia—Chronology*, 107.

35. Ibid.

36. Moschovitis, Poole, Schuyler, and Senft, *History of the Internet*, 155.

entities offered Internet access for the first time to businesses and households. The ensuing formation of a more diverse user base led to further development of the Internet.

Social constructivism makes the point that the design of a technology is incomplete until it is put into use, which continues the process of incorporating interests, values, and social relations. A specific design is not permanent, since new debates and conflicts can arise as the design is applied within new social and historical relations. Given the new social horizon of users starting to interact with the technology, the structure of the Internet could change. This change to the Internet worried many of the researchers using the network. They were concerned that for-profit companies would exploit the Internet rather than help it develop.[37] While the interests of growth and expansion were shared by both the legislators who passed the law to open up the network and the researchers who had created the Internet, it was the enlargement of the user base beyond scientific and academia circles that caused concern for the researchers.

While the concerns of the researchers were largely about the commercialization of the Internet, perhaps the most striking new development on the network came from Tim Berners-Lee and Robert Cailliau of the French Conseil Européen pour la Recherche Nucleaire (CERN), who were interested in improving user access to information on their distributed network in the interest of easier data sharing and

37. Moschovitis, Poole, Schuyler, and Senft, *The Internet: A Historical Encyclopedia—Chronology*, 107.

collaboration.[38] CERN had thousands of researchers and hundreds of systems on its network. They were looking for a way to distribute information across different kinds of computers and operating systems.[39] Frustration came from computing incompatibilities at CERN due to different network schemes; Berners-Lee initially wanted a simpler and more flexible way to retrieve information over a network with a number of operating systems.[40] Berners-Lee developed a *hyperlink* system. In hyperlink systems, documents and texts, normally accessed in sequential order, can be accessed non-sequentially through links in the form a word or a phrase of text. If the link was in the form of a word or phrase, it was called *hypertext*. A hyperlink would jump to another document related to the link. Hyperlinks were an alternative way to organize information.[41] Berners-Lee also developed a protocol for accessing data and traversing hyperlinks, called the Hypertext Transfer Protocol (HTTP), and a code designed to enable movement of data across the network, called the Hypertext Markup Language (HTML).[42]

In 1989, Berners-Lee and Robert Cailliau introduced on their network this system designed to simplify navigation to different sources of information. The basic building block was a section of text, or a *web page*, accessible to other computers.

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38. Abbate, *Inventing the Internet*, 212-218.

39. Moschovitis, Poole, Schuyler, and Senft, *History of the Internet: A Chronology, 1843 to the Present*, 126.

40. Ibid., 162-164.

41. Moschovitis, Poole, Schuyler, and Senft, *History of the Internet: A Chronology*, 37; Paul Ceruzzi, *A History of Modern Computing* (Cambridge, Mass.: The MIT Press, 1998).

42. Moschovitis, Poole, Schuyler, and Senft, *History of the Internet: A Chronology, 1843 to the Present*, 164.

Some text on the web page was actually a link to other information, either on the same web page or somewhere else on the network, so that one web page became a way to link together different data. This application, known as the World Wide Web, eventually ran on the Internet, allowing links to be made to information anywhere on the Internet. The World Wide Web is a way to navigate around the Internet, which is the interconnection of computer networks. Eventually, individuals and businesses started to utilize the World Wide Web, especially when software had been developed that enabled people to use the Web without much technical knowledge.[43]

The basic design of the Internet, such as the openness of the TCP/IP protocols that give access to a variety of networks and data, allows the development of applications such as the World Wide Web, applications that run on top of it.[44] The Internet embodies the interests of the designers at IPTO and the users such as the scientists at CERN, all of them valuing a collaborative network that was inclusive to a variety of participants and incorporated the human interests and needs of a scientific community. The Web furthers these interests by facilitating a simple and flexible way to access data over the Internet that is compatible with a number of operating systems, a scheme that satisfies the interests of not only Berners-Lee, Cailliau, and CERN, but also a much broader community of non-technical users.

With the withdrawal of government and the entry of commercial suppliers in the early 1990s, the Internet became widely accessible and, for the first time, enabled

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43. Ibid., 156.

44. For more on the dependence of the Internet on applications like the World Wide Web, see David Clark, Lyman Chapin, Vint Cerf, Bob Braden, Russell Hobby, "Towards the Future Internet Architecture," IETF RFC 1287, Dec. 1991; Network World, vol. 9, 18 May 1992: 37.

electronic commerce as businesses connected to the Internet. Today, the Internet is not owned or funded by a single institution that regulates its design or use. Since 1992, regulation of the Internet has largely been managed by organizations composed of volunteers. The major regulatory organization is the Internet Society (ISOC).[45] It appoints the Internet Architecture Board (IAB) sub-council, which decides on standards, network resources, and network addresses. The Internet Corporation for Assigned Names and Numbers (ICANN) is the organization that coordinates the assignment of unique identifiers for use on the Internet.[46] All participants and managers are volunteers, though their work is usually funded by their employers or sponsors, which brings into question their potential biases.[47]

Despite the fact that the technology of the Internet continues to evolve and face challenges, the fundamental architecture of the Internet has remained largely the same. It still utilizes the method of packet switching, the protocols of TCP/IP, the principle of the end-to-end network, and it retains the ability to accommodate a diversity of applications, which may come from a variety of sources, including individual users. At the outset of the chapter, I stated that social relations result in specific interests being embodied in technology. The social relations that shaped the development of the basic design of the Internet emerged due to the free and open exchange of ideas and

45. In the acronym ISOC, the letter "I" stands for the word "Internet" and the letters "SOC" stand for the first three letters of the word "society."

46. These identifiers include domain names and Internet Protocol addresses.

47. My concerns with the current form of Internet governance, as well as alternative forms of governance, will be explored in Chapter Four of this dissertation.

information in scientific research and the need for productivity to secure funding from the government agencies overseeing the project.

Significant to the development of the network was that it occurred in a relatively closed community composed of mainly computer scientists until the late 1980s. The community was highly homogeneous and tight-knit. The members of this community shared a common interest: research in computer science. The community was also sustained by their similar origins in institutions, such as experience working in university labs, and by the continual communication that occurred among members of that community, for example, in conferences and through electronic communication. Therefore, interpretative flexibility was very low, that is, consensus in the community was relatively easy to build. Carol Gould describes scientific research as informed by the free and open exchange of ideas and information among members of its community, where these members are held as equals in respect to "their equal freedom to pursue scientific inquiry and their equal right of access to the information required for such research."[48] Gould also adds that scientific research disvalues "fraud, deceit, plagiarism, and withholding of the results of research from others."[49] The social relations involved in the development of the basic design of the Internet were informed by these values of scientific research. Above, utilizing a social constructivist approach, I elucidated the evolution of the Internet, explicating the social interactions and interests that led to fundamental design features of the Internet, including interests in

48. Carol C. Gould, ed., *The Information Web: Ethical and Social Implications of Computer Networkin*g (Boulder, CO: Westview Press, 1989), 6.

49. Ibid., 7.

interactive network computing and maximizing the participation of a diverse group of researchers and technologies on the network.

These interests pertain to the character of scientific research, involving open exchange of ideas and information among all the members of its community, and can be found in subsequent design choices. For example, the choice by DARPA to build a network using packet switching, not circuit switching, favored a highly experimental network that had never been tested before. With this kind of risk, it is unclear how big of a payoff the Department of Defense expected to receive, especially considering IPTO's implementation of Baran's plans involved few of his defense-related ideas. The choice of packet switching illustrates a strong commitment to the advancement of computer science in networking, since either success or failure would satisfy research interests. Further, the protocols of TCP/IP were designed specifically to avoid the need for additional data information and computing power, based on the interests of researchers, and they continued the embodiment of interests in a network open to participation and diversity. These protocols could have been designed differently. For example, the design of protocols could have required the incorporation of more information about the packets being sent over the network, information that would limit the diversity of new kinds of data used on the network.[50] My argument is that the Internet and the social environment in which it was created are intertwined, and that the design choices involved in these basic components of the Internet were contingent on the specific social interests—such as interactive computing and network diversity—and

50. Moschovitis, Poole, Schuyler, and Senft, *The Internet: A Historical Encyclopedia—Chronology*, 37.

the relations of the community that developed them—such as the ability of the researchers of IPTO to pursue their own interests in computer science.

Another social element that was impactful during the development of the basic design of the Internet was the authority of the government agencies that oversaw the project. The need for financial support from the Department of Defense and the National Science Foundation, which came after the DOD, was another element that shaped the social relations in the development of the network.[51] This financial support was the consequence of the research showing results. As long as the research was productive, these agencies supported the project, including its scientific character of openness and experimentation. In other words, these government agencies were less authoritative over the way the network was developed and more concerned with the productivity of the research. The authority of the governing agencies over the project facilitated social relations involving the necessity of productivity and accomplishment.

Additionally, while the development of the network was overseen by the Department of Defense, a social element that complicated the research of the computer scientists was that their work was supposed to relate to matters of defense in some way. While I have argued above that defense-related research was deflected by the scientists in IPTO, the authority of the Department of Defense remained a threat to the work the scientists were doing. The research did not have to strongly relate to issues of defense, but it did have to have some association. If the research was not related to these matters, the Department of Defense could then intervene with the work being done on

51. The National Science Foundation took over the development of the network from 1990 to 1992.

the project and force its development towards more defense-related issues.[52] While the scientists were largely successful in deflecting defense-related research, social relations were still informed by this need to be associated with defense at least slightly, as I will elaborate upon later in this chapter.

The social relations that shaped the development of the basic design of the Internet were the homogeneous community of computer scientists involving the values of free and open exchange of ideas and communication as well as the authority of the government agencies that funded the development of the network and had their own interests. In the previous chapter, I argued for the Marcusian perspective that institutions operate under constraints, following certain social imperatives that influence choices about both what will count as a technological problem and what will serve as a technological solution. In my exploration of the development of the Internet above, the computer scientists who developed the network defined the problems, the parameters of solutions, and thus the path of the evolution of the Internet. The interest of defense-related research was secondary to the interests of facilitating human needs and interaction, fostering a scientific community, and advancing computer science. The implementation of packet switching and the design of the protocols of TCP/IP embody the interests of computer scientists, who did not implement Baran's more secure packet switching design or more discriminating protocols. As a Marcusian perspective suggests, the Internet was developed through the framework of social imperatives that reveal the social formations of the character of scientific research and the influence of

52. The Department of Defense oversaw the development of the network from 1958 to 1990.

government oversight. However, his theory of technological rationality leads to the expectation that class structures will be embodied in the design of the Internet and, further, that the dominant class would subvert the realization of social participation by non-dominant classes in the creation of technology. My investigation of the Internet considers the potential for oppressive embodiment of interests, as proposed by Marcuse's theory of technological rationality. To the contrary, however, the hierarchical structure of the Department of Defense, wherein the upper level of administration supported research for defense purposes, seemed not to suppress the interests the community of computer scientists in IPTO. In fact, the interests of these computer scientists were embodied in the Internet while the interests of defense were largely sidelined. Nonetheless, Marcuse's argument that the ruling interests will be dominant may not be misdirected. The upper administration and the researchers shared an interest in advancing science and technology, albeit for different ends. Thus, I cannot separate the two parties in the embodiment of such interests, such as participation and the sharing of resources.

However, at least during the initial development of the Internet, the model of technological rationality as embodying class struggle is not applicable. The Internet developed through social processes allowing for broad influence on and participation in its structure, as illustrated by the Ann Arbor researchers who influenced Roberts' thought on the design of TCP/IP protocols. This participatory perspective on technological development does not readily lend itself to Marcuse's concern about technological oppression, at least in this stage of the evolution of the Internet.

For Marx, the material manifestation of social interests, needs, and relations, or objectification, is a positive process when they are represented in products. As I have shown, the social relations during the development of the Internet were embodied in the technology. Marx also employs the term use-value to express the practical aspect of products, their value in meeting human needs. The fundamental design features of the Internet, packet switching and the TCP/IP protocols, objectified the needs of those scientists who created and participated in the Internet. With the success of the packet switching network connecting sites across the country and the TCP/IP protocols allowing a variety of computers to join the network of the ARPAnet, the interests and needs of computer science researchers were represented in their work. The use-value of the ARPAnet is evidenced by the steady growth of its participating networks and users. The choices of design about the fundamental features of the ARPAnet—the choice between circuit switching and packet switching or the choices between alternative ways to configure network protocols—embody unique ways of satisfying the use-values of the Internet, objectifying the interests of the scientists, and their uses for the network.

During the development of two of the fundamental features of the Internet, packet switching and the TCP/IP protocols, the Internet was not yet commercialized and commodified. The labor involved in the production of a new multi-computer network involved a kind of collaborative effort by the scientists that did not obscure their participation in its development. The researchers, who were also users of the Internet, did not misconceive their product as an object existing without their interests and labor, a misunderstanding that Marx called alienation. However, when the Internet entered the marketplace after 1992, the threat of alienation through fetishism became a

possibility, that is, the commoditization of social relations where relations among people are mistaken for relations among things. In fact, as I pointed out above, researchers were concerned about the effects of commercial uses of the network and argued against it. The possibility of alienation deserves attention in the environment in which the Internet has existed since the 1990s; this will become a focus in later chapters of this dissertation.

Like Marx and Marcuse, Feenberg argues that social values are incorporated within technologies. He utilizes social constructivism to establish that the embodiment of social interests in technology are negotiated, leading to new developments in its design. The World Wide Web, for example, a program that runs on the Internet, embodies the interest in accessibility of data within a field of diverse computer technologies. Like Marcuse, Feenberg argues that the pervasiveness of a certain set of embodied values marginalizes other interests and exerts coercive influence on technological choices. Feenberg does not frame technology as solely and inevitably coercive, although he does concentrate on the social forces through which an exclusive set of values may be designed into a technology. The Internet is a positive alternative to the kinds of technological development that Feenberg generally studies, since in its fundamental design, the Internet is a minimally coercive system, avoiding exclusive interests, class domination, and alienation.

In the next section, I identify and explore in detail the social factors that contributed to the distinctive interests embodied in the fundamental architecture of the Internet: accessibility, openness, and decentralization. I separate these interests for analytic clarity. However, the three interests are not mutually exclusive but

complementary to each other, such that design features of the Internet that grew from one interest may also serve the other interests.

Distinctive Interests

Accessibility

Accessibility may be the clearest example of an interest that has been embodied in the basic design of the Internet.[53] By accessibility, I mean the ability of the users of the Internet to readily view and contribute data over the Internet. In the beginning stages of the designing of the Internet, the people involved in the project formed a relatively closed community of mainly university-based computer scientists whose goal was to create an advanced communications system that would link multiple networks together. The success of their research depended on their ability to communicate and collaborate. The value of accessibility of information was well situated in this academic environment of cooperative scientific research, as were the interests of open communication and experimental freedom.

A technical result of this interest in accessibility was the choice of packet switching. A main accomplishment of packet switching was that it ensures the accessibility of data because packets travel through decentralized interconnecting networks, allowing for transmission of data even if some of the networks are malfunctioning or disconnected.[54] The difference between circuit and packet switching

53. David D. Clark, "The Design Philosophy of the DARPA Internet Protocols," *Computer Communication Review* Vol. 18, No. 4 (August 1988): 106-107.

54. The accessibility of the packet switching network was especially important to the computer scientist Paul Baron, who influenced DARPA to create such a network. Baran created a network that would be accessible even in the extreme conditions of war, when parts of the network would likely be

is that packet switching avoids delays in transmission due to damage and error, making access to data over the network more ready and reliable. Thus, the ARPAnet embodied the interest of accessibility in its basic design of packet switching.

The high value placed on accessibility by the researchers involved in the early development of the Internet is also illustrated by what they built on top of the network they were creating. A key example is the application called electronic mail (or email). In 1971, Ray Tomlinson wrote the first successful programs that facilitated the exchange of email among ARPAnet users.[55] In time-sharing systems, where many terminals at one site were connected to a host computer, message programs were already being used, but those programs provided little advantage over regular office or campus mail. Email allowed quick messages to be sent over the network to separate host computers across geographical locations. The director of DARPA at the time, Stephen Lukasik, quickly became an advocate of email, even though he cautioned his researchers that their work needed to relate to defense.[56] Lukasik realized that email had a use-value: it was an efficient way for him and his employees to communicate with each other, allowing research questions to be answered much quicker than before email. As a resource for ARPAnet users, email grew quickly in popularity. In fact, in the late 1970s, IPTO's report to the management of DARPA concluded that "the largest single surprise of the ARPAnet program has been the incredible popularity and success

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damaged.

