

A Synthetic Theory of Law and Technology

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INTRODUCTION

This Article outlines a synthetic theory of law and technology that could contribute to the development of legal analysis at the intersection of law and technology. The theory is 'synthetic' as it is based upon a synthesis of instrumental and substantive theories of technology. Generally speaking,

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instrumental theories tend to treat technology as a neutral tool without examining its broader social, cultural, and political impacts. In contrast, substantive theories emphasize the ways in which technological systems can exert 'control' over individuals, often without their knowledge. A synthesis is necessary because each theory, standing alone, has disadvantages that reduce its potential for interfacing with legal analysis. Instrumental theories fail to recognize the contextual complexities that should and must inform all legal analyses. This failure is profound when that analysis is employed in the search for optimal policy solutions in an environment of changing technology. Substantive theories, on the other hand, appear to over-emphasize the need to address the social impact of technological structures while downplaying the relevance of human agency. They also tend towards abstraction and they undervalue the need to examine each case on its particular facts and circumstances.

Yet both theories and their accompanying bodies of literature have much to offer legal analysis in situations where technological changes appears to threaten legally protected values and interests. Together, the two visions can be combined into a synthetic theory that presents a new view of the relationship between law and technology: in times of technological change, (when interests traditionally protected by law are threatened), legal analysis should become more contextual and forward-looking and less deferential to traditional doctrine. In doing so, legal analysis focusing on the future paradoxically ensures that traditionally-protected interests remain protected.¹ This view in turn can be broken down into a two-part legal analytical framework:

1. Applying traditional doctrine, consider whether technology change threatens traditional interests that the law seeks to protect; and
2. After determining that the legal interests are threatened by changes in technology, legal analysis should adopt a more contextual approach that is less deferential to traditional doctrinal approaches.²

1. This perspective on the relationship between law and technology was discussed in an earlier article. See Arthur J. Cockfield, *Towards a Law and Technology Theory*, 30 MAN. L. J. 383 (2004). This paper draws to a certain extent from this earlier work.

2. This approach is more closely related to substantive theories of technology that explore potential unanticipated adverse outcomes associated with technological change.

Part I of this Article provides an overview of the literature associated with instrumental and substantive theories of technology. The instrumentalists are often identified with strains of thought that respect human agency in matters of technology, in part because technology itself is sometimes perceived to be neutral in its impact on human affairs and in part because of their emphasis upon human powers. Part I also reviews some of the important works that discuss substantive theories of technology with an emphasis on sociological works. In contrast to the instrumental perspective, the substantive theories emphasize how technological structure can overcome human agency. Moreover, substantive theories sometimes seek to show that technological change has been discontinuous in the sense that modern technologies increasingly exert more 'control' over our lives. Finally, Part I includes a discussion of recent works, including critical theories, which challenge or elaborate on aspects of the substantive theories or try to reconcile them with instrumental perspectives.

Part II begins by briefly explaining the current legal approach in which technology law is compartmentalized into discrete areas of enquiry such as copyright law, in contrast to other academic disciplines that have developed mature theories of technology. The Part then focuses on a discussion of how instrumental and substantive theories could help to generate a general theory of law and technology and their interaction. From the standpoint of legal analysis, instrumental and substantive theories have both strengths and weaknesses. A combination of the two main theoretical strands might well contribute to the development of an improved analytical framework for identifying and implementing optimal social policy. In particular, legal analysis that is informed by substantive theoretical perspectives could provide better critiques of the ways that technology developments affect and/or potentially subvert interests now protected and promoted by law. Part II also elaborates on the proposed synthetic theory of law and technology and illustrates how this theory would inform law and technology analysis by examining new surveillance technologies and post-September 11th legal changes involving state searches and privacy interests.

I. THE INSTRUMENTAL THEORIES

A. OVERVIEW: ASSESSING THE WORKS IN TERMS OF STRUCTURE/AGENCY AND TRANSFORMATION/CONTINUATION

Numerous ways exist for engaging in a sociological analysis of technology. Some of these are rooted in the earliest traditions of sociological analysis (such as those associated with Karl Marx, Max Weber, Emile Durkheim, and George Simmel. Others have begun to reorient the field of study beyond these modes of enquiry and toward approaches less reliant upon their sociological forbearers.³

In essence, we suggest that sociological approaches to technology can be understood broadly as differing on two major analytical dimensions.⁴ First, sociological approaches tend to emphasize either the potential of human agency in addressing the implications of technological development or the structural dominance of technological systems and logic. In many cases, the latter is tied to economic foundations, such as capitalism. For others, the technology is either the logic of the structure⁵ or a reflection of a newly formed structure.⁶ However, while these approaches have an overarching emphasis on either agency or structure, most approaches note how agency affects structure and vice versa.

A second dichotomous distinction embodied in sociological approaches to technology is the emphasis either on the continuation or the transformation of society as a result of new technology. The fundamental concern raised is whether the development of new technologies constitutes a clearly distinctive time in which the past, and its conceptions and experiences, has been rendered obsolete, or whether there is simply a continuation of old forms that have been differently cloaked. This discussion has largely been articulated in terms of modernity and what is referred to as “late” or “post”

3. The following literature review does not purport to offer a comprehensive examination: for instance, we do not review sociological approaches that rely on Social Systems theory or that of Critical Realism.

4. See, e.g., Samuel E. Trosow, *The Ownership and Commodification of Legal Knowledge: Using Social Theory of the Information Age as a Tool for Policy Analysis*, 30 MAN. L. J. 417 (2004) (comparing different theoretical perspectives along seven strands).

5. See *infra* Part I.C.3.

6. See *infra* Part I.C.4.

modernity. However, regardless of this split, these approaches to technology have been equally critical and hopeful about the prospects of technology and its implications.⁷

We will attempt to parse these approaches in terms of their positions on the structure/agency and transformation/continuation dialectics, but we acknowledge that these are reductionist interpretations of complex theories. As such, we recognize that these divisions are, to a certain extent, artificially concocted dichotomies. Instrumentalism is a social perspective which is only loosely articulated as a theoretical approach. The instrumental perspective can be tied to an articulation of optimistic conceptions of a knowledge and information society that has taken full advantage of the technological tools at its disposal.

B. INSTRUMENTALISM AND TECHNOLOGICAL OPTIMISM

A number of theorists, particularly in communications and economics, hold that technology is simply a tool – an instrument of the social, political, or economic group or individual that chooses to develop and use a certain

7. Anthony Giddens, for instance suggests that forms of modernity have simply become “radicalized,” and indicates this as “late” modernity. The implications for Giddens of this in relation to technology is one of ambivalence, whereby the intensification of modernity has rendered technology simultaneously something we can control and something that is capable of becoming uncontrollable at any moment. See ANTHONY GIDDENS, *THE CONSEQUENCES OF MODERNITY* (1990). What the notion of postmodernity attempts to do is unlink social change from notions of progress. This shift away from notions of progress is a theoretical move that situates things like technology as part of a language game, better understood as a form of discourse. One of the major points of postmodernism is Mark Poster’s idea that we have moved into a “mode of information,” something that has transformed our social world. See MARK POSTER, *THE MODE OF INFORMATION: POSTSTRUCTURALISM AND SOCIAL CONTEXT* (1990). We increasingly experience the world in terms of images, and see computer generated data (let alone images) as real as other forms of corporeal information. This is precisely what Jean Baudrillard suggests as well. Baudrillard’s notion of the “hyperreal” suggests that the reality we hold to be true is broken down into images alone and that these images are detached from their actual “referent” – the “real” world object we may have thought they were indicating. See JEAN BAUDRILLARD: *SELECTED WRITINGS 171-172* (Mark Poster ed., 1988). What Baudrillard expresses is a world in which nothing is seen as genuine or authentic, a world in which that which is a representation is treated as being “more real” than the “real.” Technology in this context is just a self-referential trope, akin to the dreamworld depicted in movies like *The Matrix*, which contains a number of references to Baudrillard’s works. See *THE MATRIX* (Warner Bros. 1999).

technology.⁸ This instrumental perspective is, as Andrew Feenberg suggests, the most widely accepted view of technology.⁹ It is entrenched in many social sciences and bureaucratic organizations, from business to government to non-profit organizations, and pervades everyday parlance regarding technology in the larger society. This perspective on technology holds that technology is completely neutral, solely serving the intended purposes held for it by its users.¹⁰

The use of certain forms of technology may preclude the use of other technologies, but these “trade-offs” are calculable choices rationally arrived at through different forms of debate. However, authors who espouse this perspective, albeit rarely explicitly, clearly prefer public and democratic debate.¹¹ This instrumental perspective holds that technology exists as a form of truth that can be readily transferred across societies. It is efficient and rational, and its productivity can be measured objectively, regardless of culture. It is a bit of an understatement to say that this technological perspective is shy of being a critical perspective on the future potential for and of technology, or even of its current effects. This is quite obvious in comparing this perspective with the substantive theories on technology we will discuss in the pages below.

Yet, this understanding of technology strongly emphasizes the abilities of human agency over and against the potential limitations of technological systems (i.e., structures). For the instrumentalists, human beings can and do direct the use of technology, and the fears of technological tyranny overcoming human autonomy are unfounded. Some instrumental approaches, however, such as those found in the management sciences,¹² ignore questions of individual autonomy because they are exclusively focused on enhancing efficiency, leaving the social questions to other disciplines.