55. Moschovitis, Poole, Schuyler, and Senft, *History of the Internet: A Chronology*, 73.

56. Hafner and Lyon, *Where Wizards Stay Up Late*, 193.

of network mail."[57] And as usage grew, email messages became more casual. Hafner and Lyon write, "The ARPAnet was official federal government property, but network mail was being used for all manner of daily conversation."[58] Furthermore, people with access to the network began to use the ARPAnet for personal reasons, for types of interactions beyond the approved use of the network.[59] Therefore, even though the ARPAnet was not intended as a message system, the users of the network developed ways to send messages to each other. These casual messages were recognized as outside of the goals of defense and of project research, even by those who sent them. However, when the ARPAnet community started messaging about the appropriateness of personal statements over the network in 1979, "what emerged from the debate was strong evidence that the networking community felt a deep stake" in the creation of the network and that the network needed to include the freedom of open communication.[60] The successful defense of email as a tool for open communication illustrates a key interest in the values of scientific research in DARPA at the time.

From a social constructivist perspective, the development of email indicates an alternative social interest that expands the use-value of the Internet in a new direction. Messages sent over the connecting networks were a new use of the Internet. Email was not an official directive of DARPA, but a creation by users of the ARPAnet for

57. Ibid., 214.

58. Ibid., 209.

59. One example is email being used for the retrieval of a forgotten razor. In another instance, "Rumor had it that even a dope deal or two had been made" over the network. Hafner and Lyon, *Where Wizards Stay Up Late*, 188.

60. Ibid., 211.

communicating with each other in less official or formal ways. Email represented both the desire to maintain an informal social structure and the desire to communicate about research efficiently. And while DARPA leaders were initially skeptical of the appropriateness of using the network for small, informal communications, ARPAnet user interest in email was overwhelming. While email was eventually accepted by managers of DARPA as an appropriate use of the network, that outcome was contingent on social factors, which in turn impacted the development of the Internet. The history of email exposes the contending interests at play in the development of the Internet: those of the scientists and academics on ARPAnet who developed and used email to make the flow of communication on the network better, and those of the Department of Defense in the using the network to share research data by formal, official means.[61] Ultimately, email embodied the interest of accessibility and open communication valued by the scientific community.

The creation of the World Wide Web for the Internet, discussed above, also illustrates how fundamental accessibility was to developers of the Internet. As originally conceived, the Internet project was focused on sharing resources. The World Wide Web was mainly developed because of the interest of Tim Berners-Lee and Robert Cailliau in a simpler, more accessible way to link information together, making information from different sources on the Internet more easily available to users who wanted it.[62] The World Wide Web application developed by Berners-Lee and Cailliau was originally approved as a side project. Today, it is an integral part of how

61. Ibid., 189.

62. Abbate, *Inventing the Internet*, 212-218.

information on the Internet is accessed. Like the development of email, the creation of the World Wide Web was motivated by the distinctive interest of the users of the Internet in making information more readily accessible to the users in the community.

I have argued that the accessibility of the network built by DARPA was not simply a result of a technical necessity. Accessibility was an interest already well-situated in the community of scientists that originated the design of the Internet. Email, although not serving the goals identified at the inception of the DARPA project, nevertheless became the most used application on the network because it allowed the users of the network greater access to each other. The development of email and the World Wide Web are especially noteworthy because they were applications driven by the interests of the computer scientists working within the new communications system, not by the specific or explicit goals of the organizations that employed the scientists. Accessibility itself was a driving interest in the development of the Internet, as a goal of the DARPA communications project and personally for the designers involved in creating the Internet.

Openness

How the interest of openness is embodied in the Internet is perhaps not as obvious as the interest of accessibility. But, like accessibility, openness was a goal of the Internet from the beginning. Clark writes that among the original goals for the ARPAnet, the network was to "support multiple types of communications service," "accommodate a variety of networks," and "permit distributed management of its

resources."[63] In other words, the design of the ARPAnet should be open to accommodate the needs of disparate types of communications and networks, suggesting an early commitment to open development of the Internet itself.

The term openness as it applies to the Internet has two different components: openness of technology and openness of information. Openness of technology means, first, that the Internet is open to different hardware and software. This is the kind of openness the protocols of TCP/IP help to ensure. The protocols of TCP/IP were devised so that differently structured computer networks could conceivably use the protocols to connect to the network. Thus, an open Internet network means that individual connected networks may be separately designed and developed, each with its own unique interface in accord with the requirements of that network. Open technology also involves open standards for development of the Internet, where protocols and code can be freely used by many people. While the DARPA communications project had specific goals from its inception, the network was not designed for just one type of application, but was built to be a general infrastructure allowing new applications to run on it, as illustrated by email and the World Wide Web.

Openness of information has two aspects. One aspect is the way the network transmits different kinds of information without preference. Personal emails are treated by the network the same as important government documents. Since the ends of the network process the data sent over the Internet, the network itself does not process data, but simply transmits it as if all data is the same. With this end-to-end principle of data transfer, the network incorporates a principle of data neutrality: all information is

63. David D. Clark, "The Design Philosophy of the DARPA Internet Protocols," 106-107.

treated equally. As described above, this end-to-end principle was developed because of the interests of the ARPAnet users, who were reluctant to have the network interfere with their own technology and thus limit their control over their machinery. And while this interest was apparent to Roberts back in 1967, openness was a continual interest embodied in the protocols of the Internet, as I will argue below.

The openness of the ARPAnet does not mean that there was a lack of concern about the security of the network. Security measures were part of the project from the beginning, allowing only people approved as part of the project to access the network. While the network continued to grow among the government and universities of the United States, the network was still closed to anybody not approved by the government, such as commercial parties. The ability to exchange ideas freely and openly does not mean that researchers were not concerned about securing their research from corruption or plagiarism. The characteristics of scientific research which support free and open exchange of ideas are not in line with the production of a technology in a competitive environment where secrecy and security is desired for reward of funding, for future commercial profit, or for greater development of the technology by other countries. While openness was an essential aspect of the scientific research being conducted for the project of ARPAnet, security was also part of the environment in order for the openness to persist among the limited amount of researchers that were part of the project.

The second aspect of openness of information is the ability to collaborate in the production of information on the Internet either by adding or changing content. Users are able to participate on the Internet, for example, by creating their own web pages or

adding content to existing web pages through the option to comment on a web page. Roy Rosenzweig writes that participation and creation on the web far exceeded expectations, and that a survey in 1997 showed "an astonishing 46 percent of web users have created their own pages."[64]

This interest in open collaboration is also illustrated by the development of open source software in the community of programmers. Some examples of open source software that are important to the Internet are SendMail, a mail transport program that serves much of the email traffic on the Internet, and BIND, a program that every Internet address depends upon.[65] Open source software is relevant to programmers, as it is often associated with motivating innovation, creativity, and diversity in design, as well as to users since the Internet relies on many open source programs for some of its basic functions, such as mail transfer. Unlike software that is developed by a company and sold to customers, open source software is developed freely by a community of programmers and is licensed to allow other programmers the right to modify or extend the software.[66] A software program is a series of instructions for a computer. A program is originally written as commands in a human-readable computer programming language, called *source code*.[67] Computers cannot process the source

64. Roy Rosenzweig, "Wizards, Bureaucrats, Warriors, and Hackers: Writing the History of the Internet," *The American Historical Review*, Vol. 103, No. 5 (December 1998): 1551, referring to Graphic, Visualization, and Usability Center of Georgia Tech, "8th WWW User Survey" (December 1997), www.gvu.gatech.edu/user_surveys/surveys-1997-10/#highsum.

65. Samir Chopra and Scott Dexter, *Decoding Liberation: The Promise of Free and Open Source Software* (New York: Routledge, 2008), 15, 106.

66. Chris Woodford, *The Internet: A Historical Encyclopedia—Issues* (Santa Barbara: ABC-CLIO, 2005), 195.

67. Ibid., 195.

code of a program directly, so the program is translated into a format called *object code*. Object code consists of strings of binary numbers (zeros and ones). It is impossible for a programmer to work back from the object code to the original source code. If a programmer wishes to allow details of the program to be known and used—and perhaps modified—by other programmers, the software is designed to be open by providing the source code along with the program, so the code can be used, rewritten, and distributed freely. The interest of open collaboration is then designed into open source software, carrying and allowing access to the source code. Programs that have been developed as open source software allow other programmers to improve upon the programs.[68] Here, I am not referring to the basic design of the Internet. However, the pervasiveness of the interest in openness in the area of software design reinforces my claim that openness was a fundamental interest in the development of the Internet.

As Clark explains above, the interest of openness was explicitly part of the project that led to the basic design of the Internet. However, this interest in openness extended beyond the stated goals of DARPA. In the institutional, scientific environment in which the Internet developed, the research scientists already supported the values of open communication and collaboration. The participating scientists were also granted the freedom to communicate and collaborate openly by the government that managed and funded their research.[69] DARPA was a government agency that was aimed toward scientific research that could lead to technological advancement that would serve

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68. Today, open source software is used by large commercial websites and web servers, which run the open source Apache product, and most email is transferred with the open source Sendmail software.

69. Junghoon Kim and Tomoaki Watanabe, "The Social Construction of the Internet and Emerging Problems of Internet Governance," presented at Bugs (Montreal, April 2002): 5.

national interests, so scientists working for DARPA were encouraged to embrace the scientific principle of collaboration and open communication. Openness was a goal not only for the communications system being created by DARPA but it was also a goal for DARPA employees, who perceived it as essential to the success of their research. From the early days of the development of the Internet through the early 1990s, the federal government backed the production of open source software and open standards.[70]

While the history of the Internet indicates that the interest in openness has been around since the beginning of the DARPA projects, this does not mean openness was a technical necessity. For instance, the protocols of TCP/IP did not have to be the standard for the Internet, for other protocols were technically acceptable.[71] The protocols of TCP/IP were developed without concern for their commercial performance or issues of payment for the use of the network. Alternative designs were backed by suppliers of telephone systems, who were interested in maintaining their control over communications systems in general.[72] Gilles and Cailliau write that the telephone companies "concentrated their efforts on designing a system that would be easy to charge for rather than one that would be easy to use."[73] Abbate writes that proprietary standards tend to favor manufactures of products and decrease compatibility between different products. To avoid incompatibility issues with new products, formalized open

70. Roy Rosenzweig, "Wizards, Bureaucrats, Warriors, and Hackers: Writing the History of the Internet," 1549-1550; Abbate, *Inventing the Internet*. MIT Press, 178.

71. Abbate, *Inventing the Internet*, 147-179.

72. James Gilles and Robert Cailliau, *How the Web was Born: The Story of the World Wide Web* (New York: Oxford University Press, 2000), 65.

73. Gilles and Cailliau, *How the Web was Born*, 65.

standards may be established. Formal standards are authorized by organizations nationally or internationally, and open standards are created to allow participation of users and designers, thus embodying both openness and accessibility.

Standards can be a form of control over technology or a form of openness in technology.[74] Open standards permit significant interchangeability in terms of design; if all manufacturers of a device use the same standards, products from different manufacturers will work together. With open standards, users of the Internet can choose products on the basis of performance or price, rather than what is simply compatibility. As Abbate argues, open standards can empower users of technology. Open standards can allow for greater choice and more individualized interests to be satisfied, as opposed to the marketplace controlling these aspects of our relations with technology. The opposite approach by some manufacturers is to keep standards of a product from being publicly known. Abbate explains, "Large firms such as IBM have often tried to protect their established markets by keeping their internal product standards secret," making it difficult for other vendors to offer compatible products.[75] These proprietary standards kept secret by firms create products that only work with their own standards; such firms may charge a licensing fee to other manufacturers if the firms allow these manufacturers to use their standards.[76] This type of commercial interest keeps standards a secret, produces incompatibility between products, limits technological choices, and

74. Abbate, *Inventing the Internet*, 147.

75. Ibid.

76. Ibid., 149.

suppresses interests outside of commercial interests from being embodied in technology.

The users of ARPAnet were supportive of open standards for the protocols, specifically TCP/IP. These users saw alternative protocols –most specifically, one known as X.25—supported by the telecommunications companies as attempts to use protocol standards "to impose their vision of a worldwide network system on computer owners and network operators."[77] The difference between the TCP/ IP and the X.25 protocols focused on an aspect of networking called *virtual circuiting*, which is when the individual packets of data are converted into an ordered, continuous, and error-free stream of data.[78] With the protocols of X.25, the virtual circuit was provided by the network, where the network was responsible for the routing of information in organized packets of data. With the protocols of TCP/IP, the computers at the ends of the network were responsible for providing the virtual circuit. To the telecommunications companies hoping to run a network, the best protocols allowed them to regulate the transfer of data over the network. However, computer users such as the researchers in DARPA, preferred that individual computing sites have maximum control over network performance, so that they could determine how best to satisfy their own computing needs. With the protocols of TCP/IP, the network was simply a means of providing a connection between computers, with a minimal amount of regulation from the network itself.

77. Ibid., 152.

78. Ibid., 156. The term virtual circuit refers to a dedicated circuit between two host computers, where the data is ordered, continuous, and error-free.

Abate writes that the protocols of X.25 illustrated an alternative view of the Internet, "a centralized, homogenous internet system in which network operators controlled network performance."[79] With the design of the X.25 protocols, network providers could control the quality of service provided to users, possibly charging more for better service. In addition, unlike the open protocols of TCP/IP, alternative protocols could have been closed in order to control the data running over the networks (for example, certain types of data transfers or sizes of data packets). Support for the protocols of TCP/IP as the standard protocol of the Internet also gave preference to equal treatment of information, which further devalued commercial interests related to computer networking.

The increasing popularity of computer networks created international interest in the standards for network protocols.[80] Abbate writes that the choice between protocol standards illustrated that "the Internet and its creators were no longer operating in the insulated world of defense research; they had entered the arena of commerce and international politics."[81] The protocol standards had political significance. Abbate explains that "most national governments actively promote the competitiveness of their domestic industries," arguing that standards for products might involve political interests (representing national accomplishments and economic benefits). Since TCP/IP protocols were used by the Department of Defense of the United States, the U.S. government had an interest in making their protocols the standard for networking in the

79. Ibid., 167.

80. Ibid., 147.

81. Ibid., 152.

future. To ensure the adoption of TCP/IP by other networks being developed around the world, the Department of Defense released TCP/IP publicly, thus fostering an open standard of computer networking.[82] While the openness of the protocols satisfied the interests of computer users and DARPA researchers, it also allowed the protocols of the United States government to become the standard of networking internationally.

As Janet Abbate writes, the debate about the acceptance of TCP/IP as the standard protocol of the Internet revealed "the economic, political, and cultural issues underlying these arguments."[83] Members of the United States government and the researchers at DARPA favored an open network, sacrificing the greater control over network functions in order for the network to develop openly and be more compatible with other technology. The openness of TCP/IP also allowed for those standards, developed by the United States government, to become the standard internationally, illustrating technological achievement. As well, since the protocols were already largely used in the United States, the country did not have to adjust its technology, which would be costly. Lastly, the TCP/IP protocols embodied the interests of accessibility and openness, regardless of profit or commercial potential, reflecting the interests of the scientists and users of the ARPAnet in the transfer of a variety of data over the network without discrimination.

82. Rosenzweig, "Wizards, Bureaucrats, Warriors, and Hackers," 1536.

83. Abbate, *Inventing the Internet*, 152.

Decentralization

The interests of accessibility, openness, and decentralization are not mutually exclusive, and often these interests complement each other. An interest in accessibility produces the development of a reliable and robust communications system that allows information to be readily and broadly available. Openness encourages the diversification of networks, hardware, software, and information on the Internet, along with the ability to access the information and to participate, which includes a transparent and participatory architectural design. Decentralization is woven throughout these interests but specifically refers to the distributed nature of the operation of the Internet, where there is no hierarchical treatment of data and no central computer, or set of computers, that regulate the entire system. An additional feature is the decentralization of control over the operation of the Internet. Both the openness of the Internet and its accessibility to different networks are complimented by the decentralized group of organizations that have brought a variety of interests to overseeing the network since its 1990 decommissioning by the Department of Defense.

The adoption of the packet switching system made the Internet a decentralized, or distributed, network from its very inception. Neither Paul Baran nor the members of DARPA expected that this distributed network for the purpose of remotely sharing of the resources of different computers would be used for communication by email, much less that the email application would become central to the wide use of the Internet. Had the network been centralized so that the ways it was developed and used could be better observed and controlled, email might not have been able to develop as it did

(since email involved informal, non-defense-related communication). Abbate writes, "The organizational culture surrounding the ARPAnet was notably decentralized, collegial, and informal."[84] The coordination of research relied largely on collaborative arrangements between the different research sites, where technical decisions were usually made by consensus. This collegial management style was typical for scientific research. Abbate explains that at DARPA, which was primarily comprised of scientific researchers, it was believed that the best way to get results was "to find talented people and give them room to work," often in areas the researchers had explored independently.[85] In the decentralized environment of DARPA, people were generally treated as collaborators and were encouraged to experiment with new ideas. Abbate explains that researchers also viewed DARPA as an agency that funded research "with few strings attached," which made talented scientists want to join its projects.[86] The success of DARPA research and the ARPAnet satisfied the interests of the Department of Defense for technological progress while allowing an informal and collegial style conductive to the character of scientific research involving experimentation and innovation.