This instrumental view can be seen as a backdrop to many of the perspectives that articulate the arrival of a new information society. One of most well-known of these perspectives is Alvin Toffler’s *The Third Wave*, in which he

8. See, e.g., ANDREW FEENBERG, TRANSFORMING TECHNOLOGY: A CRITICAL THEORY REVISITED 5-6 (2002).

9. *Id.*

10. *Id.*

11. See, e.g., BILL GATES, THE ROAD AHEAD 252 (1995).

12. See, e.g., Rias J. van Wyk, *Technology: A Fundamental Structure?*, 15 KNOWLEDGE, TECH. & POLY 14, 19-31 (2002).

articulates three “waves” of technological innovation: agricultural, industrial, and informational.¹³ The latter of these, in whose throes we presumably remain today, has transformed our world into one oriented toward and almost completely dependent upon computer communication technologies. Toffler’s perspective on the potential for new information and communication technologies is probably best expressed in a more recent context in an article he co-authored entitled “Cyberspace and the American Dream.”¹⁴ The authors of this article advocate a transformation of the legal and political barriers to what could be viewed as their “utopian” perspective on cyberspace. They call for the removal of obstacles to free market competition in the information technology and communications sectors, and they call upon governments to resist the temptation to control growth of online multimedia platforms.¹⁵

This article articulates an approach to technology that is exemplified in a number of other fairly optimistic and instrumental discussions of new technologies. For example, Charles Leadbeater has similarly advocated for a redesign of economic systems to make better use of knowledge capitalism – something he sees as consisting of “innovation, design, branding, [and] know-how.”¹⁶ He suggests that the potential for developing, using and spreading knowledge should be on the forefront of economic agendas, in recognition of social capital as a driving factor in the global economy.¹⁷ Before these texts, but after Toffler’s earliest declaration of a third wave economy, Yoneji Masuda clearly articulated a marked social transformation in the shift from an industrial society to an information society based on his particularly Japanese perspective.¹⁸ He suggested that society has undergone and continues to undergo a variety of substantial transformations; the end result of which will not be an updated industrial age

13. See ALVIN TOFFLER, *THE THIRD WAVE* 26 (1980).

14. See Esther Dyson, George Gilder, George Keyworth & Alvin Toffler, *Cyberspace and the American Dream: A Magna Carta for the Knowledge Age*, 12 INFO. SOC’Y 295 (1996).

15. *Id.*

16. CHARLES LEADBEATER, *THE WEIGHTLESS SOCIETY: LIVING IN THE NEW ECONOMY BUBBLE* 22-24 (2000).

17. *Id.*

18. See YONEJI MASUDA, *MANAGING IN THE INFORMATION SOCIETY* 3-10 (2d ed. 1990).

but a new and unique period in human existence.¹⁹

Other instrumentalist perspectives outline a prediction of the future based on the potentials for and use of new technology. However, they rarely problematize the technologies themselves. For instance, in the case of Donald Norman's *The Invisible Computer*, social issues are relegated to user error or, more importantly, as he articulates in this text, poor design.²⁰ There may not be a more clear instrumental and optimistic perspective on the future than Bill Gates' *The Road Ahead*, which focuses on the potentials and future of the new information technologies. Even Gates, however, is aware that "As with all major changes, the benefits of the information society will carry costs."²¹

In essence, instrumentalist perspectives are often optimistic about technology. This optimism is shared to differing extents by sociological theorists like Manuel Castells, but his is a cautious optimism. The social theories concerned with technology discussed next (perhaps because many are revisions of Marxist approaches) tend to be a bit more pessimistic about potentials for technology.²²

19. *See id.*

20. *See* DONALD A. NORMAN, *THE INVISIBLE COMPUTER: WHY GOOD PRODUCTS CAN FAIL, THE PERSONAL COMPUTER IS SO COMPLEX, AND INFORMATION APPLIANCES ARE THE SOLUTION* (1998).

21. GATES, *supra* note 11, at 251.

22. It is important, however, to note the very early contribution of another Marxist theorist, Daniel Bell. *The Coming of the Post-Industrial Society* is one of the earliest key texts on the information society, heralding the coming age in which computers and information would be everywhere. *See* DANIEL BELL, *THE COMING OF THE POST-INDUSTRIAL SOCIETY: A VENTURE IN SOCIAL FORECASTING* (1973). Bell highlighted a world in which people would engage in "knowledge work" and in which capitalism would be radically altered. While his Marxist perspective is clear in his focus on the transformation of labor and capital in the "post-industrial society," the more melancholy Marxist notions of alienation and oppression are tempered by Bell's optimism for this radically altered "new" society. In fact, one of the main distinctions between Bell's perspectives on technology and society from a Marxist perspective is his emphasis on the transformation of capitalist objectives, instead of a continuation. While he acknowledges the rise of technical elites and suggests that the shift from manufacture to service industries will be problematic, his overall optimism has more in common with those who can be deemed as instrumentalists than those who have taken up traditional Marxist positions.

C. SUBSTANTIVE THEORIES

1. Overview: The Substantive Impact of Technology on Society

Sociology and other disciplines often place an emphasis on substantive or critical theories that offer interpretations of technology that have arisen from and share a heritage with the writings of Karl Marx, specifically their embodiment in critical theory and political economy. We begin our discussion of substantive theories by reviewing a few key works in this area. The Article will then turn to the famed sociologist of law, Max Weber, and his view that bureaucracy and technology form an iron cage, followed by a review of Jacques Ellul's emphasis on "technique." We then briefly examine how recent writings strive to confront the issue of technological determinism, including Manuel Castells' notion of a network society, science and technology studies and approaches that emphasize social biases in technology.

Before we begin the review, it may be helpful to offer an example of how technologies can have a political, social, cultural, or other substantive impact on society so that, according to the substantive theories, the technologies are not merely neutral tools. In *Do Artifacts Have Politics?*, Langdon Winner simply accepts the premise that technologies are interwoven into modern politics and in fact embody specific forms of power and authority.²³ To sustain this point, Winner presents two examples.²⁴ In the first example, highway overpass bridges were deliberately built low to prevent low-income transportation, like buses, from travelling out of New York City toward the homes of the wealthy on Long Island.²⁵ In the second example, although mechanical iron molding machines did not work as well, or as cheaply as skilled iron workers, they were implemented to effectively prevent iron workers from unionizing. This provided the steel mill owners with an alternative, if needed.²⁶ To Winner, it is obvious that technologies stack the deck in favor of certain social and political interests and, as such, the technologies have a substantive impact on society that exists outside of their

23. See Langdon Winner, *Do Artifacts Have Politics?*, 109 DAEDALUS 121, 122 (Winter 1980).

24. *Id.* at 123-124.

25. *Id.*

26. *Id.* at 124-125.

intended uses.²⁷

2. Marxist Approaches to Technology

Perhaps as a result of the dominance of Karl Marx's conceptions and critiques of capitalism within many sociology departments, most sociological perspectives on technology have been, at a minimum, influenced by Marx's ideas. Indeed, some sociologists see themselves as the contemporary torchbearers of his thought. The perspectives of critical theory and political economy (sociological) perspectives on technology are certainly two modes of analysis that share a Marxist heritage. Political economists within sociology and communication studies, however, generally are seen by themselves and others within a framework of critical theory. The difference is in their foci. Critical theory is a much broader theoretical means of critiquing society as a whole while political economists focus their work on critically assessing the means of production and distribution of technology.

Critical theory arose out of the Frankfurt Institute for Social Research founded in 1923 in Frankfurt, Germany. Two of its members, Max Horkheimer and Theodor Adorno, offer provocative critiques of culture in their book *Dialectic of Enlightenment*.²⁸ Throughout this text, Horkheimer and Adorno argued that the Enlightenment, rather than liberating people from fear, has produced new forms of authority and control.²⁹ This barbarism is quite clearly wrapped up in forms of instrumental rationality and administration that reinforces the demands of capitalism and is a base from which all forms of new technology are born.³⁰ They reserve some of their sharpest and most poignant criticism for the culture industry, which they suggest partakes willingly in the repression of human freedom and autonomy through mass deception.³¹ The underlying emphasis in this text is that technologies, and in

27. See generally *id.* Winner's approach to technology is largely seen as most closely associated with those of science and technology studies discussed below, but the notion that there are interrelations between the social and political production of technology pervades all of the substantive theories of technology we discuss.

28. See MAX HORKHEIMER & THEODOR W. ADORNO, *DIALECTIC OF ENLIGHTENMENT* (John Cumming trans., 2d ed. 1995).

29. *Id.* at xi.

30. *Id.*

31. *Id.*

particular new media of technology, are designed not to encourage human liberation and freedom, but rather to set limiting parameters in which human beings can express themselves. The “freedom to choose an ideology. . . everywhere proves to be freedom to choose what is always the same,”³² and technology is simply another means by which to perpetuate capitalist forms of oppression and domination.

Fellow Frankfurt School critical theorist Herbert Marcuse is even more explicit about the role of technology in his work *One Dimensional Man*.³³ In the text, Marcuse holds as a thesis the notion that society has been collapsed into one dimension of thought or action—a technical and rational dimension. Marcuse holds that technology cannot be distinguished from how it is put to use. In the present course of events, technology has imposed itself as a system of domination, removing possibilities for any other alternatives in discourse, action, or thought.³⁴ Social validity is dependent on the “technologically rational.” “Technology,” according to Marcuse, “serves to institute new, more effective, and more pleasant forms of social control and social cohesion.”³⁵ Through this process, notions of personal autonomy and freedom are being replaced by suggested needs and desires generated by an increasingly “rational” society.

One of the more recent critical texts is Andrew Feenberg’s *Transforming Technology: A Critical Theory Revisited*.³⁶ This text is an update on a 1991 work entitled *A Critical Theory of Technology*. Unlike Frankfurt School theorists like Horkheimer, Adorno and Marcuse, who explicitly and implicitly posit the predominance of structural control, Feenberg attempts to reinstate a notion of human agency and engage in “politics of technological transformation.”³⁷ Feenberg believes that critical theorists’ acquiescence to the inevitable technological structure in the 1970’s was a wrong turn, and that critical theory needs to engage in a more interventionist strategy.³⁸

In Feenberg’s view, though capitalism has provided an

32. *Id.* at 166-7.

33. See HERBERT MARCUSE, *ONE DIMENSIONAL MAN: STUDIES IN THE IDEOLOGY OF ADVANCED INDUSTRIAL SOCIETY* (1964).

34. *Id.* at 18.

35. *Id.* at xv.

36. See FEENBERG, *supra* note 8.

37. *Id.* at 13.

38. *Id.* at 18

incredibly efficient means of distribution and production, it is unsustainable.³⁹ Critical theory, he suggests, must engage capitalism and the implications it has for technological development and technical and rational thinking. Feenberg argues that a current critical theory must be one that focuses on human relations to matter, rather than one that is concerned with perpetuating our technological dominance over it or, as was the case with earlier forms of critical theory, simply critiquing this dominance.⁴⁰

While Feenberg seeks to revitalize critical theory, Herbert Schiller and other political economists focus on the production and distribution of new information and communication technologies.⁴¹ Schiller does not see the information society as any sort of new configuration of the social world. He sees the information society in terms of an economic continuation of the past. Capitalism, though perhaps refined and modified slightly, remains, and it remains with a fairly strong division between “haves” and “have nots.”⁴²

Both critical theory and political economy on the whole emphasize the dominance of social structure over and against the power of human agency. Yet authors generally recognized as critical theorists and political economists do give significant caveats to the powers of human intervention and agency. On the one hand, political economists tend to hold a fair bit of hope out for the prospects of unions and government regulation. The critical theorists, on the other, see the potential for change in the engagement of social dialogue and critique, though Feenberg and other later authors may hold more hope for this than the radically pessimistic opinions of earlier Frankfurt School critical theorists.⁴³ What is apparent in these texts is an emphasis on the structures embodied in technology and technological practices and their precedence over and against the constrained agency of human or even institutional action. Further, critical theorists and especially political economists make clear that technology embodies a continuation of old

39. *Id.* at 24-27.

40. *Id.* at 170.

41. See FRANK WEBSTER, THEORIES OF THE INFORMATION SOCIETY 124-160 (2002).

42. See Herbert I. Schiller, *Striving for Communication Dominance: A Half-Century review*, in ELECTRONIC EMPIRES 17, 19-20 (Daya Kishan Thussu ed., 1998).

43. See *supra* nn.23-34 and accompanying text.

forms of capitalist logic and practice, one that limits the potential to conceptualize new forms of technology with a new formation of society.

The predominance of technological structure as a continuation of previous modes of social and political practice that overwhelms individual will in a dehumanizing way is also apparent in the works of Max Weber and Jacques Ellul, to whom we now turn.

3. Weber's "Iron Cage" and Jacques Ellul's Technique

In the *Protestant Ethic and the Spirit of Capitalism*,⁴⁴ Max Weber suggests that Puritan ethics and ideas influenced the development of capitalism.⁴⁵ Weber describes capitalism as creating an organizational shift towards rationalization/bureaucratization from a value-oriented organization to a goal-oriented organization. As a result, the increased rationalization of human life traps individuals in an "iron cage" of rule-based, rational control: the new economic order "is now bound to the technical and economic conditions of machine production which to-day determine the lives of all individuals who are born into this mechanism . . . with irresistible force."⁴⁶

Though Weber's notion of the iron cage—the restrictive rationalization of human life that society has created for itself—has filtered throughout many contemporary texts, it is perhaps best rearticulated in light of the theoretical position of Jacques Ellul. Ellul, yet another transformed Marxist, suggests in his first major text, *The Technological Society*, that current society and society's future will be one in which people become

44. MAX WEBER, *THE PROTESTANT ETHIC AND THE SPIRIT OF CAPITALISM* (Talcott Parsons trans., 1958).

45. *See id.*

46. *Id.* at 181. Weber rejects the metaphor of capitalism as a "light cloak" that can be thrown aside in favor of the metaphor of an "iron cage." *Id.* For an effort to link Weber's views more directly with technology concerns, see Terry Maley, *Max Weber and the Iron Cage of Technology*, 24 BULL. OF SCI., TECH. & SOC'Y 69 (2004) (claiming that Weber should be reassessed as a compelling critic of science and technology). Importantly, Maley suggests that there is a potential for human agency found within Weber's work and that one need not take the same direction as Ellul. *See id.* at 74. Rather Weber "does not foreclose the possibility of meaningful intervention" in his postulation of the iron cage. *Id.* at 84. *See also* LAWRENCE A. SCAFF, *FLEEING THE IRON CAGE: CULTURE, POLITICS, AND MODERNITY IN THE THOUGHT OF MAX WEBER* (1989).

increasingly dependent on machines.⁴⁷ This is a society in which people order their lives to accommodate the demand of rationality and efficiency, the mode of operation upon which machines exist. In his numerous texts, Ellul questions whether such a society has indeed progressed. Rather, he contends that the advent of the technological environment has seriously impinged upon human freedom and autonomy.⁴⁸ In his writing, the social, political, and economic worlds are seen in terms of epochal transitions, and Ellul was concerned about what he saw as a particularly dire transition to an oppressive epoch, that of the technological society.⁴⁹

Jacques Ellul focused on a notion of dialectics inspired by Hegel and Marx, yet he believed that the dialectical tensions of our social world were not ones that would ever come to some final solution or synthesized resolution.⁵⁰ Dialectics, he believed, go much further than the class struggles suggested by Marx; instead, they pervade every aspect of our lives.⁵¹ For Ellul, this is what arguably makes us human; our living out the tensions of life proves us to be free, to be cognitive creatures that have a full sense of agency and autonomy.

This tension is the central element of Ellul's work, and he suggests that the technological society has begun to make the tensions that make us human, in many respects, collapse in favor of those in line with technical considerations. In this technological society, all of life is being subsumed by

47. See JACQUES ELLUL, *THE TECHNOLOGICAL SOCIETY* (John Wilkinson trans., 1964).

48. *Id.* at 138.

49. See JACQUES ELLUL, *WHAT I BELIEVE* 135 (Geoffrey W. Bromily trans., 1985).

50. *Id.* at 29-46.

51. ELLUL, *supra* note 50. Ellul believed that at every moment we are torn between things like life and death; torn between the ability to make a change in our world and recognize our own insignificance. We struggle between rational decisions and emotional ones, and for Ellul, life is always dialectic in this perspective. Resolution of these tensions, unlike the synthesis that Marxism provides, was not found in a new synthesis between these two binary oppositions. We cannot create a "middle ground," so to speak, in any of the tensions we face (like a proletariat revolution and the institution of a communist state). Instead, Ellul suggested that synthesis (insofar as it is a synthesis) occurs only by simultaneously living out the tension between the two. We embody life and death at the same time. We live the struggle of being rational and being irrational (emotional). See Wha-Chul Son, *Reading Jacques Ellul's The Technological Bluff in Context*, 24 BULL. OF SCI., TECH. & SOC'Y 518 (2004).

“technique” described as “the totality of methods rationally arrived at and having absolute efficiency . . . in every field of human activity.”⁵² The essence of this fairly dense definition suggests that everything is measured against its rationality and efficiency. As subsequently discussed in Part II.B., the tension identified by Ellul is also a helpful way to understand the tension inherent within the law that simultaneously looks backwards (to promote consistency and certainty) and tries to move forward (to account for changing facts and circumstances).

4. Technological Determinism and Recent Efforts

One of the underlying concerns in most substantive theories of technology is the notion of technological determinism. These theories frame technology, to greater or lesser extents, as inherently possessing a structure that in turn produces a society that must act and exist in certain ways. Modern technologies, as suggested by Ellul and others, are the real culprits in enhancing this determinism.⁵³ Consider Martin Heidegger’s views set out in *Question Concerning Technology*.⁵⁴ According to Heidegger, modern technology uses resources from nature and the world, and converts them into energy to achieve its objectives. While ancient technologies were at the whim of nature, modern technology reverses this role, and makes itself master over nature.

Heidegger illustrates his point by comparing a sawmill in the Black Forest to a dam on the Rhine. The sawmill uses the energy of the river, but only turns as the river flows, faster as the river rises and slower as the current drops off. The hydro dam, on the other hand, has blocked the Rhine, forcing its water to flow through it at a uniform rate. It essentially turned the Rhine into a standing reserve for artificial purposes. Heidegger sees this as symptomatic of modern technology, which treats nature as a standing reserve forced to provide us with endless and efficient resources. But humans inadvertently also become a part of this process, whereby we

52. ELLUL, *supra* note 47, at xxv.

53. See Thomas P. Hughes, *Technological Momentum, in* DOES TECHNOLOGY DRIVE HISTORY? 101, 112 (Merritt Roe Smith and Leo Marx eds., 1994) (“A technological system can be both a cause and an effect; it can shape or be shaped by society. As they grow larger and more complex, systems tend to be more shaping of society and less shaped by it.”).

54. See MARTIN HEIDEGGER, *THE QUESTION CONCERNING TECHNOLOGY AND OTHER ESSAYS* (1977).

are forced to keep up with and adapt to technology. This leads to Heidegger's two problems with technology: first, we humans are treated as mere resources, and second, while we think we are the masters, we are not. We cannot see this, or understand the world around us because modern technology obscures our vision. Once we can identify these two problems, we can understand the 'essence' of technology.⁵⁵

Alternatively, an instrumental perspective towards technology would hold the opposite view: that technology is only a tool and has no inherent structure. Most sociological schools have rejected this latter idea as fundamentally naïve, but many are also wary of attributing too much power to technology, something plainly evident in Ellul's texts. The texts discussed next tend to point to the complexity of conceptualizing technology, attempting neither to hold deterministic assumptions nor neglect technology's inherently social character. Each of these texts begins by arguing that technology is never created or used in a social vacuum; rather it is always part and parcel of social pretenses and purposes.