The decision to use packet switching for APRAnet was a choice away from a centralized system. This choice, made to ensure that communication was possible on the system even if some interconnected networks were malfunctioning, reflected a greater interest in accessible communication than in controlled communication, since a

84. Ibid., 54.

85. Ibid., 55, 77.

86. Ibid., 77.

decentralized network makes regulation of data more difficult. The embodiment of the interest in a decentralized network also makes it difficult for a single set of interests or a single source of power to appropriate the Internet.

Social constructivism argues that the choices made in alternative technological designs do not ultimately depend on the technology, but rather on the interests and needs of the various social groups that are involved in the design process. In Marxian terms, the design of a technology embodies the relations of the social environment in which it was created. This chapter has established that the embodiment of three distinctive interests in the Internet—accessibility, openness, and decentralization—were the result of the social relations of a particular time and place involving the values of scientific research (such as maximizing the inclusivity and diversity of researchers, information, and technologies) as well as the government agencies that oversaw the development of the project (which emphasized productivity especially). I argued that the choice of packet switching, and not circuit switching, incorporated the interest of accessibility and that the evolution of the Internet protocols involved a struggle between the interest in closed standards for commercial enterprise and open standards that favor participation, collaboration, and diversity. The two kinds of protocols met different needs and embodied different interests. Additionally, the acceptance of email by the Department of Defense was a choice between control over the network, enforcing formal standards and stricter management of research activities and of communication in general, or a more open and accessible network, embracing a more accepting and diverse approach that allowed for experimental research beyond strictly

defense-related matters. Openness and accessibility are also embodied in the development of the World Wide Web and open source software.

If available alternative choices had been made in the development of the Internet, the network would likely be very different. For example, the network would rely on a centralized organization for the transfer of data with circuit switching. And with protocols like those of X.25, that centralized organization would have the potential to regulate the transfer of data in order to discriminate against certain pathways, possibly for economic reasons—in order to bill more for quicker or larger packets of data transfer. It is difficult to determine how applications such as email and the World Wide Web would have developed had there been greater interest in the commercialization of the Internet. It seems reasonable to suppose that with a centralized and closed network, the ability to use and contribute to the design of applications and programs would have been limited. This plausible alternative development of the Internet addresses different needs and embodies different values, illustrating that the development of the Internet with the distinctive interests of accessibility, openness, and decentralization was not a result of a technological need. Instead, the embodiment of the distinctive interests of accessibility, openness, and decentralization in the basic architecture of the Internet was a result of the social relations of its production.

Conclusion

This chapter has shown that the Internet was designed to be accessible, open, and decentralized, reflecting the interests of the dispersed, collaborative scientific community that created it. The network was designed to allow its early users to contribute to the Internet, to participate, interact with, and affect the system in a variety of ways, and thus to become creators as much as users. But while the decentralized design does not favor the interests of content control and commercialization, the basic design of the Internet does not exclude these interests, especially considering the core interests in accessibility and openness. In fact, one of the attributes of a decentralized network is that it is difficult, in the long run, for one interest or set of interests to supersede other popular interests.

My investigation of the interests embodied in the Internet has concentrated on its development, considering the context in which the basic architecture of the technology was designed. Above, I argue that the design of the Internet embodied the social interests, needs, and relations of a government-sponsored research community working across four decades. And considering that the culture of DARPA and other designers involved in envisioning the Internet as a technology open to their contributions, the Internet is a product in whose production designers and users have been engaged in objectification without much alienation. As Marx theorized, one form of alienation arises when a product, such as the Internet, which is a result of human labor within a set of social relations, is misconceived as a thing existing without human participation. The structures of production and the market can alienate people from the

social relationships that objectification enables. For reasons demonstrated in the discussion above and to be further developed in later chapters, alienation has not been a central feature of the production of the Internet.

Above, I have argued that the fundamental design of the Internet embodied interests that created a minimally coercive technological system during the time of its development, avoiding exclusive interests, class domination, and alienation. While the community involved in the development of the fundamental design of the Internet was limited to scientific researchers and government elites, the context in which the Internet operates has continued to develop and expand, incorporating commercial interests and extending to businesses and private households across the world. Social constructivism suggests that the outcome of competing designs is not permanent, since new debates and conflicts regarding a design can arise as the design is applied to new social and historical contexts. How does this new environment affect social relations involving the Internet? For instance, has the commercialization of the Internet obscured the social relations involved in its objectification and produced alienation? Has the labor involved with the Internet become valuable less for its creative self-objectification and usefulness and more for its ability to generate exchange, resulting in the objectified social relations within the Internet being misunderstood as a relation between things, as a site of fetishism? Another set of questions formed in the current context of the technology involves the interests of accessibility, openness, and decentralization. Do these interests remain central to developers and users of the Internet? Given that they are pervasive interests embodied in the Internet, I will analyze whether they have come to marginalize other interests and exercise a coercive influence over other interests and

needs in the new commercial, global context. These are questions I take up in the chapters that follow.

CHAPTER THREE

COMMERCIALIZATION AND THE INTERNET

The context in which the Internet operates has continued to develop and expand since the networks basic architecture was developed as a government project by the Defense Advanced Research Projects Agency (DARPA), extending to business and private households across the world and incorporating more commercial interests. In this chapter, with an extension of a Marxian analysis, I investigate the Internet as a system of production, distribution, and consumption of information, goods, and services involving both use-value and exchange-value.[1] I examine the commodification of information and communication on the Internet, showing that market values have the potential to obscure other social relations involved in the technology. The investigation focuses on the commodification of personal information through the collection of data about the activity of Internet users by marketers to be used for commercial purposes in targeting product advertisements towards particular consumer groups.

This use of information, I argue, exploits and transforms the interest of openness embodied in the basic design of the Internet. As established in Chapter Two, the embodiment of the interest of openness involved the diversification of networks, hardware, software, and information on the Internet, a transparent and participatory

1. I am extending and applying a Marxian analysis to the Internet, beyond his work on capitalist forms of labor in an industrial age in factory or factory-like settings concentrating on a material foundation of the accumulation of capital and the production of surplus value. As I will explicit, this extension of Marx's work in this chapter is useful in exposing forms of exploitation on the Internet involving its commercialization.

architectural design, and the ability to access and produce data on the technology. Since openness—especially the openness to software and the continuing transparency of information—has come to serve commercial values, I analyze the openness of the Internet for its possible coercive uses and the potential deformations that a predominance of exchange-value over use-value may bring to this technology. However, the continuing production of open source software and alternative non-commercial platforms on the Internet suggest a countervailing activity that prevents the social relations involved in the creation of information goods and services from reducing the Internet to a site of exchange-value alone. Although commercial interests have the potential for the alienation and exploitation of Internet users, I argue that commercial interests have not been able to dominate the technology's distinctive interests of accessibility, openness, and decentralization, and that users retain the ability to circumvent the forms of technological oppression resulting from the commercialization of the Internet.[2]

This chapter continues my analysis of the social and political dynamics of the technological development of the Internet, building upon the work of Karl Marx, Herbert Marcuse, and Andrew Feenberg. The social relations involved in the Internet as they relate to the design of the technology have been underdeveloped in philosophical treatments of the Internet. In particular, theorists of the Internet have not yet undertaken a detailed analysis of the forms of technological oppression related to a Marxian

2. The cases and examples I give in this chapter about the commercialization of the network will change, given that the Internet is still developing.

analysis of fetishism.[3] My argument uniquely articulates how the interests embodied in the basic design of the Internet relate to social struggles and exploitation, as well as current and potential social forms of cooperation, participation, and self-determination.

Social Constructivism on Changes in Technology

The social constructivists argue that new debates and conflicts regarding a design of a technology can arise as it enters new social and historical contexts, instigating changes to its design. This process can potentially lead to the embodiment of new interests and values as well as new possibilities for technological oppression, as I will argue is occurring with the Internet as it becomes more of a commercial enterprise. Constructivism proposes that the introduction of a technology to new social groups instigates a process of *interpretative flexibility*, whereby the meanings of a technology can be reconstructed and the interests embodied in the technology can be altered.[4] For example, as noted in Chapter One, Bijker and Pinch write that the development of the bicycle with air-filled tires, rather than solid rubber tires, represented a convenient and safe mode of transportation to some people but traction problems and ugliness to

3. About the academic literature on the Internet, Douglas Kellner writes there is an absence of detailed and convincing work on alienation, calling for a study of "what sort of alienation is being produced, how this is happening, what is bad about it, and how it can be overcome." This chapter serves as such a study. Douglas Kellner, "New Technologies and Alienations: Some Critical Reflections," in *The Evolution of Alienation: Trauma, Promise, and the Millennium*, ed. Lauren Langman and Devorah Kalekin-Fishman (Lanham, MD: Rowman & Littlefield Publishers, 2006), 60.

4. Thomas P. Hughes. "The Evolution of Large Technological Systems," in *The Social Construction of Technological Systems: New Directions in the Sociology and History of Technology*, ed. Wiebe E. Bijker, Thomas P. Hughes, and Trevor J. Pinch (Cambridge, MA: MIT Press, 1987), 40-44.

others.[5] These alternative interpretations of one feature of the design of the bicycle foregrounded interpretations of the bicycle itself — as either a mode of transportation or a thrill-producing device for adventure. These different interpretations led to different problems and further developments of the bicycle by relevant social groups. In Chapter One, I also analyzed how the French Minitel device, originally designed to distribute information to people, was perceived by its users as the solution for other kinds of human communication, transforming the system to accommodate the exchange of instant messages. Thus social groups construct different problems that a technology might solve, engaging diverse uses of the technology and suggesting alternative designs.

As I have argued, a technology is not fully determined by its technical specifications and capabilities. With the Internet, there were alternative paths of development, such as different protocols that allowed for more commercial possibilities for the network. However, the social values determined that the protocols of TCP/IP would be implemented, instead of alternatives such as X.25. As the Internet continues to develop within a wider field of social groups, the interests and values embodied in the Internet are being reinterpreted. In the case of the Internet, a key occurrence of interpretative flexibility occurs with the struggle to appropriate the Internet for commercial uses. The development of the Internet can involve countervailing interests incorporated into the technology during periods when the technological change is driven by solutions to diverse problems for different social groups. For example, in

5. Trevor Pinch and Wiebe Bijker. "The Social Construction of Facts and Artifacts," in *The Social Construction of Technological Systems*, ed. Wiebe Bijker, Thomas Hughes, and Trevor Pinch (Cambridge: MIT Press, 1997).

Chapter Two of this dissertation, I identified the openness of the Internet as an emancipatory feature of the basic design of the Internet. However, the openness of the technology can be employed towards various ends by different social actors. This chapter considers the question of whether the entry of commercial interests has deformed openness, by causing the Internet to systematically reflect and embody the interests of some groups in society and to systematically neglect and exclude the interests of others groups, thus leading to a form of technological oppression. The next section sets the context for these questions through an overview of the development of the commercialization of the Internet. I focus on the design features of accessibility and openness as they have been employed to collect personal data about Internet users.

A Brief Overview of
The Commercialization of the Internet

Since 1990, the Internet has not only grown but has also taken on a more commercial orientation. Commercial interests had been prohibited on the Internet until 1992. Before this time, the network was accessible only to people affiliated with the government or a university; no commercial providers could sell access to the Internet. Beginning in 1990, the networks of the Internet were run by the National Science Foundation, which used dedicated circuits provided by MCI and packet switches made by IBM. The foundation continued expanding the networks of the Internet through a consortium named Merit, made up of MCI, IBM, and universities in Michigan.[6]

6. Janet Abbate, *Inventing the Internet* (Cambridge, Mass: MIT Press, 1999), 8-9; Thomas J. Misa,

Internet use was still limited to organizations that received government research funding and universities until 1992. In that year, U.S. Representative Rick Boucher of Virginia sponsored legislation to allow for the expansion of the Internet to include commercial use of the networks.[7] Commercial entities, including the three major commercial long distance networks MCI, Sprint, and AT&T, began offering businesses and households Internet access through what became known as Internet Service Providers (ISPs), the first being America Online, Compuserve, and Prodigy. These companies introduced paid access to the Internet, instead of the free access that had been the rule.[8] Later, cable companies entered the commercial access market.[9] As a result, communications and media companies came to control most of the networking infrastructure of the Internet. The expansion of the Internet led not only to the formation of a more diverse user base but also to one interested primarily in profit.

Shane Greenstein credits the commercialization of the Internet to the success of the World Wide Web (or the Web).[10] He connects two events that happened around 1992: first, the creation of user friendly software applications called Web browsers that

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Leonardo to the Internet: Technology and Culture from the Renaissance to the Present (Baltimore: Johns Hopkins University Press, 2004), 191-194.

7. Moschovitis, Poole, Schuyler, and Senft, *The Internet: A Historical Encyclopedia—Chronology*, 107.

8. Michelle Kessle, "Pay-as-you-surf Internet Access Takes Off," *USA Today*, December 4, 2003, D1.

9. There are still non-commercial structures such as free wireless Internet access, but they are used by a minority of internet users.

10. Shane Greenstein, "Commercialization of the Internet: The Interactions of Public Policy and Private Choices or Why Introducing the Market Worked So Well," in *Innovation, Policy, and the Economy*, Volume 1, ed. Adam Jaffe, Josh Lerner, and Scott Stern (Cambridge, MA: MIT Press, 2001), 151.

permit users to traverse, retrieve, and view information resources on the Web; and second, the growth of businesses advertising on the Web. An important development was the capability of a web browser to connect to a website to search the Web. The Internet company Google is the best known example of a website offering a search engine to locate relevant data on the Web and supply links to relevant websites. User-friendly interaction with the Web through web browsers and the ability to search through the data on the Web by using search engines, Greenstein argues, opened the way for successful business and advertising on the Internet.

The basic business models that dominate the Web today, Christian Fuchs argues, are advertising and selling services to users.[11] The dominance of advertising as a business model on the Internet, he claims, "can be seen in the fact that 9 out of the 10 most accessed Web platforms make use of it for accumulating capital: (1) Google, (2)Yahoo.com, (3)YouTube, (4) Facebook, (5) Windows Live Search, (6) Microsoft Network, (8) Blogger.com, (9) Baidu.com, and (10) Yahoo.co.jp."[12]

By 2006, business strategies related to the Internet had shifted from primarily providing information through advertisements on a particular website to building marketing strategies based on communication and cooperation. The social networking platforms, such as MySpace and Facebook, allow for online communication with other people, establishing or continuing some form of social connection through an integrated use of technologies (including personal profile webpages, email, forums, digital

11. Christian Fuchs, "Labor in Informational Capitalism and on the Internet," *The Information Society*, Vol. 26, Issue 3 (May 2010), 192.

12. Christian Fuchs, "Labor in Informational Capitalism and on the Internet," 192. The exception is Wikipedia, which is a nonprofit initiative.

images, and digital videos). The platforms also network users with other people through discussion forums, interest groups, and chat rooms. Such platforms typically attract as many users as possible by offering their services for free. They generate profit by selling advertisement space to third parties who favor the platforms based on the size and demographics of the user base.[13]

Social networking websites in particular value their users building online profiles, because surveying these profiles allows for targeted advertising.[14] However, posted personal data on profiles is not the only information collected by websites in the hope of attracting the interest of advertisers. Users also provide data when they sign up, move through the website, or contribute content. Additional user data is collected by auditing where people click, how long they stay on a page, and which computers are connecting to a website.[15] Since advertising is created to appeal to particular user demographics, it is reasonable that commercial websites with advertising would want to collect data on who is using their website. First, user information can be electronically surveyed for data, collecting data about particular keywords entered and pieces of information searched for on the Web. This data, processed by a marketing database, is used in the development of particular marketing strategies directed at individual users. For example, Google's popular email service, Gmail, provides users with 7.5 gigabytes

13. Christian Fuchs, "Labor in Informational Capitalism and on the Internet," 191.

14. Charles Vincent and Jean Camp, "Looking to the Internet for Models of Governance," *Ethics and Information Technology*, Vol. 6 (2004), 170.

15. Vincent and Camp, "Looking to the Internet for Models of Governance," 170.

of storage space.[16] In exchange, users agree to let Google survey their email for marketing purposes. As Gmail users send and receive emails, keywords found in their emails are tracked and inform the automatic display of individually targeted advertisements.[17]

Targeted advertising to individuals is the business model that has come to dominate the Web, where free Web services (such as a search engines, email, social networking sites, and online storage) are offered and funded through a sophisticated advertising system which trades on the personal information of its users.[18] Google gathers millions of search terms daily that help to refine its search engine system and provide detailed data for marketing purposes. Internet users who employ Google's search engine, upload videos on MySpace, browse personal images on Facebook, accumulate friends with whom they exchange content or communicate online via other social networking platforms are thus commodities to be sold to advertisers.