More recent works have tried to address the issue of technological determinism by trying to assess its complexities in a more comprehensive manner. For Manuel Castells, the transformation towards information capitalism is one in which the social, economic, and political worlds have become centralized around networks that link people, institutions, and countries.⁵⁶ This is "the network society" we now dwell within, and it is largely a result of the development of information and communication technologies such as the Internet and mobile phones that enable communication and the transmission of information and ideas to occur on an unprecedented global scale.⁵⁷ By shifting the focus in social analysis towards that of a network, Castells has articulated a new way of understanding the connection between humanity and technology. Castells' work places people and their artifacts in a mutually bound relationship.

To some extent, Castells' work avoids the issue of "essentializing" technology by instead "essentializing" the

55. *Id.* at 5. This is also the explicit concern of Jacques Ellul and the effects of "technique," that humans have turned into mere resources. See JACQUES ELLUL, WHAT I BELIEVE 137 (Geoffrey W. Bromiley trans., 1989).

56. See MANUEL CASTELLS, THE RISE OF THE NETWORK SOCIETY (1996).

57. MANUEL CASTELLS, THE INTERNET GALAXY 2 (2001).

network in which technology is intrinsically bound.⁵⁸ While this circumvents the pitfalls and perils of both critical and instrumental views of technology, Castells does not give us a sense of how best to understand technological artifacts themselves. Perhaps this is because it is impossible to do so: one can not remove a technology or a conception of technology from the networks of relations in which it is bound, nor can one extract the relationships of human beings with technology from the network in which they are bound. Both technology and humanity are necessarily implicated in and bound together within complex social relationships.

Rather than focus on networks as a unit of analysis like Castells, Science and Technology Studies (STS) focuses on understanding “science and technology as social relations and as socially constructed.”⁵⁹ That is, while Castells gives us a sense of how important the networks are to technology (and vice versa), STS gives us a sense of the complexity of social structures behind the production, distribution and consumption of science and technology. According to STS, we can learn more about technology by paying attention to the processes by which technologies are made and the myriad of ways in which these technologies may be put to use, which vary in degree from the intentions or original design.⁶⁰ This suggests that science and technology developments are driven by social relationships and networks as well as formalized practices and the employment of scientific methodology. Principally, STS demonstrates that scientific and technological practices are far more socially nuanced and complex than the public perception and presentation of these practices suggest.

The relationship between technology and history is likewise complex: technological development and use have

58. See Webster, *supra* note 41, at 102-104.

59. WENDA K. BAUCHSPIES, JENNIFER CROISSANT & SAL RESTIVO, SCIENCE, TECHNOLOGY, AND SOCIETY: A SOCIOLOGICAL APPROACH 1 (2006). See also THE SOCIAL CONSTRUCTION OF TECHNOLOGICAL SYSTEMS (Wiebe E. Bijker et al. eds., 8th prtg. 2001).

60. By way of example, cellular phones were designed to enable wireless communications, but because technologies were needed to calculate the physical location of the cell phone to work, they are also now used as a government tracking devices to the extent that state agents can access telephone company records that track the geographic location of the phone’s usage. See, e.g., *In re Application for Pen Register and Trap/Trace Device with Cell Site Location Auth.*, 396 F. Supp. 2d 747, 754 (S.D. Tex. 2005) (“While the cell phone was not originally conceived as a tracking device, law enforcement converts it to that purpose by monitoring cell site data.”).

many outcomes. Technology is not given to one specific future, despite Ellul's dire warnings of a social world in which technique dominates.⁶¹ Nor is technology solely a slave to capitalist enterprises as Herbert Schiller or other political economists might suggest.⁶² As opposed to a relatively strict technological determinism, notions of a "soft determinism" remain tenable. Thus technologies may be seen as embedded in a particular "technological frame" which serves to guide (configure) future actions and relationships with those technologies, their users, and their subjects.⁶³ Overall, STS demonstrates that there is an interrelation between historical social development and the development of technology.⁶⁴ Rather than suggesting that one drives the other (a reductionist critique of the perspectives of both instrumentalism and technological determinism), STS seeks a middle ground, seeing history and technological development

61. As for a theoretical framing of these issues, one theory articulated by a number of STS researchers is the Actor-Network Theory (ANT). In a manner similar to Castells, ANT posits that the work of "technoscience" (a term that indicates the interdependence of science and technology) is about the creation of larger and stronger networks. For ANT, these networks are heterogenous, including "both human and non-human actors that have *interests* that need to be accommodated." SERGIO SISMONDO, AN INTRODUCTION TO SCIENCE AND TECHNOLOGY STUDIES 65 (2004). The goal of these networks is to act together to achieve a particular and consistent effect in a machine-like fashion. The goal may likewise be to produce particular facts, in which the network is employed to ensure that the components are in agreement. Empirical research informed by ANT tends to focus both on the interests of the actors being examined (human, machine or artifact) and the socially inscribed process of "translating" these interests. In both scientific and technological endeavours, ANT highlights the very social nature of the work that is involved in the relationships that exist or are made to exist between objects and their representations. *See id.* at 65-74.

62. *See* Schiller, *supra* note 42.

63. Technological frames are built up after periods of "interpretive flexibility," in which a given technology can be seen as having numerous potential trajectories. *Id.* at 81. STS typically points out that in the end the social expectations and the design of a given technology begin to coalesce around a singular purpose and expectation. *Id.* The technological frame and the reduction in interpretive flexibility serve to both configure the way a particular technology is able to be used as well as configure the user of that technology by setting the parameters under which the technology may be socially expected to be used. *Id.*

64. *See, e.g.,* Trevor J. Pinch and Wiebe E. Bijker, *The Social Construction of Facts and Artifacts: Or How The Sociology of Science and the Sociology of Technology Might Benefit Each Other*, in THE SOCIAL CONSTRUCTION OF TECHNOLOGICAL SYSTEMS, *supra* note 49, at 17.

as intertwined.⁶⁵

This discussion of sociological approaches to technology would be remiss if it neglected concerns of class, gender, and ethnicity. Some of the most prominent discussions pertaining to these concerns relate to the orientation of technological objects, often understood as masculine pursuits, and the existence of and potential for digital divides. As many authors recognize, the theoretical formulations that articulate a means for understanding the relations of technology with humanity should also embrace means for engaging with the social issues that these relations present. For instance, feminist approaches to technology have long argued that technology is about men: technologies are largely controlled by men and are designed both by and for men. Cynthia Cockburn refers to this as a “technological segregation” which she views as particularly harmful.⁶⁶ This perpetuates the economic and social disadvantages of women, bolstering job segregation by limiting employment of women in jobs which require technological expertise. Other works focus on the growing digital divide: because technology is not neutral in its application, exclusions from design, exclusions from use, and exclusions from control often surround the adoption of new technologies.⁶⁷ At their heart, these critiques of technology seek to understand how bias is integrated into technological systems and how this bias tends to perpetuate the advantage of some over and against the potentials for others.

Theorizing about technology requires at its most basic level

65. Unlike STS, Giddens and other more postmodern approaches such as those of Mark Poster and Jean Baudrillard, focus on and suggest that there has been a fundamental change in our social world. Both Giddens in his notion of “late modernity” and postmodernists see this social transformation as rendering more modern conceptions of the social world as obsolete. There are distinctions between “late modernity” and “post modernity” but overall they focus on the emergence of a society in which there has been a dissolution or fragmentation of modern frames of reference, i.e., institutions, identity, power, politics, etc. See GIDDENS, *supra* note 7, at 148-150.

66. See CYNTHIA COCKBURN, *MACHINERY OF DOMINANCE: WOMEN, MEN AND TECHNICAL KNOW-HOW* 17-20 (1985). Under one view, the critique of this segregation is reinforced by the persistent illusion of technology as freeing women, being an agent of social change. Images of 1950’s housewives whose machines simplify their daily tasks abound here, and yet as those same images suggest, this often reinforces “rather than undermine[s] gendered expectations.” EILEEN B. LEONARD, *WOMEN, TECHNOLOGY AND THE MYTH OF PROGRESS* 19 (2003).

67. See, e.g., PIPPA NORRIS, *DIGITAL DIVIDE CIVIC ENGAGEMENT, INFORMATION POVERTY, AND THE INTERNET WORLDWIDE* (2001).

an understanding of the implications of technology in the everyday life experiences of persons and social groups. Moreover, the issues raised by feminist approaches to technology as well as the concerns expressed above over the digital divide suggest that theoretical approaches considerations of technology must be grounded in empirical research.

D. SUMMARY: TOWARD A SYNTHESIS

We have discussed the theoretical frames of technology above in terms of their orientation to human agency and social structure. This is a very reductionist way of looking at perspectives on technology, as each of these theoretical frames is far more complex than this dichotomy suggests. However, simply put, one can see that instrumental perspectives on technology treat technology as merely a tool wielded by individuals and institutions. Technological transformation in this framework is a matter of purposeful action, a matter of rational and utilitarian choice. The perspective of the critical theorists and Jacques Ellul, however, suggest technology to be far more than a tool. In their estimation, technology is imbued with the power of the social structure, be it capitalism or Ellul's technique, and as such has rendered the actions of human agents insignificant.