Commercial platforms with millions of users that spend an extended amount of time using the site can charge advertisers more per advertisement than a website with thousands of users who connect to the site for only a few minutes, making the most popular commercial websites potentially the most profitable. Thus, websites who make money from advertising revenue are incentivized to track both the number of users and visits as well as the length of time each user spends on the website. This kind of data

16. "Your Storage Limit," Google Inc., last modified October 11, 2010, http://mail.google.com/support/bin/answer.py?hl=en&answer=6558.

17. Joanna Glasner, "What Search Sites Know About You," *Wired*, April 5, 2005, www.wired.com/news/privacy/0,1848,67062,00.html.

18. Christian Fuchs, "Labor in Informational Capitalism and on the Internet," 191.

collection is generally automatically implemented by the computer of the user with the installation of a *cookie*, software that allows the website to recognize the user as she views and interacts with different parts of the website.[19]

As people convert their offline and online social networks into online data, commercial websites also collect data about their contacts in order to develop further advertising potential. With the increasing convergence between applications on the Web and Internet capable devices, people merge their information from mobile phones, contact lists from different email services, and contacts from social networking services, all of which maximizes contact information for marketing databases.

Companies can now create detailed demographic profiles for individual users employing aggregate data-tracking software to combine information for a single user from multiple sources within a single marketing database.[20] Tracking popular searches on their search engine is useful to Google itself. However, popular online stores such as Amazon may also find this same information useful because such search information can enable them to target particular products to particular users on their website. This kind of tracking for commercial purposes can span across multiple websites and is indicative of a large-scale development of information about users by multiple commercial companies over an extended period of time. Large interactive advertising agencies - DirectLink, Gostats and Hitbox, for example - track user movement by means of cookies. When a number of popular websites use these agencies, it becomes

19. Joanna Glasner, "What Search Sites Know About You," *Wired*, April 5, 2005, www.wired.com/news/privacy/0,1848,67062,00.html.

20. William Safire, "The Internet sells its soul," *The New York Times*, April 10, 2005, query.nytimes.com/gst/fullpage.html?res=9C06E3D7133FF933A25757C0A9639C8B63.

possible to track a user for an extended period of time and to collect ever more data about her as she connects to different websites.[21] Furthermore, in addition to tracking user data for internal use for Web platforms running commercial websites, these agencies collect and sell information about users to firms that compile lists of potential customers for direct advertising campaigns.

The evolution of the Internet as a platform for commerce has made it possible for organizations to gather data on its users, including browsing patterns, items purchased, movement across the Internet, dates and times of use, preferences, social groups, and even keystroke behavior. The commercialized Internet utilizes the openness and accessibility of the technology for the collection of data. This kind of data surveillance treats users of the Internet as consumers, partly transforming commercial websites into targeted advertising campaigns. Google provides a prototypical example of the capitalist relations arising from the incorporation of commercial interests into the Internet. Google is a profit-oriented company financed through advertising based on data surveillance which turns users and their personal data into commodities. Targeted online advertising produces profit for Internet corporations who use the technology for commercial purposes. Further, social networking websites often invite users to post their own commodity preferences - favorite music, movies, and books - which, in turn, provide data for advertising additional commodities directly to that same user on her social networking website. Dallas Smythe writes that such advertising business models are not primarily based on commodification of content, but on the commodification of

21. Charles Vincent and Jean Camp, "Looking to the Internet for Models of Governance," 170.

users.[22] With the rise of user-generated content, free social networking platforms, and other free platforms that yield profit by targeted advertisement, the primary source of economic value for commercial companies on the Web is providing data about their users to advertising clients who enable capital accumulation. Users of free, commercial websites contribute their unpaid time in an exchange relationship that gives the websites personal data to sell for directed advertising. The more users employ advertisement-based online platforms and the more time those users spend online producing, consuming, and exchanging data, the higher the cost of advertising on those platforms and the higher the profits for the businesses behind those particular platforms.

Marx and the Commodification of the Internet

Below, I will extend and apply a Marxian analysis to the business model of data surveillance for targeted advertising, arguing that profit is a distinctive feature of the commercialized Internet that involves alienation and fetishism. For Marx, objectification is the manifestation of human interests, needs, and relations embodied in a product. Alienation occurs when the products of human labor within a set of social relations are misconceived as things existing without human participation, as 'mere' objects without the social relations involved in their production. Further, labor in a capitalist society becomes alienated when appropriated for commercial purposes and sold as a commodity with exchange value. Laurence Ashworth and Clinton Free argue

22. Dallas W. Smythe, "On the Audience Commodity and its Work," in *Media and Cultural Studies KeyWorks*, ed. Meenakshi Gigi Durham and Douglas M. Kellner (Malden, MA: Blackwell, 2001), 233.

that that commercialization of the Internet has produced interactions under the framework of exchange, including the collection and dissemination of data online.[23] Users of the Internet engage in an exchange in which data is collected about them, either explicitly given by the user or implicitly supplied through data surveillance, and in return expect to receive something, such as online services, goods, or possibly monetary compensation (after taking an online survey perhaps). Ashworth and Free argue that in order for users of the Internet to consider the data they provide as part of an exchange with online providers, user data must be perceived as belonging to users themselves; that is, users of the Internet must perceive themselves as having ownership of data about themselves. This relationship between the user and her data, where the data incorporates and represents the user as a product of her labor online, constitutes a form of objectification. Ashworth and Free further claim that the exchange framework presupposes that users of the Internet perceive data about themselves to be valuable and worth the services or goods they receive in the exchange. For example, a limited amount of personal data may allow a user access to a website. However, Google's email service, with 7.5 gigabytes of storage, may be valuable enough to exchange for the surveillance of her data for keywords, which results in more targeted advertisements to her. For Marx, when people produce market commodities, the products of labor become valuable less for their usefulness and more for their ability to generate exchange for other commodities. Value belongs to the product itself in its exchangeability. Commodity fetishism, according to Marx, is a form of alienation, in

23. Laurence Ashworth and Clinton Free, "Market Dataveillance and Digital Privacy; Using Theories of Justice to Understand Consumers' Online Privacy Concerns," *Journal of Business Ethics*, Vol. 67, No. 2 (August 2006): 110.

that the embodiment of use-value and social relations of production are obscured. These commodities, now detached from their origins, are exchanged in ignorance of the fact that their value also arises from social productions and relations. When applied to the exchange of data on the Internet, utilizing data about users for targeted advertising either on a single website or by advertising agencies across different platforms obscures the original use-value of the data. The data becomes valued for its ability to target advertising without regard for the original value of the data.

Alienation as a result of the collection of data online is also discussed in a paper by Maria Bakardjieva and Andrew Feenberg.[24] In this paper about research methods on the Internet, they articulate an approach to compiling data from online chat rooms, where people with similar interests post comments to each other. Their approach can be applied to forms of alienation present in the commercialization of the Internet, beginning especially with their claim that the comments by chat room users are products of the labor of those people (the creation of the information and entry of the data) and that the use of those products requires permission from their producers. It is not primarily a violation of privacy to use those products without permission in a research study, they argue, since chat room participants should realize that their work is accessible to other people. Rather, Bakardjieva and Feenberg claim that the offense of using data without permission stems from the extent that chat room visitors have invested themselves in their work. In other words, as products embodying the interests and values of the users, their comments involve objectification. They write,

24. Maria Bakardjieva and Andrew Feenberg, "Involving the Virtual Subject," Journal of Ethics and Information Technology, vol. 2, no. 4 (2001): 233-240.

"Objectification in this sense is akin to self-realization, voice, creativity, and empowerment of the subject in the public realm."[25] Alienation then is the appropriation of those products for the purposes never intended by the persons who made the products, "drawing these products into a system of relations" over which the laborer "has no knowledge or control."[26] The harm of alienation in this sense is its disempowerment of the user of the chat room when the objectification of the user is employed for another, unrelated purpose outside her involvement. As reported by Bakardjieva and Feenberg, a research subject was hesitant to participate in their study because of "the possibility of estranging the product of her personal objectification, meant for one purpose and context, and putting it to use for another unrelated purpose beyond her control."[27] Their research clarifies the possibility of alienating the users of the chat room from their data.

This approach to online research identifies a few points that apply to my analysis of the commercialization of the Internet. First, the labor in adding data on the Internet—the use of search engines for research, posting comments on websites, building online profiles in social networking platforms, exchanging information in emails—involves objectification, i.e., this labor of productive activity embodies the interests, needs, and relations of the people who participate in these activities. Second, alienation can occur when these products of labor are treated without regard for their social origins or the intentions of their producers, that is, when products on the Internet

25. Ibid., 236.

26. Ibid.

27. Ibid., 237.

are regarded as having value completely independent of recognizing the involvement of laborers with the process of embodying values. With commercialization, personal labor and information become fetishized when data surveillance builds a marketing database that makes the products of labor valuable mainly for their exchangeability and profit potential. In the case I have described, personal content as data is drawn into a system of relations that is out of the control of the laborer. While the Internet makes possible a variety of creative objectifications through such things as profiles and emails, it makes equally possible their commodification and alienation. With data surveillance, if labor in the form of data is exchanged for commercial use by search engines, email services, and social networking platforms, this commodification of labor involves fetishism, where the value of the data is its potential for commercial profit and the data as relations between people becomes obscure.

Marx writes about a capitalist system wherein the exchange of commodities produces a surplus, a profit. Since the capitalist pays a laborer for her labor as a commodity, the capitalist claims ownership of that labor and therefore of the products produced by it. These products as commodities are then exchanged for a profit on the market. In a Marxian framework, surplus value comes from the labor. In a capitalist system, commodities are produced as things destined for sale on the market in order to return more capital than was originally invested in the production of the commodities.[28] Exchange resulting in a profit is distinctive to the capitalist systems and different from simply exchanging commodities for money or other commodities, because the capitalist enters into the exchange exclusively in order the produce a profit. Profit-making

28. Karl Marx, *Capital*, vol.1, 320.

becomes the ruling motive, the basis of which is the capitalist's ability to obtain the commodity at a value below its value on the market through the exploitation of the labor of those workers who do not receive a wage equal to the value of their labor.

Fuchs suggests that commodification on the Internet occurs in two ways.[29] First, there is direct sale of commodities; for example, payment is exchanged for downloading music from an online source. Second is data surveillance, whereby companies provide free services in order to attract a large number of users to platforms so that data about the users, in turn, can be commodified and sold to advertisers. This second mode of commodification poses the question of the Internet as a potential means of exploitation. Fuchs presents a useful hypothetical about the role of the users of the Internet in the commercialization of the Internet: if users of the Internet stopped posting data on social networking platforms like Facebook, the number of users of the platform would drop since the platform's use-value, connecting to other users, would decline.[30] Then corporations would reduce or stop buying advertisements because the platform would reach fewer consumers, and the profitability of the platform would also drop, perhaps to a point when decreasing profits would mean the platform would have to close down. This thought experiment by Fuchs clarifies how the relations of personal information that users exchange with each other on the Internet is converted into data that is essential for generating profit for commercialized Internet companies. For such platforms as the social networking websites and Google's email service, users partly

29. Christian Fuchs. "The Internet—Serving the Revolution?" www.counterfire.org/index.php/features/83-science/4746-the-internet-serving-the-revolution (last updated April 2010).

30. Christian Fuchs, "Labor in Informational Capitalism and on the Internet," *The Information Society*, Vol. 26, Issue 3 (May 2010): 191.

produce the product by creating profiles or communicating through email that Google surveys for keywords for advertising. Furthermore, even in the case in which commodities are simply exchanged (such as a book for money), users of the platform are encouraged to add data through comments or reviews which provides content that can be surveilled and commodified. [31] Therefore, the users provide labor, producing a significant part of the use-value and exchange-value of these platforms, leading to a profit. With the content of these websites being partly created by users, the platform owners exploit their own users, since the labor of the users involves no compensation at all for the profits enabled by their work. The user of the commercial Internet receives less in value than she puts into the exchange, i.e., her personal data that yields capital is more valuable than the goods and services she receives in return.

In this section, data surveillance for targeted advertising profit is shown to involve alienation and fetishism. I argued that the users of platforms are laborers through the productive activity of creating data online, and the data that they create is exchanged for use of the platforms. Alienation occurs when the data of the users is employed for the purposes of target advertising, where the data is appropriated into a system of relations over which the labor has no control and is obscured from her creation. In this system, the value of the data is its potential for profit without regard for the value that the data was originally produced. The commodification of the data for direct advertising also exploits the user since the data is exchanged for the use of a

31. In this example, the data of the user in her comments or reviews is not technically an exchange for the use of the platform since this data is not demanded for the use of the platform, and so this exchange is not technically an illustration of surplus. However, exploitation of the data of the user for profit is exemplified in this exchange. As well, my analysis of surplus is indebted to Fuchs and is an extension of a Marxian analysis. My investigation should not be taken as a strict application of Marx.

platform and this data gains a profit for the platform without added compensation to the user. In the next section, I investigate the extent that the Internet has been commercialized and exceptions to its commercialization.

The Contested Internet

The commercialization of the Internet involves modes of alienation and exploitation, involving the commodification of personal data and the exploitation of unpaid labor. Does the Internet primarily, then, stabilize capitalism and exploitation? Does it harm rather than advance social emancipation? These questions are put too simply. As noted above, the Internet is still developing in a process of interpretative flexibility where the meanings of the technology can be reconstructed and interests embodied in the technology can be altered. Even as the Internet incorporates fetishistic and commodified values, it remains a contested technology as it continues to embody the fundamental interests of accessibility, openness, and decentralization, which provide alternatives to commercialization and allow for choice, participation, and opposition. Therefore, the Internet is neither a wholly emancipatory nor a completely oppressive technology; rather it is a developing technology that contains potential for social opposition.

In the last chapter, I demonstrated that the Internet was designed to be accessible, open, and decentralized, reflecting the interests of a dispersed, collaborative community in a technology that allowed for participation, interaction, and contributions from its users. The decentralized design of the Internet makes controlling data over the

Internet difficult. The accessibility of the Internet produces the development of a reliable and robust communications system that allows information to be readily and broadly available. And the openness of the technology encourages a diversification of networks, hardware, software, and information on the Internet, along with the ability to access the information and to participate. Decentralization is woven throughout these interests but specifically refers to the distributed nature of the operation of the Internet, where there is no hierarchical treatment of data and no central computer that regulates the entire system. While commercial interests were not embodied in the basic design of the Internet, its design does not exclude these interests. In fact, one of the attributes of a decentralized network is that it is difficult, in the long run, for a single set of interests, such as the primary interests embodied in the basic architecture of the Internet, to prevent other popular interests from being incorporated in the technology as well, such as commercial interests.

The openness of Internet technology, especially the ability to collaborate in the production of information by adding or changing content, has been employed in the commercialization of the Internet by compiling and accessing user data for marketing purposes. Openness, however, is also employed in open source software, which is developed freely by a community of programmers and is licensed to allow other programmers the right to modify or extend the software.[32] This open, cooperative production of open source software allows people to freely benefit from its production without following a capitalist model of commodification since it does not involve

32. Chris Woodford, *The Internet: A Historical Encyclopedia—Issues* (Santa Barbara: ABC-CLIO, 2005), 195.

relations of exchange for profit. A commodity is measured by its exchange-value in the marketplace, and a product freely given and taken cannot be a commodity. This open access model can also be found in the production of the Linux operating system, which is freely accessible along with the source code of its software applications. The Free Software Federation and the Open Source Initiative, two groups who produce free software ranging from operating systems to applications, further support the open access model.[33] This model involves the combined effort of a large number of distributed programmers providing alternatives to commercial operating systems such as Microsoft Windows. This open access model of software production develops software to meet the needs of computer users in a decentralized way. Another example is the open source web browser Firefox, an alternative to other commercial browsers, such as Microsoft's Internet Explorer.[34]

Among the ten most accessed platforms on the Web that was cited above, Wikipedia was the only one that is not a commercial platform. It is a free, global encyclopedia project written collaboratively by its users, independent of commercial interests.[35] The platform is based on an open source code that makes it easy for people

33. David Berry, "Internet Research: Privacy, Ethics and Alienation: An Open Source Approach," *Internet Research*, Vol. 14, No. 4 (2004), 328-329. The free software movement began with a commitment to the preservation of the free exchange of scientific and academic data within the software industry by Richard Stallman, then a researcher at MIT.[33] He created a free software license called the GNU and the General Public License (GPL), which guaranteed that the source code and compiled software remained in the public domain. The attempts of Stallman to build a complete operating system, free of copyright, resulted in the GNU/Linux system.

34. Walt Mossberg, "Security, Cool Features of Firefox Web Browser Beat Microsoft's IE," *The Wall Street Journal*, December 30, 2004, http://ptech.wsj.com/archive/ptech-20041230.html.