This position is just as problematic as the instrumentalist vision, and, given the dichotomy postulated in this paper, Castells and STS, along with Andrew Feenberg's revisions of critical theory, are shown as attempts to chart a middle ground. It is in these theoretical articulations that we find an explicit articulation of both human agency and the determining power inherent in social structures. What is left largely unsaid is how these perspectives differ as to whether or not a substantial break has occurred in our understanding of the social world – whether the technologically inundated world in which we live is an intensified continuation of the modern world or distinct from it. In the end, both perspectives on our understanding of whether technological eras should be seen as continuous or discontinuous are found in literature representing both sides of this dichotomy.⁶⁸

68. See, e.g., David Lyon, *Surveillance Technology and Surveillance Society*, in MODERNITY AND TECHNOLOGY 161, 161–63 (Thomas Misa, Philip Brey & Andrew Feenberg, eds., 2003) (claiming that modern and postmodern

We propose in a similar manner a law and technology theory that could balance the potentials for restrictive and beneficial forms of social structure against the limitations and potentials of human agency. Legal frameworks also need to simultaneously recognize the historic continuities in the development of technology as well as understand that the development of technology may have led to a world that is quite different than the past.⁶⁹

II. A SYNTHETIC LAW AND TECHNOLOGY THEORY

A. LEGAL ANALYSIS AT THE INTERSECTION OF LAW AND TECHNOLOGY

Unlike other academic disciplines, there has been no attempt to develop an overarching technology theory that could potentially inform legal scholarship and analysis. Rather, legal analysts approach law and technology matters through the use of compartmentalized (but often related) subject areas: the traditional intellectual property topics (copyright, trademarks, and patents), biotechnology law, new media, telecommunications and so on.⁷⁰ Perhaps the closest attempts to develop a law and technology theory relate to cyberlaw scholarship, although it typically only investigates technological change in the context of the Internet and other information technologies.⁷¹ As such, cyberlaw has been criticized for failing to provide insights that are helpful to illuminate the entire law.⁷² A better approach, we contend, would be to examine the ways that traditional doctrinal

forms of surveillance exist simultaneously).

69. Legal scholars often implicitly stake out positions on the transformation/continuation spectrum. For a treatment on the deficiencies of traditional legal regulation vis a vis the Internet because cyberspace is a “new space,” see David R. Johnson & David Post, *Law and Borders—The Rise of Law in Cyberspace*, 48 STAN. L. REV. 1367, 1400–02 (1996). For a view that traditional international law mechanisms will properly address legal issues involving the Internet in part because historical technological developments have presented similar regulatory challenges, see Jack L. Goldsmith, *Against Cyberanarchy*, 65 U. CHI. L. REV. 1199 (1998).

70. See Cockfield, *supra* note 1 at 386–88.

71. For an attempt to generate general principles applicable to cyberlaw activities, see Arthur J. Cockfield, *Designing Tax Policy for the Digital Biosphere: How the Internet is Changing Tax Laws*, 34 CONN. L. REV. 333, 348–59 (2002).

72. See Frank H. Easterbrook, *Cyberspace and the Law of the Horse*, 1996 U. CHI. LEGAL F. 207, 207.

categories of the law—torts, criminal law, contracts, property and so on—interact with the specific technologies.⁷³

While the various components of technology law compartments may not follow a coherent or sensible format,⁷⁴ these compartmentalized approaches will not go away any time soon. Doctrinal analysis evolves by building on existing law (and our understanding of existing law) by legislators (e.g., legislation) or judges (e.g., case law) and this analysis must be an internally coherent so that lawyers will be able to provide effective and consistent legal advice to their clients.⁷⁵ The ‘always looking back’ element of *stare decisis* in the common law, for instance, promotes stability in the law while simultaneously ‘always looking forward’ to adapt to ever-changing circumstances: “In order to know what it [the law] is, we must know what it has been, and what it tends to become.”⁷⁶ For these reasons, we do not suggest that a law and technology theory should replace the traditional technology law avenues of enquiry into technology law, assuming such a move would be feasible. Rather, the hope is that a law and technology theory could draw from these compartmentalized doctrinal boxes and reflect back on them with a broader perspective, so that legal analysis would be better informed by taking a fuller accounting of the interplay between technology and law.⁷⁷

73. See *id.* at 208. In response, Lawrence Lessig has argued that cyberlaw courses provide valuable insight into the limits of traditional law as a regulator of behavior. See Lawrence Lessig, *The Law of the Horse: What Cyberlaw Might Teach*, 113 HARV. L. REV. 501, 502 (1999).

74. See BRAD SHERMAN & LIONEL BENTLY, *THE MAKING OF MODERN INTELLECTUAL PROPERTY LAW, THE BRITISH EXPERIENCE, 1760–1911*, 3 (1999) (discussing the historical factors that shaped the traditional categories of intellectual property).

75. See, e.g., Scott Brewer, *Exemplary Reasoning: Semantics, Pragmatics, and the Rational Force of Legal Argument by Analogy*, 109 HARV. L. REV. 925, 926 (1996) (describing how the common law promotes reasoning by analogy to tie changing facts and circumstances to earlier judgments).

76. See, e.g., OLIVER WENDELL HOLMES, JR., *THE COMMON LAW* 1 (1881) (Little, Brown and Co., ed. 1923).

77. By studying law and technology issues as matters that should be relegated to sealed boxes, legal scholarship has arguably promoted a body of doctrine that is unfinished and, at times, inadequately informed. See, e.g., Dana R. Wagner, *The Keepers of the Gates: Intellectual Property, Antitrust, and the Regulatory Implications of Systems Technology*, 51 HASTINGS L.J. 1073, 1074–77 (2000) (noting that courts have struggled with limited success to apply legal precedents to disputes involving emerging technologies and “[i]n many cases, those law-and technology issues that have been addressed have

While broader theories of technology have not yet been developed, legal analysts at least implicitly stake out positions along the theoretical spectrum discussed in the previous Part. Consistent with Feenberg's views on the social sciences and public policy researchers, instrumental theory seems to dominate much law and technology analysis. Legal analysis often fails to take into explicit account the ways that technological developments may undermine or augment individual or broader social interests. There have nevertheless been some efforts to take a broader perspective towards the potential uses of technology to protect legal interests. As mentioned, cyberlaw research has explored some of the technologically-imposed limits of law as a potential regulator. Technological structures themselves now play roles formerly played by law: the dicta that 'code is law' represents such an explicit attempt to see how a certain form of technology—the software and hardware technologies that enable the Internet—can constrain or enable certain forms of individual behavior. Hence the code can potentially be directed by regulators in such a way to arrive at more optimal forms of policy.⁷⁸ More explicit evaluation of the interplay between technology and law is also seen in other areas, such as the ongoing debate surrounding whether legislatures or courts are better suited to deal with legal issues involving complex technological developments.⁷⁹

It has also been noted that a more coherent law and technology approach is needed to address 'recurring dilemmas'

been resolved only partially or inconclusively.”).

78. See LAWRENCE LESSIG, *CODE AND OTHER LAWS OF CYBERSPACE* 6 (1999); M. Ethan Katsh, *Software Worlds and the First Amendment: Virtual Doorkeepers in Cyberspace*, 1996 U. CHI. LEGAL F. 335, 341 (asserting that regulating technological developments of the Internet can be used to promote public interests); Joel R. Reidenberg, *Lex Informatica: The Formulation of Information Policy Rules Through Technology*, 76 TEX. L. REV. 553, 560–68 (1998) (discussing policies to regulate information flows).

79. See GUIDO CALABRESI, *A COMMON LAW FOR THE AGE OF STATUTES* 47 (1982) (arguing that administrative agencies have an inherent bias against adapting legislation to technology change). For an argument that, when technology is changing rapidly, courts should generally defer to legislators in part because legislators can enact clearer rules and solicit expert input, see Orin S. Kerr, *Congress, the Courts, and New Technologies: A Response to Professor Solove*, 74 FORDHAM L. REV. 779, 782–83 (2005). See also David Friedman, *Does Technology Require New Law?*, 25 HARV. J.L. & PUB. POL'Y 71, 85 (2001-2002); John D. Gregory, *Solving Legal Issues in Electronic Government: Jurisdiction, Regulation, Governance*, 3 CAN. J. L. & TECH. 1, 18 (2003) (discussing how governments need to carefully scrutinize technological developments to ensure that legislation affects the targeted areas to reduce the risk of spillover effects).

where traditional approaches have been inadequate, such as (1) the potential need for laws to ban, inhibit or encourage new technology; (2) reducing uncertainty in the application of existing legal rules as applied to new practices; (3) avoiding the possible over-inclusiveness or under-inclusiveness of existing legal rules as applied to new practices; and (4) remedying obsolescence of existing rules.⁸⁰ Under another view, the study of diffusion attributes would aid in determining the appropriate structure and timing of legal responses aimed at the optimal promotion of new technologies.⁸¹

B. RECONCILING THE TWO PERSPECTIVES INTO A SYNTHETIC THEORY

These efforts do not have an underlying legal theory that ties them together. So where to go from here? The previous Part identified a number of deficiencies associated with the instrumental and substantive perspectives, bearing on their potential utility for use in legal analysis. Instrumental theory tends to underappreciate the complex interaction between law, technology and human institutions that can lead to unanticipated and adverse social policy outcomes. The substantive theories seem to pay insufficient heed to the importance of human agency. They are too quick to assume that technological structures overwhelm the wills of technology producers and consumers.

The tone of substantive and critical theories of technology perhaps most closely resembles the critical legal theory scholarship of the 1970s and early 1980s. This is particularly apparent in their hostility to market forces, which these theories see as mainly preserving and promoting the power of

80. See Lyria Bennett Moses, *Understanding Legal Responses to Technological Change: The Example of In Vitro Fertilization*, 6 MINN. J. L. SCI. & TECH. 505, 517 (2005). See also Kieran Tranter, 'The History of the Haste Wagons': *Motor Car 1909 (VIC), Emergent Technology and the Call for Law*, 29 MELB. U. L. REV. 843, 875–879 (2005) (attempting to identify common links among legal responses to innovations).