35. From January 15, 2001, Wikipedia has come to include over 3.3 million evolving articles in English (with over 16 million in other languages). Wikipedia has contributors worldwide, who create, update, and delete information in the archive. Contributions and edits of articles can be written by any user of the site, although some material that tends to attract more opinion-based edits or vandalism needs

to organize and publish content without knowing much about the programming language of the World Wide Web.[36] The free, non-profit, classified advertising website Craigslist is another alternative to corporate websites that charge users to place ads. Craigslist uses a simple, text-based interface that allows for low hosting costs and makes posting classified ads by users relatively simple.[37] Another application on the Internet involving self-determining activity that can be non-commercial, avoiding alienation and fetishism, is blogs, that is, websites that can be created and produced by anyone to focus on events, topics, or personal passions. Blogs often permit people other than authors to post content, allowing broader public contributions. Both blogs and wikis are online platforms that network people around similar interests, creating a potential space for resistance to mainstream news media, for instances, insofar as authors and contributors can analyze and investigate news stories for themselves.

These examples, sharing data through free wikis, blogs and websites without commercial interests, continue to exist outside of the circulation of commodities. If a commodity is understood by its exchange value in the marketplace, something freely given and taken cannot be a commodity. Alternatives to the commercialized Internet are a result of key characteristics of the technology of the Internet. First, data available on the Internet has been a resource produced globally and diffused through the network

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to be verified by an experienced volunteer before publication. Wikipedia, "Wikipedia," en.wikipedia.org/wiki/Wikipedia; Brennon Slattery, "Wikipedia Changes Editing Policy," PC World, August 26, 2009, accessed November 1, 2010, http://www.pcworld.com/article/170826/wikipedia_changes_editing_policy.html.

36. Wikipedia, "Wikipedia," en.wikipedia.org/wiki/Wikipedia.

37. Janet Kornblum, "Web Board Craigslist Makes a Name for Itself," *USA Today*. September 28, 2004, www.usatoday.com/educate/college/careers/profile30.htm.

that remains decentralized. While commercial platforms may strive to become dominant on the Internet, the technology allows for all users to create and distribute content outside of commercial interests. The interest in accessibility embodied in the Internet also enables the pursuit of non-commercial interests. Beyond the cost of connecting to the Internet through Internet Service Providers (ISPs), users can connect to non-commercial platforms without further charge. The decentralized network leading to accessibility and the support of open platforms allows for alternatives to the commercialization of the Internet.

However, considering the popularity of social networking sites and Google applications that involving targeted advertising, users who opt out of using commercial platforms exclude themselves from the benefits of using these sites for connecting to friends or business associates. Do non-commercial platforms offer a viable alternative to commercial platforms? Robert McChesney writes that the development of non-commercial platforms have been "relegated to the distant margins" of the Internet and is "nowhere near the heart of operating logic of the dominant commercial sector."[38] Samir Chopra and Scott Dexter argue that the basic architecture of the Internet does not protect the technology from becoming controlled by others interests, suggesting that open source software should be an alternative to commercial platforms in its ideals leading to public debate and not simply an alternative to the production and use of commercial platforms.[39] The Internet has become commercialized through the

38. Robert McChesney, *Rich Media, Poor Democracy: Communication Politics in Dubious Times* (Chicago: University of Illinois Press, 1999), 183.

39. Samir Chopra and Scott Dexter, *Decoding Liberation: The Promise of Free and Open Source Software* (New York: Routledge, 2008), 152 and 167.

implementation of technological practices, such as targeted advertising, that are often subtle and opposition to such practices is necessary through alternative uses of software as well as public debate leading to regulation of the Internet and its development. Open source software incorporates the interest of critical collective participation in the activity of creating its product, and this interest should be part of the platforms of the Internet as well as part of the debate about the development of the technology if there is going to be a viable alternative to the commercialized Internet. McChesney also argues for public debate about how the Internet is organized and deployed with its commercial interests.[40] He claims that this kind of public participation in technological development is not unprecedented, referencing a large public debate in Canada in the 1920s about the commercialization of their airwaves that resulted in the development of a nonprofit system. However, the debate, stresses McChesney, should not simply be about supporting non-commercial platforms on the Internet, but also about the dominance of the technology by commercial platforms over nonprofit, non-commercial platforms. Public debate and Internet regulation needs to be part of the development of non-commercial platforms in order to avoid these platforms remaining a marginalized part of the network.

The interests of accessibility, openness, and decentralization embodied in the Internet also enable commercial strategies. The key point is that the contested terrain of the Internet, where there is a mixture of commercial and non-commercial uses and

40. McChesney, *Rich Media, Poor Democracy*, 127.

interests, has not changed the fundamental architecture of the Internet.[41] However, as I have argued, commercialization involves the exploitation of users of the Internet involving commodification and alienation, obscuring the users of the Internet from their productive activity online. While there are non-commercial platforms that are developed on the Internet, commercialization has a growing dominance that should be debated publicly leading to regulation of its development before commerce becomes irreversibly entrenched as the dominant interest of the Internet.

Technical Oppression and the Future of the Internet

How will the Internet continue to develop? Will it be dominated by commercial interests? Feenberg offers two different answers to such questions. His first answer is approached through broad projections about the future of the Internet and the interests that dominate its use. However, by neglecting to address commercial data surveillance, Feenberg fails to account for the commercial interests that could be capitalized in a future of the Internet that focuses on community platforms, therefore the separation of commerce and community in his future projection of the network is not convincing. His second answer to the future of the Internet is approached through a technological code analysis, which, when applied to the Internet, offers a more nuanced critique of the

41. By the architecture of the Internet, I mean the fundamental structure of the network as defined during the early stages of its development in chapter two, most notably the data transmission method of packet switching, the protocol standards of TCP/IP, and the principle of end-to-end networking. This architecture is the network's basic building blocks that applications are built upon, such as multimedia access and display allowed by personal interface, software, and World Wide Web. However, when simply referring to the Internet, I do not strongly separate the Internet from these integrated applications that have become part of the way we experience the Internet as users.

commercialization of the Internet. Below, I will begin by criticizing his broad projections of the future of the Internet, and then turn to his technical code analysis.

Feenberg has not done a sustained analysis of the design of the Internet and its social implications, but he has written on the technology as holding the potential for the development of human communication, community, and democracy. In his talk "A Democratic Internet?", he juxtaposes two possible Internet futures—the community model and the consumption model. The community model conceives of the Internet as dominated by social interaction between people, as exemplified by communities formed around the online "spaces" of social networking websites and email. The consumption model describes an Internet dominated by the needs of purchasing goods, viewing different kinds of media, and facilitating the services of different companies. The domination of these kinds of consumer activities in the consumption model does not engage the participatory communication and interaction of different people in a community. Feenberg takes the view that eventually one of these models will dominate the interests and uses of the Internet.

Feenberg's community model fails to take into account the commodification of data on social networking websites and email, where groups of online users are exploited by advertising opportunities through data surveillance of their communication and their content. The commercial appropriation of online communities commodifies what Feenberg sees as communicative interactions. Feenberg's polarization of two distinct Internet models, community and consumption, unconvincingly separates these two interests without regard for the forms of commercialization on the network, such as data surveillance.

Feenberg offers another approach that can be more productively applied to the development of the commercialization of the Internet: the technical code analysis. According to Feenberg, the technical code refers to the interests and values that become embodied in a technological design.[42] As he points out, designing technology involves selecting a configuration from among many possibilities; designers build in the potential for user initiative while also yielding to the guidance of social forces. In Chapter Two, I argued that the social forces that guided the basic design of the Internet embodied a distinctive technical code: accessibility, openness, and decentralization to enable the dispersed collaboration and interaction of users who could affect the system in a variety of ways and thus become as much creators as users of the Internet, if they chose. I further argued that this fundamental technical code was embodied in the design of a minimally coercive, relatively emancipatory technological system which, during its development, avoided exclusive interests, class domination, and alienation. But as we have seen in this chapter, the development of commercial interests as a socio-economic force affecting the Internet, especially the successful model of commercial data surveillance, has productively employed the dominant design features of the technical code of accessibility, openness, and decentralization to produce alienation and fetishism.

Feenberg argues that the relation between technical properties, values, and social outcomes is exposed by a technical code analysis which correlates technical properties with social values. In this analysis, social constructivism is utilized by

42. Andrew Feenberg, *Questioning Technology* (New York: Routledge, 1999), 97 and 224.

exploring the interests that are designed into technologies as a way to illuminate the values and choices that become manifest in them. Feenberg admits that values change over time, being interpreted within a specific social and cultural context. Therefore, one contribution of the technical code analysis is its utility in exposing the interrelation of social and design consequences, indicating the potential for new social interests to impact the values embodied in technology.

As my analysis of the Internet shows, the basic architecture of Internet technology has remained stable, even through capitalistic interpretations of the dominant design features by major commercial agents.[43] The interests embodied in the basic design of the Internet are employed for opposing uses - one use for unexploited open communication and the other use towards profit and alienation - and yet both uses involve the characteristics of participation and collaboration by people who continue to create as well as use the Internet for diverse purposes. The technical code analysis does not explain the future of the Internet, but it does expose the potential for further development of commercial interest in the technology without eradicating the continuation of non-commercial interests as well. While the commercialization of the

43. One example of a threat to the interests in the basic architecture of the Internet is to the neutrality of its network. Net Neutrality is a design paradigm that has the network of the Internet transmit data without discriminatory intent, where certain kinds of information are not prioritized over other kinds of information. This paradigm minimizes the control of the network owners over the system so their preferences, for example, giving priority to data from preferred websites in exchange for a fee, are not forced onto the users of their network. As Craig Newmark explains, "Imagine if you tried to order a pizza and the phone company said AT&T's preferred pizza vendor is Domino's. Press one to connect to Domino's now. If you would still like to order from your neighborhood pizzeria, please hold for three minutes while Domino's guaranteed orders are placed." With a neutral network, no data is given precedence over other data, receiving faster transmission, or blocked over a network. Net neutrality has been a discussed widely in the United States and is currently still the paradigm of the network in the country. In my next chapter, I will discuss how in different countries the paradigm is not supported, mainly for political and cultural reasons. Richard Whitt, "What Do We Mean By "Net Neutrality"?," Google Inc., June 16, 2007, accessed November 1, 2010, http://googlepublicpolicy.blogspot.com/2007/06/what-do-we-mean-by-net-neutrality.html.

Internet has become pervasive in the technology, involving alienation and exploitation of its users, other interests still persist.

Conclusion

The Internet is a technology that has continued to embody the interests in accessibility, openness, and decentralization as well as expanded to incorporate commercial interests and uses through the appropriation of the first set of interests. Extending a Marxian analysis to commercial data surveillance, the users of the Internet are alienated from the relations embodied in the product of their own labor (their data). In addition, with the commodification of the data of users, a surplus value through commercial data surveillance has led to the exploitation of those users. However, since the technological oppression through commercialization of the Internet necessarily involves the agency of Internet users, there remains the potential for alternative choices that lead away from alienation and fetishism. Considering the technical code analysis, the users of the Internet are active agents engaging in the development of the values embodied in the technology and, as agents who still have the potential to create a less alienating technology by choosing websites that do not employ data surveillance. Instead, the users of the Internet could support websites that do not use oppressive business practices, patronizing corporations who structure their business to avoid the exploitation of personal data. However, with the pervasiveness of commerce on the Internet, public debate about the interests incorporated in the Internet is also required, leading to the development of regulation of the technology in order to avoid the

continued marginalization of non-commercial interests and practices. The Internet, in its design embodying diverse uses and participation, does not lend itself to the eradication of commercial interests itself, and public awareness and regulatory principles need to be developed if alienation and exploitation through its commercialization is to be adequately confronted.

CHAPTER FOUR

THE GLOBALIZATION OF THE INTERNET

In light of the principal involvement of the government and research institutions of the United States in the development of the Internet, I investigate in this chapter whether the interests of accessibility, openness, and decentralization embodied in the network are tolerant of other cultural values or whether these embodied interests marginalize other values around the world as the Internet is globalized. This chapter develops my philosophical framework by critically evaluating theoretical work on the globalization of the Internet as it relates to forms of technological oppression in philosophy and other disciplines. At this point in the history of the Internet, the technology is involved in the process of interpretative flexibility, whereby both emancipatory and oppressive potentials of the technology are being negotiated around the globe. Critiquing the use of the technology in a number of societies, particularly political appropriations of the Internet, I argue that the embodiment in the Internet of a Western scientific community's interests accessibility, openness, and decentralization, which informed the communicative preferences of the technology, has not imposed a specific set of cultural values and communicative preferences on diverse cultures around the world. These interests continue to facilitate a variety of social interactions on the technology. Users can contribute to information and data on the Internet, communicate and debate ideas, and participate in social and political activities around the world. The globalization of the Internet is not a deterministic force in or among

societies around the globe in either its emancipatory or its oppressive consequences. However, throughout my investigation, I argue that the basic design incorporating the interests of accessibility, openness, and decentralization retains the potential to be shaped by social meanings and uses. The technical code of the Internet averts the hegemony and exclusivity of technological oppression.

Drawing upon my philosophical framework, I begin this chapter by arguing against a reductionist formulation of globalization of the Internet that ignores the social relations involved in the appropriation of the technology around the world. Instead, I claim that a theoretical treatment of the globalization of the Internet should acknowledge that local interpretations and uses of the technology result in socially contingent appropriations and, consequentially, forms of technical oppression need to be studied at these levels. Then, I investigate theories of globalization to elucidate the role of the Internet in these theories. On one hand, some theories of globalization claim that the Internet advances hegemony as it exacerbates existing inequalities and regional configurations of power. Other theories articulate the emancipatory features of globalization. Utilizing examples of social groups struggling to appropriate the Internet to their needs and interests around the world, I argue against deterministic theories that claim that the Internet primarily advances Westernized values or produces social inequalities. Reviewing the contested situation of the technology in a number of societies, particularly political appropriations of the Internet for both oppressive and emancipatory purposes, I argue that the fundamental interests of openness, accessibility, and decentralization initially embodied in the design of the Internet result in an emancipatory ability to incorporate alternative values and uses through dispersed

collaboration and participation, which enables the technology of the Internet to remain minimally coercive. This chapter brings the work of Karl Marx, Herbert Marcuse, and Andrew Feenberg to an examination of the ways in which the Internet is involved in technological oppression, in order to argue that the embodiment of the interests of accessibility, openness, and decentralization persist in allowing for emancipatory forms of technological appropriation.

My Philosophical Framework and Globalization

The Internet has been shaped by social and historical relations that have resulted in specific interests being embodied in its technology. In Chapter Two, I showed that the technological development of the Internet demonstrates that, while the production of the Internet was advanced by certain technological achievements, these technical aspects alone do not explain how or why the Internet came to have its particular design. I established that design choices incorporated the interests of the dispersed, collaborative scientific community that created it. The design allowed its early users to contribute to the Internet, to participate, interact with, and affect the system in a variety of ways, and thus to become creators as much as users. At the time of its development and within this context, I argued, the Internet avoided exclusive interests, class domination, and alienation.

How has the Internet been confronted and interpreted around the globe, especially in relation to these concerns? Have the interests embodied in its basic design—accessibility, openness, and decentralization—allowed for the incorporation of diverse

interests and uses of the technology, as the creators of the Internet had intended? In approaching these questions, it is worthwhile to recall the process of interpretative flexibility, in which a technological design can be freshly constructed and the interests embodied in the technology can be altered when the technology is introduced to new social groups. As Feenberg asserts, the agency of the users of a technology has a potential impact on the development and meaning of that technology. With the expansion of the Internet around the world, the uses and interests brought to the technology would not be the same across the globe, since globalization exposes the technology to new social contexts and new users who become involved in the negotiation of the meanings, uses, and design of the technology. Given my philosophical framework, an investigation of the theoretical treatment of the globalization of the Internet should recognize socially contingent appropriations of the Internet involving local interpretations and uses of the technology, including the effects of governmental appropriations of the technology.

Such an understanding of the globalization of the Internet refutes a reductionist treatment positing that technological determinism drives appropriation of the Internet around the world. Certainly, the potential for technological oppression—alienation (as argued by Marx), technological rationality ossifying dominate social formations (as argued by Marcuse), and hegemony (as argued by Feenberg)—should enter into the study of differing appropriations of the Internet. In particular, this study of technological oppression can be used to distinguish between more negative uses and features of the technology and more emancipatory uses and features of it, including the potential role of user agency to overcome forms of technological oppression, as

Feenberg emphasizes in his work. Further, this study of the globalization of the Internet delineates the ambiguities of technological development and appropriation, the construction of socially contingent meanings and uses, and argues for closer consideration of the potential forms of technological oppression involving the Internet around the globe.

Defining Globalization

In order to study the globalization of the Internet, I must first analysis theories of this phenomenon, elucidating the role of the Internet. Globalization is a term that encompasses a diversity of features and a variety of theoretical positions. Carol Gould writes that globalization involves "an intensified interconnection of economies, societies, and cultures, facilitated by the new technologies of information and communication," accompanied by the strengthening of political, economic, and judicial institutions across regions—the European Union, transnational corporations, and the World Social Forum, for example.[1] In scholarly work about globalization, the Internet, while not always taken as the primary example of the information and communication technologies interconnecting the world, is certainly acknowledged as an important example. Below, after defining globalization in relation to the Internet, I argue that these theories depict globalization as a multidimensional process that intertwines a network of communications with an extension of the capitalist market that potentially

1. Carol C. Gould, "Globalization," in *The Oxford Handbook of Business Ethics*, ed. George G. Brenkert and Tom L. Beauchamp (New York: Oxford University Press, 2010), 305.

produces either cultural homogenization through the Westernization of values around the world or the spread of cultural diversity. From my philosophical framework, theories that predict the eventual uniformity of culture around the globe are involved in alienated characterizations that ignore the participation of local social relations in the Internet. Disputing such alienated characterization of the Internet, I explicit in the following sections the diverse appropriations of the technology around the world, investigating its emancipatory and oppressive consequences.

Douglas Kellner writes that "a wide and diverse range of social theorists are arguing that today's world is organized by accelerating globalization," but that the definitions of globalization by these theorists differ.[2] For instance, Kellner observes that characterizations of the phenomenon tend to be either pessimistic or optimistic. For some theorists with a pessimistic viewpoint, globalization is indicative of the imperialism of global capitalism increasing the economic domination of wealthier nations and corporations over poorer countries and people, further spreading the logic of commodification and the accumulation of surplus value.[3] More optimistic theorists argue that the phenomenon of globalization generates fresh communicative, economic, and political opportunities. One example is the way in which the Web includes small businesses and individual entrepreneurs who might otherwise have been excluded from a global market.[4] Another divergence occurs between critics of globalization who assert

2. Douglas Kellner, "Theorizing Globalization," *Sociological Theory*, Vol. 20, No. 3 (November 2002): 285.

3. For more of this argument, see Christina Fuchs, "Critical Globalization Studies: An Empirical and Theoretical Analysis of the New Imperialism," *Science & Society* 74, 2 (2010).

4. For more of this argument, see Bill Gates, with Nathan Myhrvold and Peter Rinearso, *The Road Ahead* (New York: Penguin Books, 1996).

that globalization produces cultural homogenization by Westernizing cultures around the world, and those theorists who write that globalization involves political potentials for the spread of democracy and freedoms along with cultural diversity.[5] The latter theories characterize globalization as increasing the potential for communication, education, culture, and other beneficial social activities, especially with the development of the Internet as a new communication and information technology. Lastly, some theorists believe that the path of globalization is inevitable and beyond the intervention of people, while other theorists view the phenomenon as generating new social struggles that can involve the diverse viewpoints of many different people and groups.[6]

Theorists also attribute the primary causes of globalization to different factors, including 1) the proliferation of new communications and information technology, as Manuel Castells theorizes, 2) the spread of capitalism and its market economy, as

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5. Christian Fuchs argues that inequality in the world is growing, leading to more hegemony and economic disparity. See Christian Fuchs, *A Contribution to Critical Globalization Studies*, Centre for the Critical Study of Global Power and Politics Working Paper CSGP 09/8 (Peterborough, Canada: Trent University, 2009). For the more optimistic perspective, see Thomas Friedman, *The Lexus and the Olive Tree* (New York: Farrar Straus Giroux, 1999). Roland Robertson is also optimistic about the benefits of a more unified understanding and concern for the world; see Robertson, *Globalization: Social Theory and Global Cultures* (Newbury Park, CA: Sage, 1992).

6. Kellner, "Theorizing Globalization," 267. For an argument that globalization is inevitable, see Friedman, *The Lexus and the Olive Tree.* Also, Antonio Negri and Michael Hardt argue that while resistance to globalization is possible, certain consequences of the phenomenon (such as a global economy and resulting inequalities) are very difficult to overcome, see *Empire* (Cambridge, MA: Harvard University Press, 2000). For more optimistic work on globalization and consequential social struggles, see David Held, Anthony McGrew, David Goldblatt, and Jonathan Perraton, *Global Transformations* (Cambridge, MA: Polity, 1999), 2, 15. Helm describes globalization as a phenomenon that interconnects states and societies, deepening the social relations and institutions across the globe. For Helm, activities can influence what happens on the other side of the global, and so local groups can have a greater impact globally. Also, for more information about social movements against inequalities created through globalization, see Christian Fuchs, "Antiglobalization," in *Encyclopedia of Governance*, ed. Mark Bevir (London: SAGE, 2007), 20-24.

Thomas Friedman emphasizes, or 3) the growing fragmentation of local civilizations, as stressed by Samuel Huntington.[7] These viewpoints are not necessarily mutually exclusive; for instance, considering the impact of the Internet on globalization, Friedman also acknowledges that information and communication technologies such as the Internet facilitate globalization.[8] Similarly, Huntington acknowledges the role of such technology in the spread of ideas, money, goods, people, and culture, and claims that the Internet has increased the rate of globalization.[9] And Castells recently argued that, among the developments of globalization in the twenty-first century, "the shift from traditional mass media to a system of horizontal communication networks organized around the Internet and wireless communication has introduced a multiplicity of communication patterns at the source of a fundamental cultural transformation."[10] Therefore, while there may be disagreement about the primary cause of globalization, a key feature of the phenomenon shared in the work of the theorists above is that the Internet is, at the very least, a facilitator in the spread of capitalism and a world market as well as in the replacement or supplementation of local social and cultural relations with more global social relations.

Despite differences in definitions of globalization and disagreement about its positive or negative effects as well as its primary cause, these theories nonetheless lead

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7. The above references come from Kellner's "Theorizing Globalization," 285; Manuel Castells, *The Rise of the Network Society* (Oxford: Blackwell, 2010); Friedman, Thomas, *The Lexus and the Olive Tree* (New York: Farrar Straus Giroux, 1999); Samuel Huntington, *The Clash of Civilizations and the Remaking of World Order* (New York: Simon and Schuster, 1996).

8. Friedman, *The Lexus and the Olive Tree*, 14.

9. Huntington, *The Clash of Civilizations and the Remaking of World Order*, 67.

10. Castells wrote the above ideas in his preface to the 2010 edition of his book. Manuel Castells, *The Rise of the Network Society* (Oxford: Blackwell, 2010), xviii.

to a clearer understanding of its key features: the development of a global economy, the interconnection of societies, the transformation of cultures, the expansion of social struggles, and the proliferation of the Internet as a communication and information technology. Definitional differences also allow us to identify the phenomenon as a multidimensional process with a cumulative impact that is not reducible a single feature. At this point in the history of globalization, the key features are intertwined to some extent. The proliferation of the Internet creates a network for communication across the globe while also facilitating the extension of the capitalist market system by coordinating the movement of goods and information, producing a technological infrastructure for the global economy. The Internet also allows for individuals to communicate and form transnational alliances, uniting to fight for better working conditions, social justice, or political freedoms. Additionally, globalization impacts different regions or individuals around the world in dissimilar ways; the very idea of the convergence of local cultures or economic structures with a global phenomenon takes these cultural or economic structures as initially unique or distinctive so they must be assumed to follow unique processes towards convergence.

Above, I argued that globalization should be theorized as a multidimensional phenomenon differentially impacting separate regions and people around the globe. My investigation explores the globalization of the Internet as incorporating a variety of social relations. As I have argued previously, alienation involves the misconception of products such as the Internet as objects detached from the social relations in their production and appropriation. Social relations can become hidden through alienation, deforming the relations of values and interests created and shared among people

through the use of technology such as the Internet. Building upon this idea, I criticize theories of the globalization of the Internet that suggest that the network results in a uniformity of social, economic, or political consequences around the world, since this suggestion amounts to an alienated characterization of the technology as unresponsive to social relations. With this characterization, human agency in the appropriation of technology becomes displaced and the ability of users to influence the appropriation of the Internet is not apparent since it is taken to be determined. My investigation below addresses more specifically the ways in which the Internet participates in and has impact upon the phenomenon of globalization, arguing that the Internet can be appropriated for many purposes around the world for its technical code allows for the incorporation of a variety of uses, interests, and social relations.

Instances and Consequences of Internet Globalization

The spread of the Internet across the globe has instigated theorization about how its potential facilitation of public engagement, communication, and a global economic system affect social inequality. Will the Western interests and values that informed the communicative preferences embodied in the Internet design impose a specific set of cultural values and communicative preferences on societies around the world, shaping the values and communications of individuals and groups in these cultures? Or are these diverse cultures not so fragile and their potential for domination by Western values and communication preferences not so determined? In this chapter, I have suggested an approach to globalization as a multidimensional phenomenon and oppose

a reductionist approach that suggests that the Internet is inescapably deterministic in its appropriation. Globalization may have both emancipatory and oppressive consequences, impacting regions and people around the globe in a variety of ways. Globalization of the Internet is neither a fundamentally positive nor inescapably negative phenomenon. In some cases, the technology may facilitate individual and group opposition to the dominant social order and enable them to come together in resistance, while at the same time, it may also increase the power of ruling social forces to limit communication for these individuals or groups.

Below, I explicate the consequences of the globalization of the Internet, focusing on the impact of the basic design and its embodied interests, but also considering the impact of the particular social, economic, and political environments into which the Internet is incorporated. While investigating the appropriation of the Internet around the globe and situating the role of the Internet in oppressive and emancipatory instances of globalization, I elucidate how the fundamental embodied interests of openness, accessibility, and decentralization have allowed for the incorporation of the different values and uses of the technology. To do so, I engage with the work of Pippa Norris on the globalization of the Internet as it reflects and reinforces, rather than transforms, the distinctive cultural interests and conditions of specific societies, considering political appropriations of the Internet in Iran, Saudi Arabia, and China, as well as the use of the Internet in other social struggles around the globe.

The Social and Economic Impact of the Globalization of the Internet

The globalization of the Internet is not a deterministic force in or among societies around the globe in either its emancipatory or its oppressive consequences. Such a technology can be appropriated for many purposes around the world, including the reinforcement of social and economic inequalities. Pippa Norris and Ronald Inglehart argue that the theoretical interpretations of the globalization of the Internet have often exaggerated its potential consequences, such as the endangering of cultural diversity, the leveling of financial hurdles, the widening of the dissemination of information, and the expansion of social movement networks.[11] In their book *Cosmopolitan Communications: Cultural Diversity in a Globalized World*, Norris and Inglehart analyze empirical evidence about the spread of communication globally, both at the societal level and the individual level by drawing from the World Values Survey and the European Values Surveys conducted from 1981 to 2007.[12] They investigate broad patterns of information and communication inequalities across the globe, distinguishing between inequalities confined to the Internet and those ascribable to broader phenomena. They argue that if inequalities are not specific to the Internet itself, then

11. Pippa Norris and Ronald Inglehart, *Cosmopolitan Communications: Cultural Diversity in a Globalized World* (New York: Cambridge University Press, 2009). While their work is inclusive of all communications and information technologies (such as televisions, radios, telephones, and newspapers), their work also studies the Internet and their findings directly relate to the technology.

12. Norris and Inglehart, *Cosmopolitan Communications*,xiii. The surveys provide data from countries comprising almost 90 percent of the world population, including societies with per capita incomes as low as $300 per year to societies with per capita incomes a hundred times that high, and a variety of political orientations from established democracies to authoritarian states. I also draw from earlier work by Pippa Norris, *Digital Divide: Civic Engagement, Information Poverty, And the Internet Worldwide* (New York: Cambridge University Press, 2001), which examines the potential exacerbation of social inequalities due to the growth of the Internet on a global scale and supplements some of her arguments in *Cosmopolitan Communications*.

the cause of those inequalities must be attributed to larger social and economic issues such as endemic poverty, low levels of education, and/or an underdeveloped communications infrastructure.[13] Norris and Inglehart write that the persistence of global and social inequalities in access to information largely "reflects deep-rooted disparities in resources" and suggest that, in consideration of the consequences of the globalization of the Internet, "the claims about the threat of either cultural convergence or polarization may have been overstated."[14] They argue that the Internet tends to reflect rather than transform the cultural, economic, and political values of local societies, such that the technology serves to reinforce local features.

Cultural imperialism is a term denoting the homogenization of cultures around the globe, and typically indicates the domination of Western ideas and practices that shape the interests and values of individuals and groups in other cultures.[15] Norris and Inglehart write that "the worldwide export and import of cultural goods generally reflects the disparities of power and wealth around the planet" and that there is a predominant expansion of the Western cultures.[16] Nevertheless, they argue that "the impact of cultural trade and global information flows on poor countries remains limited," because "the people of many low-income societies and those living under restrictive regimes remain relatively isolated from global economic, social, and political

13. Norris and Inglehart, *Cosmopolitan Communications*, 134.

14. Ibid., 135.

15. Fuchs, *A Contribution to Critical Globalization Studies*, 4.

16. Norris and Inglehart, *Cosmopolitan Communications*, 97.

networks."[17] When looking specifically at data where there is widespread access to global networks, however, Norris and Inglehart suggest that "there remain grounds for skepticism about the claimed effects of Americanization or Westernization."[18] While cultural change is discernible, they argue that cultures also continue to exhibit distinct characteristics and do not seem to be converging into a homogenized culture:

> Even among postindustrial societies such as the United States and Britain, Sweden and Germany, and Japan and South Korea, which are tightly interconnected through communication networks, trade flows, and economic interdependence, having the greatest share of cultural trade in audiovisual programs, there remain distinctive and persistent cultural differences that show no signs of disappearing.[19]

Norris and Inglehart thus refute claims of the homogenization of societies and the development of a monolithic, global Western culture in both relatively wealthy countries and poorer countries. In addition, while cultures around the world are not the same as they were a generation ago, there is little evidence to suggest that the Internet is significantly more responsible for the changes than films, television, or music. "The people of the world have come to share certain cultural icons and contemporary fashions, and increasing amounts of information and ideas about people and places, but this does not mean that they will lose their cultural heritage."[20] As I have argued, the embodied interests of the Internet have resulted in a technology that does not necessitate the transformation of societies. Since the interests embodied in the Internet are not deterministic, my claim that the globalization of the

17. Ibid.

18. Ibid.

19. Ibid., 308-309.

20. Ibid., 310.

Internet supports a variety of values and uses is supported by the work of Norris and Inglehart.

While cultural imperialism may not be occurring on the scale envisioned by many of globalization's critics, the dominance of the English language on the Internet is an example of a form of cultural imperialism particular to the technology. Norris and Inglehart state that while there is a gradual diversification of the population using the Internet, especially Chinese-, Japanese-, and Spanish-speaking users, there is still a disproportionate amount of content in English as compared to many languages around the world.[21] Joseph Kizza, however, explains that the English used on the Internet is itself becoming "an amalgam of various versions of regional and national English variants such as American (United States), Canadian, Caribbean, Australian, and South African English."[22] David Graddol argues that a standard English across the Internet cannot be maintained in a decentralized network.[23] In a study by Graddol on the use of English online, he found that there is increasing the use of "informal and more conversational language" as well as "a greater tolerance of diversity and individual style."[24] These online trends in the use of the English language, Graddol argues, suggest "a weakening of the institutions and practices which maintained national standard languages" and that "native-speaking countries are experiencing a

21. Ibid., 94-95.

22. Joseph Migga Kizza, *Ethical and Social Issues in the Information Age* (New York: Springer, 1998), 242.

23. David Graddol, *The Future of English? A guide to forecasting the popularity of the English language in the 21st century* (London: The British Council, 1997), 56.

24. Graddol, *The Future of English?*,56.

'decentrardisation' of English."[25] The variations on the English language suggest that the cultural domination of English used on the Internet may diminish over time, since localized influences and language variations are already widely present. Furthermore, Kizza writes, "As the Internet engulfs the globe, other languages will gain prominence."[26] He adds, based on research from the Internet Society by Christian Huitema, that it takes about two million active users of the Internet to establish a language online and create a market for it. He concludes, "As the Internet grows, the body of other people speaking other languages will grow as well," and the English language will be relatively proportionate to the other languages spoken by the users of the Internet.[27]

One argument about the economic consequences of globalization is that it imposes an imperialism of global capitalism, thereby increasing the economic domination of wealthier nations and corporations over poorer countries and people. Norris and Inglehart find that, unsurprisingly, the richest societies have better access to both the Internet and economic resources than poorer countries. They further add that "in recent decades, the poorest nations have not been catching up; they have been falling farther behind."[28] The concern is that poorer societies without access to the Internet will be marginalized in a global economic market that may be essential for economic success. They write that inequality of access between richer and poorer

25. Ibid.

26. Kizza, *Ethical and Social Issues in the Information Age*, 242.

27. Ibid., 243.

28. Norris and Inglehart, *Cosmopolitan Communications*, 134.

groups "[applies] to other kinds of media exposure and reflect deep-seated social inequalities based on cognitive skills, socioeconomic resources, and motivational attitudes."[29] Their conclusion is that the spread of the Internet is not the cause of greater wealth, decreasing wealth, or the gap between these richer and poorer societies. Norris writes, "Internet penetration rates can be predicted by economic models that also explain which countries are rich in telephones, radio and television, and even newspapers…Internet technology is new; global economic inequalities explaining technological diffusion are not."[30] While Norris denies that the Internet is a primary cause of the growing inequality of wealth between the richer and poorer societies, she also argues that the availability of the Internet reinforces "existing economic inequalities, rather than overcoming or transforming them."[31] However, since other media and information communications also reinforce these inequalities, the basic design of the Internet bears no special responsibility.