81. See Gaia Bernstein, *The Paradoxes of Technological Diffusion: Genetic Discrimination and Internet Privacy*, 39 CONN. L. REV. 241 (2006) (discussing the relationship between privacy and a technology's diffusion process in the context of genetic discrimination and internet privacy). See also Gaia Bernstein, *Accommodating Technological Innovation: Identity, Genetic Testing and the Internet*, 57 VAND. L. REV. 963, 965 (2004) (proposing a "socially oriented approach that focuses on the impact of technological innovation on social structures, institutions, and values").

social elites. Both strains of thought are often informed by Marxist or post-Marxist philosophies.⁸² The substantive and critical theories of technology also resemble earlier critical legal theories such as those that challenged a slavish adherence to laissez faire economics.⁸³ These earlier legal theories, however, differ from substantive and critical theories of technology in their acceptance of market forces generally and in their recognition that those forces normally bestow beneficial outcomes on society. Their approach merely called for careful scrutiny to see that market forces are not abused.⁸⁴

The many problems surrounding the substantive theories disqualify them from serving as the sole theoretical structural base for a law and technology theory.⁸⁵ Rather, a synthesis of the instrumental/substantive views may offer help to legal analysts struggling with vexing legal challenges in an era of seemingly unlimited technological change.

Unlike the substantive theories or critical theories of technology, which find their philosophical roots in Marxism or post-Marxism, the synthetic theory is more closely aligned with liberal political philosophy or its more recent incarnations such as progressive liberalism or neo-liberalism, philosophies that are more compatible with much contemporary legal scholarship.⁸⁶ Classical liberalism is “generally viewed as a relatively coherent set of principles centering on the defense of individual rights and liberties, the security of property, and the notion of limited government.”⁸⁷ Liberalism recognizes man’s essentially selfish characteristics, but tries to promote the adoption of institutions that employ self-interested behavior to promote socially beneficial objectives, including, for example, pro-capitalist mechanisms for promoting wealth-creation that would fund public services. It would also encourage wealth

82. See James Boyle, *The Politics of Reason: A Critical Legal Theory and Local Social Thought*, 133 U. PA. L. REV. 685, 721–25 (1985); A. Michael Froomkin, *Habermas@Discourse.Net: Toward a Critical Theory of Cyberspace*, 116 HARV. L. REV. 749, 763 (2003).

83. See BARBARA FRIED, *THE PROGRESSIVE ASSAULT ON LAISSEZ FAIRE: ROBERT HALE AND THE FIRST LAW AND ECONOMICS MOVEMENT* 2 (1998).

84. *Id.*

85. *But see* Trosow, *supra* note 4, at 456–62 (claiming that Marx-informed social theory is the better tool for legal analysis dealing with information age issues).

86. Albeit often in an unexamined form.

87. KRISTIE M. MCCLURE, *JUDGING RIGHTS: LOCKEAN POLITICS AND THE LIMITS OF CONSENT* 3 (1996).

redistribution via progressive taxes.⁸⁸

The liberal project is, however, never complete and much legal scholarship emphasizes the need for new approaches to enhance the ideal of the meritocracy and promote solutions for even greater egalitarianism. Under classical liberalism, property rights serve as a foundation—a necessary prerequisite—for individual freedom (to a certain extent the reverse of the Marxist conception).⁸⁹ Above all, liberalism respects the rights of individuals to determine, and be responsible for, their own destiny. More contemporary visions of liberalism strive to develop institutions to promote this goal, while recognizing that there are serious impediments to its attainment, including family wealth disparities and systemic barriers such as racism.⁹⁰ As such, liberalism is loosely related to the proposed synthetic theory that strives to respect human agency via the instrumental perspective, while recognizing a need for the law to address the deeper and often less apparent ways that technological developments may be thwarting or inhibiting the attainment of just policy outcomes.

Finally, the proposed synthetic theory is consistent with some of the more recent works (e.g., the writings of Feenberg, Castells and STS) which recognize the complex interplay between society and technology. These works seek to find new matrices or forms of analysis to evaluate this interplay, in the interest of developing tools for inducing socially optimal technological developments.

C. USING SYNTHETIC THEORY TO INFORM LEGAL ANALYSIS

In a previous work, it was suggested that, in situations involving technological change, legislators and courts employ two implicit approaches when examining the relationship between law and technology.⁹¹ On the one hand, some legal

88. For discussion, see generally Arthur Cockfield, *Income Taxes and Individual Liberty: A Lockean Perspective on Radical Consumption Tax Reform*, 46 S.D. L. Rev. 8 (2001).

89. See Richard A. Epstein, *Liberty versus Property? Cracks in the Foundations of Copyright Law*, 42 SAN DIEGO L. REV. 1, 1 n.1 (2005).

90. Cockfield, *supra* note 78, at 61-65.

91. We also recognized that there will often be a significant blur between these two broad analytical approaches. See generally Cockfield, *supra* note 1, at 388-99 (discussing the difference between the “liberal” and “conservative” approaches). To a certain extent, the different approaches reflect the differing approaches to the interpretation of statutory and common law rules where

analysts use a flexible and forward-looking or “liberal” approach (not to be confused with the political philosophy of liberalism touched on earlier) that considers how the law can best protect interests and values when they are threatened by technological developments.⁹² Moreover, these analysts recognize that technological developments are embedded within economic, political, social, and other processes. This view is more closely related to the substantive theories of technology that scrutinize technological change within its broader economic/political/social context.

On the other hand, legal analysis can also be more rigid or “conservative” in the sense that it emphasizes the need to follow traditional doctrine without fully taking into account how the interplay between law and technological developments can undermine interests and values.⁹³ At times, this conservative approach is employed to try to promote legal consistency and certainty, always important objectives as they enable individuals who are potentially affected by the law to plan their activities to conform with perceived legal expectations. In this respect, the conservative approach may often be more closely aligned with the instrumentalists who view technological developments as separated from economic, political, cultural and social processes.

We have previously described how the law evolves by integrating these different perspectives. In times of technology change – when values and interests are in flux – the law will integrate the liberal approach and the more rigid or conservative approach in different ways.⁹⁴ We claim that the liberal orientation involving more creative approaches towards preserving traditional legal interests threatened by technological change will result in more internal stability

‘conservative’ judges apply rules without taking into full account the rule’s underlying purpose whereas a more ‘liberal’ or flexible judge would seek to promote the rule’s intended outcome. See generally CALABRESI, *supra* note 68, at 163–66.

92. See, e.g., Arthur J. Cockfield, *Jurisdiction to Tax: A Law and Technology Perspective*, 38 GA. L. REV. 85 (2003) (describing legal/policy responses to assist tax enforcement over remote sales encouraged by new technologies); Arthur J. Cockfield, *Transforming the Internet into a Taxable Forum: A Case Study in E-Commerce Taxation*, 85 MINN. L. REV. 1171 (2001) (discussing the ways that policy-makers confront situations where technological change challenges traditional tax policy principles).

93. For discussion, see Monroe E. Price & John F. Duffy, *Technological Change and Doctrinal Persistence: Telecommunications Reform in Congress and the Court*, 97 COLUM. L. REV. 976, 1012–15 (1997).

94. See Cockfield, *supra* note 1, at 410-13.

within the law, at least in the long run. The interests at stake throughout this process are *traditional* in the sense that the judges or policy-makers should strive to identify the most critical interests that the law currently protects. Admittedly, there is much room for debate concerning what constitutes a critical interest, determining an ultimate policy prescription. Because technologies themselves affect, change, and mask interests, the preservation of traditional interests will have a stabilizing effect on society.

The liberal approach transforms the law because judges and legal practitioners may subsequently deploy the new forms of legal analysis in areas of the law that have been relatively unaffected by technology change. For example, an expanded notion of consideration with respect to shrink-wrapped software (where consumers are not provided with all of the elements of the license contract until they access the CD within the shrink-wrapped box) may be deployed in other areas of contract law that do not examine situations involving new technologies.⁹⁵

To the extent that the conservative approach fails to properly protect legal interests threatened by technological change, a more severe correction will later take place to restore the law to its initial equilibrium. For example, U.S. constitutional protections against unreasonable state searches were initially interpreted not to cover police wiretaps of home telephones. This led to significant legal uncertainty until a correction took place forty years later when the U.S. Supreme Court reversed its earlier view.⁹⁶ This correction may form part of the ability of the common law to “work itself pure” by revising earlier precedents that have been found to lead to unjust outcomes.⁹⁷

This transformation of the law via the liberal approach, however, is not without drawbacks. For example, the liberal approach can weaken or undermine the common law principle of *stare decisis*, because old decisions may be less helpful as precedents for present or future cases. This in turn makes it

95. See, e.g., *ProCD Inc. v. Zeidenberg*, 86 F.3d 1447 (7th Cir. 1996) (rejecting traditional contract law analysis to uphold a license agreement involving shrink-wrapped software).

96. See *Olmstead v. United States*, 277 U.S. 438 (1928); *Katz v. United States*, 389 U.S. 347 (1967) (this issue is developed in more depth *infra* Part II.C).

97. See *Omichund v. Barker*, (1744) 125 Eng. Rep. 1310 (K.B).

more difficult for lawyers to predict the outcome of a case when they advise clients. As such, the liberal approach should be deployed only to the extent it can be demonstrated that technology change has or will likely destabilize traditional legal interests. Because of these problems, one goal of law and technology theory could be to assist in determining when interests are sufficiently threatened with destabilization to justify the invocation of the more liberal approach.