The appropriation of the Internet to serve the interests of local societies is possible because the interests embodied in the basic design of the Internet led to a technology that is open to incorporating diverse interests and uses. The technical code of the Internet retains the potential to be shaped by social meanings and uses. As I will illustrate in the following sections, the freedom to incorporate a variety of social relations in the Internet, including relations supporting inequalities, capitalizes on a reciprocal

29. Ibid.

30. Norris, *Digital Divide*, 67.

31. Ibid., 66.

relationship with the interests of accessibility, openness, and decentralization, which avert hegemony and exclusivity of technological oppression.

Studying the consequences of the globalization of the Internet on politics, Norris writes that Internet may alter "the balance of resources among the political institutions, reducing the costs of gathering information and communicating messages, with consequences that will mainly serve to benefit minor parties, smaller groups, and fringe movement activists."[32] She cautions her remarks by stating that while the balance of resources among the political institutions may be altered by the Internet, they are not leveled. Political activity on the Internet has the potential to "amplify the voice of smaller and less well-resourced insurgents and challengers, whether parties, groups, or agencies, which have difficulty being heard through the conventional channels of the traditional mass media."[33] The examples of successful political engagement on the Internet have involved transnational advocacy networks and alternative social movements that have used the technology to communicate, organize, and mobilize global coalitions around issues (such as world trade and human rights), challenging the legitimacy of established international organizations and national governments. Norris adds that this kind of political engagement on the Internet will primarily reinforce the activism of people already involved in such activities, better facilitating participation among politically engaged people rather than getting politically disengaged people involved. Nonetheless, the Internet does incorporate a diversity of social relations, allowing for a variety of political engagement across distances of the globe.

32. Ibid., 238.

33. Ibid., 239.

The study by Norris and Inglehart argues that the Internet reinforces social and economic inequalities, but denies that the technology creates or determines these social factors. The basic design of the Internet, with its embodied interests of accessibility, openness, and decentralization, was meant to incorporate a variety of uses and interests and be appropriated for many purposes around the world, which includes resistance to political configurations as well as reinforcement of social and economic inequalities. Regarding the argument that the globalization of the Internet is not a deterministic force in its emancipatory or oppressive consequences, or in its impact in a society or among societies around the globe, Norris writes:

> One reason why the Internet arouses such fiercely contested visions of the future is that plausibly the new technology may act both as a "great leveler" restructuring communication and information resources among intermediary institutions and empowering the class of wired political activists, while also simultaneously reinforcing inequality for those nations, groups, and individuals lacking the resources and motivation to take advantage of the new structure of opportunities.[34]

In addition to arguing that the Internet reinforces, rather than transforms, the cultural and economic conditions of societies, Norris' work emphasizes that the inequalities associated with the globalization of the Internet, such as the development of Western values in non-Western cultures or the disparities in economic resources among different societies, are more accurately attributable to endemic social and economic inequalities, both worldwide and within societies. Contrary to the arguments that the globalization of the Internet will homogenize the culture of the world, the study of Norris and Inglehart suggests that the Internet can be appropriated by societies to support their local cultures while networking to other societies around the globe. Likewise, the availability of the

34. Ibid., 237.

Internet in societies will not overcome economic disparities in the society, nor can the lack of availability of the Internet in certain societies explain their decreasing economic resources without studying the combined effects of their social inequalities (such as uneven political representation), economic conditions (such as poverty), and lack of other communication technologies (such as newspapers and television). And while the Internet does allow minor opposition parties and grassroots groups of human rights or environmental activists to communicate and mobilize around the globe, established groups with their own interests can also use the Internet to strengthen their organizations and communicate their messages as well.

Above, I argued that the Internet is not deterministic in producing particular social relations around the globe. In the next two sections, I elucidate further the range of uses and values that the basic design of the Internet allows as it is appropriated by specific societies, including appropriations that seem to be in opposition to the interests embodied in the technology, and the continuing capacity of the Internet to allow communication beyond such appropriations thus retaining the potential for resistance to the formulation of dominating interests on the technology.

Social and Political Appropriations of the Internet in Select Contexts

Although the Internet has not led to transformative changes in societies around the world, according to Norris and Inglehart, the Internet is potentially changing political engagement by improving information dissemination that can facilitate mobilization on social and political matters. Robert Klotz writes about the Internet that

"in several prominent cases it has played a prominent role in enhancing the voice of ordinary citizens against a repressive government," leading to changes in the extent that repressed groups can be politically engaged.[35] The interests embodied in the basic design of the Internet - accessibility, openness, and decentralization—allow for the networking of relatively unregulated communication and information dissemination that can be used to mobilize social groups. However, these interests can come into conflict with the values of more repressive governments, which exercise relatively strict control over information dissemination and communication. Below, I investigate examples of the Internet being appropriated by repressive governments for the control of content and analyze the success of this technological oppression, especially considering the embodied interests of openness that allows for technology to be built upon the Internet for both oppressive and emancipatory purposes.

Klotz has reported about governments around the globe that regulate the Internet, finding that countries with significant governmental regulation of the Internet, are "countries for which Internet restrictions are only a part of an overall strategy of limiting freedom;" this group is "almost exclusively composed of Asian, African, and Mideastern dictatorships."[36] An extreme example is Iran, where use of the Internet was criminalized prior to 1997.[37] After the ban was lifted, restrictions on the use of the technology were put in place, including substantial filtering of political content.

35. Robert Klotz, *The Politics of Internet Communication* (Lanham, MD: Rowman & Littlefield Publishers, 2004), 203.

36. Ibid., 206.

37. Ibid.

Regulation of information transmitted as well as received is imposed by the government. With the transmission of information, anyone wishing to establish an Internet server is required to obtain permission from the government and comply with the government filter lists, which includes the blocking of websites on human rights through software as well as blogs expressing dissent about the Iranian government.[38] The systematic suppression of content also entails extensive blocking of content sent on the network. Klotz explains that computers themselves are sometimes required to be registered with the government. [39] Also, "many governments require that all Internet access be provided through government or government-approved Internet service providers (ISPs)."[40]

In Saudi Arabia, Klotz reports that "all Internet connections are channeled through a server in the capital of Riyadh" and "approved Web pages are saved on the Riyadh server," making other content on the Internet inaccessible.[41] In 1997, the Saudi Arabian government "justified its regulations as necessary to ensure that people do not have their values offended online."[42] This filtering of Internet content clearly shows interests that diverge from the interests in accessibility, openness, and decentralization incorporated in the basic design of the technology. Content-filtering, however, is a public process, facilitated by recommendations made by the public for

38. Ibid.

39. Ibid.

40. Ibid.

41. Ibid., 207.

42. Ibid.

additional web pages to be blocked. Klotz writes that "the approximately five hundred daily suggestions for blocking are analyzed by the government, which on average blocks about half of the suggested sites."[43] Not only are websites opposed to the government disallowed but the government authorizes all Internet accounts and regulates emails, email attachments, and instant messages received over the Internet. Nonetheless, Klotz claims that these efforts by the government of Saudi Arabia do not fully block all possibilities for alternative access to information on the Internet, such that "total control is impossible."[44]

These accounts of the appropriations of the Internet in Iran and Saudi Arabia illustrate the variety of uses and interests served by the technical code of the Internet - the interests of accessibility, openness, and decentralization embodied in its technological design. These interests allow for governments to impose local restrictions but also allow for some ways to circumvent restrictions. Regardless of the restrictions described above, the openness of the Internet allows its users to utilize and build upon the network, allowing for their opinions to be expressed in spite of government control of the network. For example, Iranians can access and disseminate information restricted by the government through proxy servers, which involve interaction between private networks over the Internet that can circumvent the government's online censorship.[45] As well, with some Iranian ISPs based outside of Iran, control over the information

43. Ibid.

44. Ibid.

45. Babak Rahimi, "CyberDissent: The Internet in Revolutionary Iran," *Middle East Review of International Affairs (MERIA)*, 7, 3 (September 2003), accessed on November 2, 2010, http://meria.idc.ac.il/journal/2003/issue3/jv7n3a7.html.

disseminated online is more difficult for the Iranian government.[46] Accounts can also be established under fictitious names and the use of public facilities to access the network can minimize the risk of tracing the use of the Internet back to a particular individual. Additionally, the information being disseminated can be hidden through encryption by a variety of privacy software. Klotz writes that while privacy software has not been widely used in democratic societies, "it is in great demand from dissidents in nations limiting political freedom."[47] Klotz also highlights that the decentralization of the Internet allows for dissidents to circumvent the kinds of network control imposed by government in repressive societies. He writes, "Where Internet specific walls are imposed by government, the decentralization of Internet technology makes it likely that private efforts can successfully surmount them."[48] For example, mobilization around the rights of women in Iran has developed through the use of the technology that circumvents the censorship of the government. As Klotz explains, the cultural restrictions against women speaking openly is mirrored in public Internet cafes, which women are required to wear veils and female use of the Internet is segregated away from male use by floors.[49] Nonetheless, women express their opinions online to both men and women, becoming socially and politically engaged. In March 2010, Reporters without Borders honored the Change for Equality website (www.we-change.org) that

46. Babak Rahimi, "CyberDissent: The Internet in Revolutionary Iran."

47. Klotz, *The Politics of Internet Communication*, 204.

48. Ibid., 210.

49. Ibid., 206.

campaigns for changes to laws that discriminate against Iranian women.[50] The website was launched by twenty women activists in Iran and it has become an authoritative source of information about women's rights in a fundamentalist society. As Andrew Flanagin, Craig Flanagin, and Jon Flanagin argue, the Internet involves the conflicting interests between, for example, restriction of access to information by certain governments and the open access to information that remains possible through the fundamental technical code of the Internet even though the open access may not be easily available.[51]

China is another example of governmental appropriation of the Internet towards interests other than those embodied in its basic design; specifically, the government's interest to minimize the likelihood that the Internet will become a vehicle for political opposition. The government has created a strategy "placing significant restrictions on both the transmission and receipt of Internet communication" as well as "targeted ad hoc denials of service."[52] However, given that a distinctive feature of the Internet is decentralization, circumventing single points of control, the government of China has had limited success in restricting the technology. China has the world's largest Internet user population and its censorship system is one of the most technologically advanced in existence, censoring "tens of thousands of websites by combining URL filtering with the censoring of keywords ranging from 'Tiananmen' and 'Dalai Lama' to 'democracy'

50. "Iranian Women's Rights Activists Win First Reporters Without Borders Netizen Prize with Support from Google," Reporters Without Borders, accessed on November 5 2010, http://en.rsf.org/spip.php?page=impression&id_article=36718.

51. Andrew Flanagin, Craig Flanagin, and Jon Flanagin, "Technical Code and the Social Construction of the Internet," *New Media & Society* Vol. 12, No. 2 (March 2010).

52. Klotz, *The Politics of Internet Communication*, 206, 208.

and 'human rights.'"[53] Information about the Tiananmen Square protests of 1989 is so well censored that "the vast majority of young Chinese citizens are not even aware that the events of June 1989 ever happened."[54] When information about these events is sought through a search engine, the result in China is a message stating that "the search does not comply with laws, regulations and policies."[55] Dissemination of information about these events and other restricted topics on the Internet is prohibited and can lead to detention by the government, jail time resulting from charges of "subversion" and "dissemination of state secrets."[56] The Flanagins report that the filtering mechanisms of the Chinese government are successful for "all but the most ambitious users in China from accessing a wide range of content, including pornographic, religious, and political information."[57] Nonetheless, information does circulate in China on the Internet. The basic design of the Internet allows for applications to be built upon the basic structure of the technology, allowing for unanticipated fulfillment of human interests and potentials, for example the ability to connect securely to private servers in order to host and connect users in China who want less controlled and censored information and communication. The embodied interests of the Internet evade formulations of dominating interests on the technology, where the value of content control can be incorporated in the network but not sustained over the interests of the openness of the

53. Reporters Without Borders, "Internet Enemies 2010 - China," http://www.unhcr.org/refworld/docid/4c21f672c.html.

54. Ibid.

55. Ibid.

56. Ibid.

57. Andrew Flanagin, Craig Flanagin, and Jon Flanagin, "Technical Code and the Social Construction of the Internet," 190.

network and its accessibility. Furthermore, as I have argued, the interest of decentralization embodied in the Internet makes it difficult for the values of a governmental agency to completely oppress the interests of accessibility and openness, and these interests collectively allow the technology to incorporate uses and values beyond those values set by a political agenda.

When the potential for groups of people to communicate and mobilize around political debates is utilized, the Internet is shown to resist the technological oppression of repressive governments. However, does this feature of unrestrained communication and collaboration represent the Westernization of interests in non-Western societies? The technical code of the Internet is not coercive in its interest in unrestrained communication and collaboration, and it is not a dominating or even a necessary feature of the Internet. As I illustrated above, the potential for unrestrained communication and collaboration persists but is not a dominating feature of the Internet in such places as Iran, Saudi Arabia, and China. The existence of certain Western interests in other societies does not amount to cultural imperialism. Instead, the appropriation of the Internet to serve the interests of local societies, at least as defined by these governments, is mostly accomplished because the interests embodied in the basic design of the Internet have created a technology that incorporates diverse interests and uses. There is reciprocity between the interests of societies across the globe and the interests embodied in the Internet. The diversity of the interests that can be incorporated in the Internet extends to censorship. The accessibility of information over the Internet along with the openness of manipulating and building software to run on top of the network allows for censorship and control of the Internet by oppressive governments, and this act of

appropriating the network utilizes the initial interests of accessibility and openness embodied in the technology. There is a reciprocal relationship between the appropriations of the technology, even the oppressive appropriations described above, and the embodied interests of accessibility and openness in the Internet.

Instances of Transnational Social and Political Engagement through the Internet

If, as Norris and Inglehart argue, the Internet largely reinforces social, economic, and political features of the local society using it and, as I argue, the Internet is neither determinative of cultural imperialism nor fully appropriated by societies that use it, are there nonetheless instances when the Internet has been used to transform local or global conditions? The embodied interests of accessibility, openness, and decentralization allow for information exchange and communication even when sophisticated technological constraints are implemented, as in Saudi Arabia and China. But there have also been successful attempts to use the Internet to transform aspects of social, economic, and political structures, mobilizing collective action and political engagement across distances.

Douglas Kellner writes that many groups and individuals in developing countries have used the Internet in emancipatory ways, such as in acts of dissent. [58] For example, the Zapatista movement in the state of Chiapas, Mexico, is addressing problems of survival and transforming political conditions using the Internet as an instrument of

58. Douglas Kellner, "New Technologies and Alienations: Some Critical Reflections." www.gseis.ucla.edu/faculty/kellner/essays/technologyalienation.pdf (written in 2003).

political struggle. Klotz explains that "their early use of the Internet became a model for political minorities throughout the world and a catalyst for creating online networks of protest organizations."[59] The Zapatista National Liberation Army is a guerilla force of indigenous groups in southern Mexico who protest against laws that disfavor community property and struggle to improve conditions for indigenous peoples. In 1994, the Zapatistas rebelled against the Mexican government, resulting in the Mexican army taking control of villages. This control included blacking out outlets of information dissemination. In response, the villagers gave information to reporters and other people to tell a global audience about the events occurring in Chiapas. While the villagers themselves did not use the Internet at that time, information about their situation in Chiapas was disseminated on the Internet by other people. Consequently, demonstrations in support of the rebels occurred throughout the world and journalists, human rights activists, and delegations traveled to Chiapas in solidarity and to report on the uprising. The Mexican government backed off repression of the insurgents and began negotiations with them. The Internet has played a fundamental part in the Zapatistas continued struggle for improved conditions for indigenous groups. Fuchs describes the movement as "a transnational protest movement that is global in character and has a decentralized, networked form of organization."[60] The movement was aided by the variety of sources that were able to access and add to the information about the movement. Webpages and Internet-based communities join journalists, academics, and

59. Klotz, *The Politics of Internet Communication,* 211.

60. Christian Fuchs, "Transnational Space and the 'Network Society'", *ICT&S Center: Advanced Studies and Research in Information and Communication Technologies & Society*, www.icts.uni-salzburg.at.

other advocates in support of indigenous peoples in Mexico. Klotz writes, "Their use of the Internet has enabled the Zapatistas to convert a struggle of force that they were unlikely to win into a struggle of words that they are far more likely to win."[61] Klotz notes that dissenting repressed groups have found the Internet to be particularly helpful in circulating their message.