A synthesis of the two perspectives would inform the previous claims about the nature of law. Under this synthesis, when technological change undermines traditional interests that the law seeks to protect, legal analysis would become more contextual and forward-looking, and less deferential to traditional doctrine and precedents. This perspective does not seek to present a radical reconception of traditional legal analysis involving law and technology matters.⁹⁸ Rather, the theory simply requires a more explicit consideration of the interplay between law and technology and the ways technology can have a substantive impact on individuals and their legal interests apart from the technology's initial intended use. In other words, legal analysis informed by substantive theories can promote more just outcomes by taking a more critical examination of the ways that technological developments may be subverting legal interests that that law has traditionally sought to protect.

This framework can be broken down into the following parts and subparts:

Part 1

Determine whether the technological change is undermining traditional interests by:

- A. Identifying the traditional interest protected by law (e.g., business certainty, protection of innovator's rights) by resorting to traditional doctrinal analysis applicable to the affected area of technology law; and
- B. Assessing whether the interest is being unduly disrupted by technology change.

This initial step is more closely aligned with the

98. See, e.g., Richard A. Epstein, *Privacy, Publication, and the First Amendment: The Dangers of First Amendment Exceptionalism*, 52 STAN. L. REV. 1003, 1004-05 (2000) (describing how doctrinal analysis often requires the reconciliation of traditional legal principle in light of technological innovation); Monroe E. Price, *The Newness of New Technology*, 22 CARDOZO L. REV. 1885 (2001) (discussing how law responds to situations involving technology change).

instrumental approach. It calls for caution in using non-traditional legal analysis that might interfere with the development or adoption of certain technologies.⁹⁹ This approach does a better job at respecting human agency when compared to substantive or critical theories of technology. Instrumentalism sees consumers not as passive sheep, but as active determinants in the adoption, persistence, or obsolescence of technologies. It assumes that the role of law is to provide a legal framework, including a private property regime, that promotes technological development by rewarding innovation, which it is thought indirectly promotes the common good.¹⁰⁰ This view is also consistent with the research perspectives of Castells and STS that seek to understand the non-linear interplay among technology, individuals, and their societies without assuming this relationship to suggest that structure has overcome agency.¹⁰¹ Most importantly from a legal analyst's perspective, this initial step of the synthetic approach encourages careful analysis of the unique facts and circumstances of each legal issue in the interest of promoting a "just" result.

Part 2

If the first part of the analysis determines that technology change is disrupting traditional interests, the next step is to use more contextual analysis that:

- A. Scrutinizes the broader context of technology change and its potentially unanticipated adverse outcomes for the traditional interest as well as for other protected interests the law seeks to protect; and
- B. Seeks to find legal solutions to protect the traditional interest that are less deferential to precedent and traditional doctrine.

In this step, legal analysis can be better assisted by

99. To a certain extent, this part of the framework could be compared to the doctrinal method of constitutional interpretation. The second part more closely resembles the contextual balancing act of different interests under prudential interpretation, although it is recognized there are other potential interpretive approaches. For discussion on different interpretative techniques and forms of legal reasoning, see, e.g., PHILIP BOBBITT, CONSTITUTIONAL INTERPRETATION 11-22 (1991).

100. Substantive and critical theories of technology often reject this view.

101. This contrasts the warnings of other substantive theorists who make normative assumptions that modern technologies are often harmful to individuals and their communities.

substantive theories of technology, which emphasize the preservation of traditional interests in an attempt to combat technological structure that overwhelms and subverts these interests. For instance, according to the views propounded by the Frankfurt School of Critical Theory, Weber and Ellul, our seemingly technology-swamped modern world forms part of a larger (and less apparent) process moving toward the rationalization and bureaucratization of all human institutions. Accordingly, we measure legal rules against their potential impact on cold and rational outcomes such as efficiency – while neglecting just policy outcomes.

Finally, it is important to note there may be significant overlap in terms of the theoretical strands that could inform the two main parts of the analysis. For instance, the first part may require contextual analysis to determine what interest is being affected by the technology change. The challenge for the legal analyst will be to bring these two strands together into a synthetic theory, while simultaneously holding them apart. As previously mentioned, the tension identified by Ellul matches the tension that occurs when legal analysts confront technological change. On the one hand, the law often prefers to look “backward” to promote certainty and consistency, yet at times must simultaneously move “forward” by taking into account the effects of new technologies so that, in a seeming paradox, traditional interests will be protected.¹⁰² The proposed synthetic theory of law and technology is reflective of Ellul’s views in that it necessitates simultaneously bringing together the two theoretical strands—instrumental and substantive theories—while, in a way, also keeping them apart. It also reflects the work of Feenberg and recent research efforts by sociologists and others in areas such as STS.

D. CASE STUDY: STATE SEARCHES AND NEW TECHNOLOGIES

The following example concerning the use of new technologies to conduct state investigative searches shows how the proposed synthetic theory of law and technology could help to inform legal analysis.¹⁰³ Elaborate analysis of the use state

102. See the discussion in Part I.B.

103. The analysis in this section draws from Arthur J. Cockfield, *Who Watches the Watchers? A Law and Technology Perspective on Growing Government and Private Sector Surveillance*, 29 QUEEN’S L.J. 364 (2003) and Arthur J. Cockfield, *Protecting the Social Value of Privacy in the Context of State Investigations Using New Technologies*, 40 U.B.C. L. REV (forthcoming 2007).

searches and new technologies has been conducted elsewhere. This example is only meant to highlight a few of the relevant issues.¹⁰⁴

1. Background: Warrantless Wiretap Searches

In 1928, the Supreme Court was confronted with its first wiretap case.¹⁰⁵ The accused, Olmstead, had been convicted of the illegal sale, distribution, and import of alcohol from Canada. The conviction arose largely as a result of a wiretap at his business premises. The issue before the court was whether a warrantless wiretap search by the police violated the Fourth Amendment as a constitutionally impermissible state search. Looking back to precedents, the majority of the Court held that the police did not need to get a warrant for the wiretap because it did not involve a physical search of the household: “The [Fourth Amendment] does not forbid what was done here. There was no searching. There was no seizure. The evidence was secured by the use of the sense of hearing and that only. There was no entry of the houses or offices of the defendants.”¹⁰⁶

Brandeis, in his well-known dissent, took another approach. He identified the interest at stake, as well as the impact the new technologies would have on this interest: “The makers of our *Constitution* . . . conferred, as against the government, the right to be let alone—the most comprehensive of rights and the right most valued by civilized men. To protect that right, every unjustifiable intrusion by the government upon the privacy of the individual, whatever the means employed, must be deemed a violation of the Fourth Amendment.”¹⁰⁷ Brandeis recognized that, while wiretapping was designed to protect against crime, the over-extension of the new technology could lead to an environment that is less secure:

Subtler and more far-reaching means of invading privacy have become available to the government.

Discovery and invention have made it possible for the government, by

104. For a recent work that summarizes different scholarly perspectives, see KIRSTIE BALL ET AL., A REPORT ON THE SURVEILLANCE SOCIETY FOR THE INFORMATION COMMISSIONER BY THE SURVEILLANCE STUDIES NETWORK 38-48 (2006) (discussing, inter alia, the social consequences of surveillance).

105. See *Olmstead v. United States*, 277 U.S. 438 (1928).

106. *Id.* at 464.

107. *Id.* at 478.

means far more effective than stretching upon the rack, to obtain disclosure in court of what is whispered in the closet. Moreover, "in the application of a Constitution, our contemplation cannot be only of what has been, but of what may be." The progress of science in furnishing the government with means of espionage is not likely to stop with wire tapping. Ways may some day be developed by which the government, without removing papers from secret drawers, can reproduce them in court, and by which it will be enabled to expose to a jury the most intimate occurrences of the home. Advances in the psychic and related sciences may bring means of exploring unexpressed beliefs, thoughts and emotions.

....

... As a means of espionage, writs of assistance and general warrants are but puny instruments of tyranny and oppression when compared with wire tapping.¹⁰⁸

Brandeis implicitly followed the analytical framework discussed above. He accepts that law enforcement officials have legitimate public security interests in developing and deploying new technologies to protect the public. But once he determined that important interests such as the right to privacy were being subverted, he was ready to explore, in a manner more consistent with the substantive theories discussed above, how the new technologies would in fact make the public less secure in the long run. "Experience should teach us to be most on our guard to protect liberty when the government's purposes are beneficent The greatest dangers to liberty lurk in insidious encroachment by men of zeal, well-meaning but without understanding."¹⁰⁹ Almost forty years later, the majority of the Court adopted Brandeis' views.¹¹⁰

Digitization and Modern Surveillance Technologies

Brandeis's approach in *Olmstead* remains particularly relevant today in an era when surveillance technologies have become increasingly sophisticated, with the corresponding potential to invade privacy interests. New software programs allow police or intelligence officers to sift through electronic information, including Internet Service Provider ("ISP") traffic data, emails, and website visits. They can remotely install software on the hard drive of a suspect's computer; once

108. *Id.* at 473-76.

109. *Id.* at 479.

110. *See Katz v. United States*, 389 U.S. 347, 361 (1967). Based in part on the reasoning in this case, the U.S. Supreme Court more recently held that police use of thermal imaging to scan for the use of high intensity grow lamps inside private residences constitutes an impermissible search. *Kyllo v. United States*, 533 U.S. 27 (2001).

installed, the program logs all keystrokes on the computer. Wireless communication devices such as cell phones also provide records of the physical location of the devices (along with the location of the devices' users), which can be accessed by the state.

In addition to government efforts, the private sector has embraced technological developments that enhance the ability of businesses to collect detailed information on customers or employees. Businesses have always tracked their customers' behavior (e.g., through credit card purchases) and sold this information to third parties. So, it is not so much a question of novelty, but more a question of scale and context. Information technology developments now permit an enormous quantity of detailed transactional information to be gathered and stored, and for relationships to be drawn between formerly discrete identities.

At some point, the surveillance technologies could become integrated with large private sector and government databases.¹¹¹ Many newly proposed government initiatives would link government databases with industry databases, and could create powerful tools for a surveillance society. The merged databases could contain detailed personal information about individuals, including their email records, health problems, credit history and credit card purchases, criminal records and interactions with the police, employment histories, telephone records, television shows watched, vacation destinations, and website visits. Under the guise of national security, these merged databases could be scrutinized by a government employee without the knowledge of the individual in question. The potential threat to traditional privacy interests is clear.

The global push towards efficiency and security within surveillance networks can be critiqued through the works of substantive theorists like Ellul. Ellul warned of the potentially dehumanizing effects of the trend towards bureaucratization and rationalization in the modern age. In Ellul's view, in a world that succumbs to such "technique," things such as emotions, aesthetics, and passions are given little significance. In the technological society, we require that our welfare,

111. See, e.g., INFORMATION COMMISSIONER'S OFFICE, WHAT PRICE PRIVACY? THE UNLAWFUL TRADE IN CONFIDENTIAL PERSONAL INFORMATION 7-10 (2006).

defense, tax, immigration, and health systems be efficient; the operational goals of these systems must never be skewed by emotions or biased viewpoints.

As Ellul says, “no demands can be made that run contrary to technological growth.”¹¹² Ellul in particular may not have been surprised by the use of new surveillance technologies to respond to the threat of terrorism. He suggested that, in the modern age, we believe that technologies will solve all the dilemmas we face in life. We turn to a new technological solution and perpetuate an increasingly complicated technological cycle, looking at means rather than ends, seeking to solve problems without questioning the nature of those problems. In this process, human beings become part of the machine, themselves components of (and resources for) the technological society.¹¹³ Accordingly, Ellul might well suggest that the deployment of enhanced surveillance technologies and networks should be carefully monitored to avoid subverting traditional interests such as freedom of expression.

Ellul describes himself as a hopeful pessimist, calling on people to exploit the cracks in the technological system. He urges people to hold on to the possibility of human freedom over and against a technological society that increasingly attempts to mold human beings into its own image. Hence, he might hope that a government’s increasing use of surveillance networks could be reversed at some point.

2. New Anti-Terrorism Laws and Traditional Legal Protections Against State Searches

Yet instead of a legal backlash against increased government surveillance, we have seen that the enhanced use of surveillance networks by governments and private actors has been accompanied by legal changes that reduce or remove traditional safeguards against state searches. As a result of terrorist attacks on the United States on September 11, 2001, as well as subsequent attacks in other countries, the United States and other governments have modified their laws to facilitate surveillance of their citizens, residents, and foreign individuals. These legal changes include: making it easier to obtain warrants to use electronic surveillance against terrorist suspects; abolishing the need to obtain warrants in cases of perceived threats to national security; reducing legal

112. See ELLUL, *supra* note 47, at 135.

113. *Id.* at 137.

thresholds to obtain electronic records; enhancing the government's ability to share personal information among different government agencies, foreign governments, and the private sector; and increasing the government's abilities to deport residents for violations of immigration laws.¹¹⁴

While the anti-terrorism laws were subject to explicit (albeit limited) evaluation prior to implementation, less attention has been paid to their interplay with technological developments that surround these policy changes. The problem is that such inattention to technological developments leads to an increased risk that unanticipated adverse social outcomes will take place—that the technology will trap us within Weber's "iron cage."

3. Exploring the Social Value of Privacy

Intrusive surveillance practices are normally rationalized under the view that reduced privacy is necessary to promote public security. But, like Brandeis, we should be wary of this view. In fact, the traditional privacy/security dialectic in public policy circles is increasingly viewed as unhelpful. By drawing from substantive perspectives of technology, we can derive a more accurate assessment of the risks associated with reduction of legal protections in an era of enhanced surveillance technologies. Under the substantive view, legal analysis should recognize the "public" or "social" aspect of privacy, which is society's interest in preserving privacy apart from the interest of a particular individual's interest.¹¹⁵ Priscilla Regan, for instance, argues that privacy serves purposes beyond those that it performs for a particular individual. She notes that one aspect of the social value of privacy is that it sets boundaries for the state's exercise of power. Such boundaries, for example,

114. For a discussion of the legality of the National Security Agency's warrantless wiretapping of international communications program, see *ACLU v. National Security Agency*, No. 06-CV-10204, slip op. at 28-33 (D. Mich. Aug. 17, 2006) (holding that the program is constitutionally impermissible, as it violates rights to privacy and free speech). In Canada, a similar program was authorized by Bill C-36, the Anti-Terrorism Act of 2001, which gave new warrantless surveillance powers to an intelligence agency called the Communications Security Establishment. The Anti-Terrorism Act of 2001, R.S.C., ch. 36 (2001).

115. Earlier views on privacy tended to emphasize individualized aspects of privacy, such as individual control over personal information accessible by third parties. See generally ALLAN F. WESTIN, *PRIVACY AND FREEDOM* 7 (1967).

underlie freedom of speech and association within a democratic political system.¹¹⁶ Under this view, even if privacy becomes less important to certain individuals, it continues to serve other critical interests in a free and democratic state (e.g., the need to protect political dissent) beyond those that it performs for a particular person. As such, the preservation of the social value of privacy is consistent with the promotion of long-term security interests.

Consistent with this view, research by sociologists, political scientists, and others explores how technological advances in surveillance heighten the risk of unanticipated adverse social consequences.¹¹⁷ These outcomes include repression of political dissent as surveillance technologies are used to target identifiable groups such as Muslims, without evidence of individual wrongdoing. This sort of profiling tends to lead to social alienation of the targeted group, which increasingly leads to an “us versus them” mentality. Further, pervasive and unseen scrutiny by state agents carries the potential for inhibiting freedom of expression as individuals fear their speech and actions *could* be monitored by the police.

Moreover, political complacency may set in to the extent that ubiquitous surveillance reduces or eliminates any subjective expectation of privacy and as citizens refuse to question more and more state scrutiny. Finally, nations become less democratic when citizens have greater difficulty in holding state agents accountable for their actions—technological and legal developments increase the risk that police and intelligence officers will abuse their new surveillance powers without being detected. The failure of some legal analysis to consider fully the interplay between law and technology in the

116. Regan divides privacy into three social values: (1) a common value where all persons have a common interest in a right to privacy although they may differ on views on the specific content of privacy; (2) a public value where privacy is instrumentally valuable to a democratic political system; and (3) a collective value where privacy is seen as a collective good that, from an economist’s perspective, cannot be efficiently provided by the marketplace. See PRISCILLA REGAN, LEGISLATING PRIVACY: TECHNOLOGY, SOCIAL VALUES, AND PUBLIC POLICY 221-230 (1995). See also COLIN J. BENNETT & CHARLES D. RAAB, THE GOVERNANCE OF PRIVACY: POLICY INSTRUMENTS IN GLOBAL PERSPECTIVES (2003); Robert C. Post, *The Social Foundations of Privacy: Community and Self in the Common Law Tort*, 77 CAL. L. REV. 957 (1989).

117. See, e.g., David Lyon & Elia Zureik, *Surveillance, Privacy, and the New Technology*, in COMPUTERS, SURVEILLANCE, AND PRIVACY 1, 1-17 (David Lyon & Elia Zureik eds., 1996); JAMES R. BENIGER, THE CONTROL REVOLUTION: TECHNOLOGICAL AND ECONOMIC ORIGINS OF THE INFORMATION SOCIETY (1986).

context of state surveillance and privacy raises the risk that important democratic interests will be undermined. In the long run, this failure could make our societies less secure. Incorporating perspectives from substantive theories of technology, our proposed synthetic approach will better clarify the interests at stake so that legal rules can be designed and interpreted to ensure that these social privacy interests remain adequately protected.

CONCLUSION

Legal scholars have not yet developed a broad theory of technology, perhaps because of a felt need to examine legal issues under particular sets of facts and circumstances. The traditional compartmentalized approach that scrutinizes niche doctrinal areas of technology law (e.g., patent law or copyright law) or the impact of specific technologies (e.g., cyberlaw, new media, or biotechnology) may be inhibiting a fuller exploration of the nuanced interplay between law and technology and may be reducing the chances of attaining sound policy outcomes. A general theory of law and technology could teach us how to address situations where legal interests appear to be threatened by technological change, while still respecting the need for individualized assessment of specific legal matters.

In contrast to legal scholarship, there are ongoing efforts within other academic disciplines to explore general theories of technology. For instance, writings by sociologists tend to emphasize the potentials of human agency in light of technological structures that may (as some accounts suggest) overcome the potential for human autonomy or freedom. Sociological research also focuses on whether current conceptions of technology can be understood as maintaining a historical continuity or exists as something definitively discontinuous with previous experiences of new technologies. Instrumental theories largely fail to explicitly consider the role of technology in determining or subverting individual and social affairs in unanticipated ways. Substantive theories, on the other hand, downplay the role of human agency in technological developments and are informed by somewhat dated Marxist or post-Marxist perspectives.

A synthesis incorporating the better elements of the two theories could help to define the ambit and scope of a comprehensive theory of law and technology theory. The instrumentalist approach reminds legal analysts that each

legal solution must be carefully scrutinized under its own facts and circumstances to determine whether technology is unduly subverting interests that the law has traditionally protected. Once a determination is made that technology is in fact harming traditional interests, the substantive approach can inform analysis that seeks a broader contextual (i.e., less deferential to precedent) understanding of potential legal solutions that will preserve the traditional interests.

The proposed synthetic approach should be seen as consistent with most existing law and technology analysis. We hope to make this analysis more explicit in its consideration of the ways that the dynamics of technological change can lead to unanticipated and adverse policy outcomes. Indeed, a closer scrutiny of these dynamics may also help to illuminate the entire legal corpus, possibly even shedding light on ways that technological change transforms the law itself.