Characteristic of the Zapatista movement is the development of alternative news sources on the Internet, what Fuchs calls "alternative online media projects" that have "a high degree of openness, accessibility, and globality."[62] These alternative online media projects involve individuals, activists, and organizations on the Internet reporting news independently of major news outlets, breaking away from the business- and government-dominated official press and television networks. Kellner also traces Internet campaigns against major capitalist corporations and institutions of capitalist globalization, such as the global megacorporation McDonald's.[63] He describes a British group, London Greenpeace, that created an anti-McDonald's website. Two activists, Helen Steel and Dave Morris, developed the website and "denounced the corporation's low wages, advertising practices, involvement in deforestation, cruel treatment of animals, and patronage of an unhealthy diet."[64] The activists also organized a McLibel campaign, assembling information criticizing the corporation and mobilized experts to

61. Klotz, *The Politics of Internet Communication,* 212.

62. Fuchs, "Transnational Space and the 'Network Society.'

63. Douglas Kellner, "Globalization, Technopolitics and Revolution." www.gseis.ucla.edu/faculty/kellner/essays/globalizationtechnopoliticsrevolution.pdf (written in 2004).

64. Kellner, "Globalization, Technopolitics and Revolution."

confirm their criticism.[65] Kellner writes that their website was reported as "the most comprehensive source of information on a multinational corporation ever assembled" and was "one of the more successful anti-corporate campaigns to have been undertaken."[66]

As these examples illustrate, the Internet can be used to transform social and political issues locally and can also make them global causes by communicating across localized networks, leading to interactive debate and coalition-building. Kellner argues that the Internet thus "expands the field and domain of politics" and has the potential to empower communities by opening "new terrains of political struggle for voices and groups excluded from the mainstream media and thus increases potential for intervention by oppositional groups."[67] As Mark Poster points out, however, the Internet that can promote rebellion against corporate and political persecution can also promote existing political formations: "the Zapatistas and the neo-Nazis alike further their political ambitions by means of Web sites."[68] The freedom to incorporate a variety of social relations in the Internet, including relations involving oppression, capitalizes on reciprocity with the interests of accessibility, openness, and decentralization. Communication and collaboration on the Internet are possibilities for established governments and corporations, oppositional groups, and private individuals.

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65. To view the website, go to www.mcspotlight.org.

66. Douglas Kellner, "Resisting Globalization," www.gseis.ucla.edu/faculty/kellner/essays/resistingglobalization.pdf.

67. Douglas Kellner, "Globalization, Technopolitics and Revolution."

68. Mark Poster, *Information Please: Culture and Politics in the Age of Digital Machines* (Durham, NC: Duke University Press, 2006), 79.

The embodied interests of accessibility, openness, and decentralization have resulted in a technology that neither necessitates the transformations of societies and political systems nor derails it. However, as illustrated by the attempts to suppress information by governments or disseminate information for political engagement by activists, the Internet is not a neutral technology, for the embodied interests fundamental to its design persist across contexts.

Conclusion:
Globalization, the Internet, and Technological Oppression

As I have argued, the embodiment in the Internet of a Western scientific community's interests and values, which informed the communicative preferences of the technology, has not imposed a specific set of cultural values and communicative preferences on diverse cultures around the world. Local interpretations and uses of the technology, including censorship by the government and protest by repressed social groups, refute a reductionist technological determinism about the appropriation of the Internet around the world. The technology itself cannot transform societies to allow open interactive communication across the globe. To assume that it can is to assume an asocial development of the Internet, undervaluing the diversity and agency of users of the technology and of the cultural horizons in which the technology will be appropriated.

For Marx, alienation involves the misconception of products as objects detached from the social relations involved in their production. Alienation deforms the relations of values and interests created and shared among people through social involvement in

the making and creative use of objects such as the Internet. Expanding on this theoretical idea, Marcuse is concerned about the technological suppression of other values and interests that may exist outside the ruling ones. Rather than ruling through force, this kind of domination advances through a conception of technology as neutral, that is, an alienated misrepresentation of technology as self-contained and always the same, no matter its place in time or its environment. From the theoretical vantage points of Marx and Marcuse, the theories of the globalization of the Internet that predict its construction of an eventual uniformity of social, economic, or political systems around the globe make the mistake of participating in an alienated characterization of the technology as self-animated and unresponsive to social uses and relations. As we have seen, governmental organizations can minimize Internet communications to limit political opposition or activism for social justice. The Zapatista movement or the people engaging in discreet political discussions on the Internet in China illustrate the emancipatory features of the basic design of the Internet. In such cases, the technology may facilitate the ability of individuals and groups to communicate opposition and to come together in protest, but in others, the Internet may increase the power of ruling social forces to minimize the communicative presence of these individuals or groups while enhancing their own. As the study by Norris and Inglehart articulates, the Internet is a facilitator of social and economic inequalities in that it reinforces them but the technology does not produce or compound them. The basic design of the Internet, with its embodied interests of accessibility, openness, and decentralization, was meant to incorporate a variety of uses and interests. Such a technology can be appropriated for

many purposes around the world, given that it can both empower political engagement and reinforce social and economic inequalities.

My argument is not that theories of globalization should only reflect local definitions of the Internet. Rather, globalization should be treated as a complex and heterogeneous phenomenon, often involving the interconnection of global communication and local social features that produce contingent outcomes. As Feenberg argues, the different appropriations of a technology in social and historical contexts, separate from the context of its initial designers, uncover and actualize potentialities in the technology through unique social interactions that may involve interests not intended by the original design, and the formation of new meanings and uses.[69] As social constructivism illustrates, introducing a technology to new social groups instigates a process of interpretative flexibility, whereby the meanings of a technology can be freshly constructed. Feenberg affirms that technology is neither separate from nor indifferent to people or interests, including our social and political struggles. We can understand technology as involving interactions with people and the world. When we realize that social values pervade technology, it becomes possible to question dominant and hegemonic interests operating upon technological implementation, regulation, and social appropriation.

The technical code, as Feenberg refers to the dominant design features of a technology, incorporates the human interests and values that shaped its production and use. His focus is the embodiment of hegemonic interests and values that diminish the ability of users to choose how to interact with technology and thus limit their ability to

69. Feenberg, *Questioning Technology*, 219.

pursue their interests. The globalization of the Internet is not a deterministic force in or among societies around the globe in either its emancipatory or its oppressive consequences. The basic design incorporating the interests of accessibility, openness, and decentralization remains and retains the potential to be shaped by social meanings and uses, notably the relative persistence of unrestrained communication and collaboration. The technical code of the Internet resists complete communicative domination by any society, government, or social group that appropriates the technology. As the attempts to suppress access and openness in Iran, Saudi Arabia, and China show, the Internet is not a neutral technology; these fundamentally embodied interests are not negated in these contexts. There is a reciprocal relationship between the appropriations of the technology, even the oppressive appropriations, and the embodied interests of accessibility and openness in the Internet. The appropriation of the Internet to serve the interests of local societies is possible because the interests embodied in the basic design of the Internet led to a technology that is open to incorporating diverse interests and uses. The interests of accessibility, openness, and decentralization, while potentially oppressive when appropriated to satisfy the needs of dominant social relations, avert the hegemony and exclusivity that has concerned philosophers such as Feenberg. The net result of the interests embodied in the very structure of the Internet is an emancipatory ability to incorporate alternative interests and uses through dispersed collaboration and participation, which enables the technology of the Internet to remain minimally coercive.

CONCLUSION

While the Internet has not gone unnoticed in philosophy, philosophical investigation has mainly focused on social responses to the Internet and on envisioning future forms of social life with the technology, especially the potential of the Internet for advancing community and democracy.[1] There has been no significant attention to how the technical details of the Internet limit or expand these possibilities; philosophy lacks a sustained investigation of the implications of the basic design of the Internet.[2] In attempting to fill this theoretical gap, this dissertation has proposed a philosophical framework for investigating the social and historical relations that have resulted in the embodiment of specific interests in the technology of the Internet and made an initial investigation of how those interests figure in a globalized setting.[3] The philosophical basis of my study, indebted to the work of Karl Marx, Herbert Marcuse, and Andrew

1. The role of the body in the use of the Internet and the production of identity on the technology have also received philosophical attention, as well as the impact and use of the Internet in education.

2. The basic design and social impact of the Internet have been studied to some degree by scholars in a variety of other fields, especially history and law. Historical accounts are primarily focused on the influence of the military and the early users of the Internet in its design, highlighting the embodiment of survivability, flexibility, and high performance in the technology. Most of the major historical works were utilized in chapter two of the project. Within the field of law, issues of Internet regulation and governance have received the most attention, by Lawrence Lessig in particular. Computer scientists have written on the values and the implications of the design of the Internet, primarily in regards the current technological development of the Internet. In sociology, the work of Sherry Turkle especially cuts across disciplines, offering interesting empirical studies about the flexibility of online identity.

3. As in my other chapters, I do not strongly separate the Internet from the integrated applications that have become part of the way we experience the Internet as users, including the personal interface and software along with the World Wide Web application. However, by the architecture of the Internet, I mean the fundamental structure of the network as defined during the early stages of its development in chapter two, most notably the data transmission method of packet switching, the protocol standards of TCP/IP, and the principle of end-to-end networking.

Feenberg, is a social constructivist approach that includes theorization of the oppressive embodiment of hegemonic and exclusive interests in the Internet.

The study of the interests incorporated in the structure of Internet technology is crucial because the Internet is still a relatively new technology, which means that its development can still be shaped by the way in which people integrate it into their lives and the lines along which they elaborate its architecture. At this stage in its development, the Internet exemplifies the process of objectification insofar as it emerges from and facilitates social relationships, engaging the interests of both its creators and its users. The work of Feenberg assists in understanding the Internet by providing both an explanation of the way in which values are embodied in technology and an approach to evaluating technologies in order to uncover their inherent values. Yet his framework for technological hegemony does not fully apply to the Internet.[4] Feenberg tends to deal with technology almost exclusively as an oppressive force to be challenged, which prompts minimal consideration of potentially positive interests incorporated in technologies. Nothing in Feenberg's theory, however, excludes the possibility that technology embodies socially valuable interests worth protecting. This dissertation has introduced a conceptualization of the emancipatory potential of the Internet alongside the opposite effects of the dominating interests and institutional control that have been developing due to Internet commercialization and globalization. The work of Feenberg rightly suggests that the study of technology should be concerned with technological freedom *and* oppression — that is, with the ability or

4. Feenberg's work on the Internet has been minimal, insofar as he focuses primarily on the potential of the Internet for the development of community and democracy without an adequate appreciation for the ways in which the technology itself may be appropriated.

inability of users to choose how to interact with technology and how to pursue their own interests freely. In that vein, this study has argued that the architecture of the Internet incorporates the interests of accessibility, openness, and decentralization, leading to *relatively* free and open technological relations.

I have argued that these interests embodied in the Internet, while potentially oppressive when appropriated to satisfy the needs of dominant social relations, avert hegemony and exclusivity because they sustain an emancipatory ability to incorporate alternative interests and uses through dispersed collaboration and participation, which enables the technology of the Internet to remain minimally coercive. At this point in the history of the Internet, the technology is involved in the process of interpretative flexibility, whereby both emancipatory and oppressive potentials of the technology are being negotiated around the globe. The meanings and uses the technology, along with the social relations of the Internet, can still be altered. Additionally, the development of these aspects of the technology may stabilize over time, incorporated and propagated in more rigid technological rationalities.

However, examining the commodification of information and communication on the Internet leads to the conclusion that market values have the potential to obscure other social relations involved in the technology, especially through such developments as the commodification of personal information for commercial marketing interests in targeting product advertisements. This use of information not only exploits the interest of openness embodied in the basic design of the Internet but transforms its meaning. While openness encourages the diversification of networks, hardware, software, and information, and supplements the interest of accessibility of information and

collaboration through a transparent and participatory architectural design, the enlistment of these interests in service of commercial values has introduced coercive possibilities and the potential deformations that come with a predominance of exchange-value over use-value. Nonetheless, through the continuing vitality of such phenomena as collaborative production of open source software, the social relations involved in creating information goods and services on the Internet have not been reduced to mere exchange-value. Although commercial interests in the Internet have hegemonic potential, the incorporation of these interests in the technology has not derailed the embodiment of other interests; strict technological oppression continues to be circumvented with this technology.

Using a Marxian analysis, I have investigated the Internet as a system of production, distribution, and consumption of information, goods, and services involving both use-value and exchange-value. I argue that the Internet has facilitated alienation, through the growth of capitalistic enterprises on the Internet, as well as oppression, through the manipulation of the technology by repressive regimes. The subtle but growing appropriation of the Internet by commercial enterprises may not be readily apparent to the majority of the users of the Internet. Furthermore, in the cases of control and censorship of the Internet such as that undertaken by the government of China, it may only be the exceptional users of the Internet who are aware of either the hegemonic mediation of the Internet or the potential for less controlled uses of the technology through utilizing software to secure information and by connecting to alternative private networks with less restrictions.

In these instances, Marcuse's conception of technological rationality is quite à propos. Marcuse explains that people adjust to the technology in advanced industrial societies, making rational decisions to incorporate technological advances into their lives. Technology, along with being an instrument to achieve ends, results in concepts, representations, and ways of thinking about the world. The concept of technological rationality, as used by Marcuse, indicates the combination of social and technical reasoning into a single technological rationality, which then stands as what is rational in a society. Technological rationality transforms the needs of individuals to those needs dictated to them by technology, creating attitudes and preferences in line with the technological rationality. For Marcuse, technology is organized by people with the power to have technology serve their very own interests, resulting in a uniform way of thinking about technology. However, technology rationality, Marcuse claims, can be transformed to serve something other than social control, potentially serving such ends as freedom, individuality, and creativity.[5] This transformation of technological rationality is a result of critical reflection on the values embodied in technology with the understanding that technology is not value-neutral. With the appropriation of the Internet by dominating interests in the acquisition of information in service of profit and the control of information in service of political power, the evolution of the technological rationality of the Internet deserves continued academic reflection.

The Internet is neither neutral nor one-dimensional. As the attempts to suppress information in Iran, Saudi Arabia, and China illustrate, the Internet is not a neutral

5. Herbert Marcuse, *One-Dimensional Man* (Boston: Beacon Press, 1964), 250-253.

technology for its embodied interests persist in these contexts regardless of their political appropriations that aim to curtail them. There is a reciprocal relationship between the appropriations of the technology, even the oppressive appropriations, and the embodied interests of accessibility and openness in the Internet. Concurrently with an oppressive potential, it incorporates diverse kinds of social relations that resist oppressive forms of appropriation: embodied relations involving open communication between users of the technology, ease of access to each other, ease of access to information, and the ability to direct communication and collaboration towards a variety of human pursuits. Despite the growing commercialization and governmental appropriations of the network, the basic architecture of the Internet remains relatively unchanged, including its initial embodied interests of accessibility, openness, and decentralization. These initial embodied interests continue to incorporate social interactions on the technology. Users can contribute to information and data on the Internet, communicate and debate ideas, and participate in social and political activities around the globe. As I have shown in tracing the development of email and the World Wide Web, the basic design of the Internet has allowed and continues to allow for applications to be built upon the basic structure of the technology, thus accommodating unanticipated fulfillment of human interests and potentials. One example is the private and secure servers developed to host and connect Chinese users pursuing less controlled and censored information and communication. Thus the embodied interests of openness, accessibility, and decentralization can still limit the ability of particular values becoming so pervasive that they exclude these embodied interests in basic architecture of the Internet.

This dissertation has also investigated how the embodied interests of accessibility, openness, and decentralization have played out during the globalization of the Internet. While potentially oppressive when they are appropriated to satisfy the values of dominant social relations or governmental ideologies around the globe, as I have noted, the embodied interests of the Internet avert hegemony and exclusivity. There are inherent limits to power and control over the technology. The power to connect, collaborate, and freely communicate threatens oppressive regimes around the globe. This potential makes the future of the Internet contested ground that accentuates the importance of Internet users, especially the agency possible through relatively open communication and collaboration. Many users of the Internet have become familiar with the emancipatory features of the Internet and engage in positive relations embodied in the technology, thereby drawing attention to these features. User agency, however, must extend beyond the use of the technology. As I have argued, it is not enough to simply concentrate on one aspect of the development of the Internet, splitting the matter into either a technical phenomenon or a social phenomenon. The social and the technical are intertwined. I have addressed the importance of the interests embodied in the basic design of the technology, but governmental, legal, and corporate regulations of the technology are just as important. The replacement or reversal of the interests embodied in the Internet through governmental control, legal regulation, or corporate manipulation can significantly diminish the emancipatory potential of the technology located in this study. Were the design of the Internet changed to be fully centralized, or were its information and communication systems made less accessible to the majority of people in the world through the regulatory power of dominant groups,

then the social relations of the technology of the Internet would be significantly different. While the embodied interests in the basic design of the technology do not ensure that its emancipatory features operate fully and freely everywhere, that basic design does retain the potential for relatively open communication and collaboration, which demands participation and protection, both on and beyond the Internet.

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